

1907.

NEW ZEALAND.

FIRES ON WOOL-SHIPS

(REPORT OF ROYAL COMMISSION TO INQUIRE INTO); TOGETHER WITH MINUTES OF PROCEEDINGS AND EVIDENCE, AND EXHIBITS.

Presented to both Houses of Parliament by Command of His Excellency.

COMMISSION.

PLUNKET, Governor.

To all to whom these presents shall come, and to Alexander McArthur, of Wellington, Stipendiary Magistrate, Harold Sewallis Blackburne, of Wellington, Nautical Adviser to the Marine Department, and Walter George Foster, General Manager of the Assets Realisation Board, Wellington.

WHEREAS it is provided by section 2 of "The Commissioners Act, 1903," that the Governor in Council may appoint any person or persons to be a Commission to inquire into and report, amongst other things, upon any question arising out of the administration of the Government, or the working of any existing law :

And whereas it is expedient to appoint a Commission to inquire into and report upon the cause of fires on ships whose cargo is wholly or partly composed of wool, flax, tow, or other combustible material, and as to what such Commission considers necessary to insure the shipment of such cargo and its conveyance from New Zealand to its destination in such a condition that it will not be liable to fire from spontaneous combustion or any other cause, and also as to the necessity or expediency of amending the existing law with respect thereto :

Now, therefore, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, in exercise of the powers conferred by "The Commissioners Act, 1903," and of every other power and authority enabling me in this behalf, and acting by and with the advice of the Executive Council of the said colony, do hereby appoint you, the said

ALEXANDER McARTHUR,
HAROLD SEWALLIS BLACKBURNE, and
WALTER GEORGE FOSTER,

to be a Commission by all lawful ways and means to examine and inquire into every matter or thing touching the premises in such manner and at such times as you deem expedient.

And for the better enabling you to carry these presents into effect you are hereby authorised and empowered to make and conduct any inquiry under these presents at such place or places as you may deem expedient.

And you are hereby authorised and empowered to have before you and examine all books, papers, plans, and writings whatsoever as you deem necessary for your information on the subject-matter of this inquiry, and also to have before you and examine on oath or otherwise, as you may be allowed by law, all witnesses and other persons whom you judge capable of affording you any information touching or concerning the premises.

And I do further require you, within thirty days from the date of these presents, or as much sooner as the same can conveniently be done (using all due diligence), to report to me under your hands and seals your several proceedings, and your opinion touching the premises.

And I do further declare that these presents shall continue in full force and virtue, and that subject thereto you shall and may from time to time proceed in the subject-matter hereof at such times and within the prescribed limits as you judge convenient.

And I do hereby further declare that the said Alexander McArthur shall be Chairman of the Commission, and that these presents are issued under and subject to the provisions of "The Commissioners Act, 1903," and "The Commissioners Act Amendment Act, 1905."

Given under the hand of His Excellency the Governor, this second day of August, one thousand nine hundred and six.

WM. HALL-JONES.

Approved in Executive Council.

J. F. ANDREWS,
Acting Clerk of the Executive Council.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, to conduct and continue the inquiry provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby revived and confirmed to the thirtieth day of September next.

Approved in Council.

ALEX. WILLIS,
Clerk of the Executive Council.
27th August, 1906.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, to conduct and continue the inquiry therein provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby revived and confirmed to the twenty-first day of October next.

Approved in Council.

ALEX. WILLIS,
Clerk of the Executive Council.
2nd October, 1906.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, or in the absence of any one of them, then such two of the said Commissioners as may be present, anything in the aforesaid Commission notwithstanding, to conduct and continue the inquiry therein provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby amended, revived, and confirmed to the thirtieth day of November, one thousand nine hundred and six.

In Executive Council.

ALEX. WILLIS,
Clerk of the Executive Council.
22nd October, 1906.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, or in the absence of any one of them, then such two of the said Commissioners as may be present, anything in the aforesaid Commission notwithstanding, to conduct and continue the inquiry therein provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby amended, revived, and confirmed to the thirty-first day of December, one thousand nine hundred and six.

In Executive Council.

ALEX. WILLIS,
Clerk of the Executive Council.
3rd December, 1906.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, or in the absence of any one of them, then such two of the said Commissioners as may be present, anything in the aforesaid Commission notwithstanding, to conduct and continue the inquiry therein provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby amended, revived, and confirmed to the thirty-first day of January, one thousand nine hundred and seven.

In Executive Council.

ALEX. WILLIS,
Clerk of the Executive Council.
7th January, 1907.

PLUNKET, Governor.

IN pursuance and exercise of every power and authority enabling me in this behalf, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, by and with the advice and consent of the Executive Council of the said colony, do hereby empower Alexander McArthur, Harold Sewallis Blackburne, and Walter George Foster, the Commissioners named in the within-written Commission, or in the absence of any one of them, then such two of the said Commissioners as may be present, anything in the aforesaid Commission notwithstanding, to conduct and continue the inquiry therein provided for at Wellington, or at any other place in the said colony they may think necessary, and in all other respects do hereby revive and confirm the within-written Commission, and extend the time within which report may be made under the same as hereby amended, revived, and confirmed to the thirtieth day of April, one thousand nine hundred and seven.

In Executive Council.

ALEX. WILLIS,
Clerk of the Executive Council.
16th February, 1907.

REPORT.

To His Excellency the Right Honourable William Lee, Baron Plunket, Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Knight Commander of the Royal Victorian Order, Governor and Commander-in-Chief in and over His Majesty's Colony of New Zealand and its dependencies.

MAY IT PLEASE YOUR EXCELLENCY.

We, your Commissioners appointed on the 2nd day of August, 1906, "to be a Commission by all lawful ways and means to examine and inquire into every matter or thing in relation to the cause of fires on ships whose cargo is wholly or partly composed of wool, flax, tow, or other combustible material, and as to what such Commission considers necessary to insure the shipment of such cargo and its conveyance from New Zealand to its destination in such condition that it will not be liable to fire from spontaneous combustion or any other cause, and also as to the necessity or expediency of amending the existing law with respect thereto," have now the honour to submit this our final report.

Your Commissioners have, under their hands dated the 12th day of October, 1906, submitted to Your Excellency an interim report (a copy of which is annexed hereto) embodying certain recommendations for Your Excellency's consideration, which interim report your Commissioners now desire to confirm.

In order that the reasons for the appointment of this Commission may be the more readily understood, it will be necessary to refer to several cases of fires in vessels whose cargo has been wholly or partly composed of wool, flax, tow, or other combustible material, and to consider the causes of such fires in so far as they have been ascertained.

The following cases may be referred to:—

"BELTANA," BARQUE.

(Exhibits Nos. 14, 15, pp. xxvi, xxviii, xxix.)

On Sunday, the 15th December, 1889, the "Beltana," barque, Captain Bright, bound from Port Augusta (South Australia) to London with a cargo of wool, put into Lyttelton with her cargo on fire. The vessel had sailed from Port Augusta on the 22nd November, 1889, and the fire was first noticed on the 9th December, and she reached Lyttelton six days after the fire was first discovered. The fire was extinguished by means of chemicals, and the vessel's hatches were opened on Saturday, the 21st December, six days after she had arrived in port. After the discharge of the cargo it was found that several bales were quite damp in the interior; these were bales of locks and pieces, and the wool itself was saturated with urine and dung.

The finding of the Court of Inquiry into the cause of this fire was as follows: "Spontaneous combustion of greasy wool. Probably damp-weather shearing or wool left uncovered in wool-sheds, and imbibed moisture from the night's dew, and put in clean dry woolpacks, making no outward appearance of dampness."

"LEADING WIND," SHIP.

(Exhibit No. 15, p. xxix.)

On the 22nd January, 1891, the American ship "Leading Wind" was found to be on fire alongside the wharf in Auckland. The ship at the time was partly loaded with a cargo of New Zealand flax and kauri-gum for New York. The ship was scuttled in Freeman's Bay, Auckland, on the 23rd January, and the fire extinguished.

The Court of Inquiry into the cause of this fire found that "cargo of vessel took fire on the 21st January, 1891, alongside Auckland wharf, but cannot say from what cause."

A rider was added by the jury which stated "that, there being such a diversity of opinion as to spontaneous combustion in flax, either well or badly dressed, that it devolves on the Government to take the matter in hand and prove by practical tests whether such exists or not."

The question of the possibility of spontaneous combustion in phormium fibre was referred by the Government to Sir James Hector, who reported on the 5th June, 1889. This report will be found in full in Exhibit No. 1, pp. i and ii. We extract the following:—

“ There is no record of any conflagration that was clearly proved to have originated from spontaneous combustion of phormium fibre in bales. It is possible that if the fibre is baled up in a rotten condition, or so damp as to supply the oxygen required to promote such fermentation, the rotting would go on; but the rise in the temperature would be controlled by the compression that had been applied to the bales, as in the case of manufacture of ensilage from green fodder, in which the temperature is kept to 135° Fahr. simply by pressure. In the case of the fire aboard the s.s. ‘ Mariposa,’ there does not appear to be the slightest evidence that it originated from heat generated in the centre of the bale. It seems unfortunate that the question should have been raised, as there is nothing to show that phormium fibre is more prone to take fire than such articles as coal, greasy wool, cotton, manila, sisal, jute, kauri-gum, and many other articles of commerce that are carried without question.”

“ CANTERBURY,” SHIP.

(Exhibit No. 15, p. xxx.)

On the 3rd March, 1898, a fire was discovered to have broken out on board the ship “ Canterbury ” while lying at the Dunedin wharf loading a cargo of wool and flax. The master of the vessel, in giving evidence, said, “ I am of opinion, from careful observation, that the fire originated in the tier of flax-bales. I cannot account for it in any other way than by spontaneous combustion, but I did not notice the flax to be damp when I took it in.”

The Court of Inquiry found that “ The vessel caught fire while lying at the wharf loading for London with wool and flax. No doubt fire originated from spontaneous combustion in flax.”

“ STRATHGRYFE,” SHIP.

(Exhibit No. 6, p. xvi.)

The ship “ Strathgryfe ” left Sydney, New South Wales, on the 8th March, 1901, for London, with a full cargo consisting of wheat (in bags), concentrates (in bags), tallow, and about ten thousand bales of wool, both scoured and greasy, some dumped and some undumped. On Thursday, the 21st March, the ship was discovered to be on fire, and she put into Dunedin on the 24th March, where the fire was eventually extinguished. In the course of his evidence before the Court of Inquiry the master said, “ As to the origin of the fire, we traced the seat of it to scoured wool in the second tier from the bottom. I think, from the way in which the fire gained heat after it was first noticed, that it must have been smouldering when we left Sydney, though there was no sign of it even in the ventilators. In answer to your question as to what means can be taken to guard against fires, I can only suggest that careful examination should be made of every bale of wool shipped, if possible, by a wool expert. My opinion—and it is, as you know, very generally held—is that the principal risk is with scoured wool, especially fellmongers’, which may be shipped in an imperfectly dried state. I may say that we stowed the scoured wool next to the wheat so as not to stain the latter; that is how I know that the wool destroyed, and which was apparently the first to catch fire, was scoured and not greasy.”

The Court of Inquiry found that “ The vessel caught fire in lower hold, probably from spontaneous combustion of scoured wool shipped in a damp state.”

“ WAIMATE,” S.S.

(Exhibit No. 15, p. xxxi.)

On the 3rd December, 1901, a fire was discovered to have broken out in No. 4 hold, between decks, on the steamship “ Waimate ” whilst the vessel was loading in Napier Roadstead. The vessel at the time was loading with wool, flax, tallow, and New Zealand produce for London.

The Court of Inquiry found “ That the fire broke out in the flax stowed in No. 4 hold, between decks, but there is no evidence to show how same originated.”

“ JESSIE OSBORNE,” BARQUE.

On the 5th March, 1902, a fire was discovered to have broken out on board the barque “ Jessie Osborne ” whilst loading a cargo of wool, flax, and tow at the wharf in Wellington Harbour.

In the course of his evidence before the Court of inquiry into the cause of the fire the master said, "There was no appearance of any of the bales of wool having had fires inside. I could not say from my observation whether the fire started in the wool or in the tow. The bottom tier of wool had no sign of fire in it. The fire was all on top. The tow was burned all round the top and sides of some bales. No bales of tow were fully consumed, only partly."

The Court of Inquiry found "That there is not sufficient evidence to justify any finding as to how the fire originated."

"TURAKINA," S.S.

(Exhibit No. 15, p. xxxi.)

On the 27th September, 1905, a fire was discovered in No. 4 hold of the steamship "Turakina," lying at the Glasgow Wharf, Wellington Harbour. The fire was extinguished by the ship's chemical fire-engine. The cargo consisted of wool, flax, tow, and sundry New Zealand produce intended for shipment to London. On discharging the cargo from the seat of the fire, it was ascertained that the fire originated in some flax and wool shipped aboard at the Bluff. About ninety bales of flax and wool were damaged.

The following is the finding of the Collector of Customs: "That the wool and flax was found to be on fire in No. 4 hold, 'tween decks. As to cause, I cannot give an opinion, unless to spontaneous combustion of the flax or wool."

"PITCAIRN ISLAND," BARQUE.

This barque was destroyed by fire at sea. She had a cargo of wool and tow. We have no evidence to show how the fire was caused.

The Court of Inquiry at Valparaiso found, "The cause of the accident is not known: strong opinion the disaster caused by tow."

"PERTSHIRE," S.S.

(Exhibit No. 29, pp. lii and liv.)

The fire on this vessel occurred early in June, 1906, before her arrival at Las Palmas on her voyage to London with a cargo of New Zealand produce. The fire appears to have been confined to No. 4 hold, and was extinguished by water introduced into the hold after about two hundred and fifty bales of wool and tow had been jettisoned. On the vessel's arrival in London on the 11th June, 1906, Lloyd's surveyor found the cargo remaining in the affected hold considerably damaged by water, but was unable to explain the cause of fire.

"WAIMATE," S.S.

(Exhibit No. 29, pp. liv, lv.)

The steamship "Waimate" loaded a cargo of New Zealand produce for London. A fire was reported to have broken out in the flax and tow cargo at sea on the 16th June, 1906. Upon the vessel's arrival in London she was surveyed by Lloyd's surveyor, but they did not investigate the cause of the fire. This vessel was equipped with a sulphur-dioxide fire-extinguishing machine, and was by its use able to keep the fire under for about ten days. When she arrived at Plymouth the temperature of the holds was normal. After taking on board 6 cwt. of sulphur for the machine, she was able to leave on the 8th June for London, where on discharge it was found that the damage to the vessel and cargo was very slight in comparison to what had occurred on other vessels which had caught fire.

"GOTHIC," S.S.

(Exhibit No. 3, pp. lii-lv; Exhibit No. 35, pp. lxi-lxiii.)

The steamship "Gothic" loaded a cargo of New Zealand produce for London. All went well until the vessel had left Teneriffe, when smoke began to issue from No. 3 hold. This hold was accordingly entered, when, on rummaging, the cause of the smoke was found to be certain bales of slipped wool, which were heated and smoking. These bales were at once removed and thrown overboard, and the hold, after examination, was closed, and nothing further happened until the ship was off the Lizard, when smoke began to issue from No. 4 hold. On opening this hold white vapours or steam issued, immediately followed by such dense volumes of black smoke that it was impossible to enter the hold or to check the fire by ordinary means,

and it was decided to drown the hold. When this was partially effected, however, the ship took such a serious list that it was resolved to send the passengers ashore at Plymouth, and the ship was beached and the hold filled up. The water being subsequently pumped out, the voyage was continued to London, where the hold was entered and cleared.

“RIMUTAKA,” S.S.

(Exhibit No. 35, pp. lxiii–lxviii.)

The steamship “Rimutaka” loaded a cargo of New Zealand produce for London, where she arrived on Friday, the 22nd June, 1906. On Saturday night, the 23rd June, the day after the vessel had berthed in the Victoria Dock, a fire broke out in the after-hold. The cargo in the upper ’tween-decks had been discharged, and the seat of the fire was ascertained to be in the lower hold amongst the cargo which had not at that time been reached. The ship’s chemical engine was set to work on the outbreak being discovered, and, according to the statement of the ship’s officers, had practically smothered the fire, but at this juncture the shore fire brigade arrived on the scene, and, in spite of the remonstrances of the officers of the ship, removed the hatches and poured water into the hold through the hatches. The result was far greater damage by water than by fire. The fire was eventually subdued, and the discharge of the cargo proceeded.

In 1894 a Select Committee of the Legislative Council of New Zealand was set up to investigate the shipping of wet wool. The report of the Committee will be found in Exhibit No. 1, p. 1. The report was to the effect that, although spontaneous combustion might arise in bales of wool shipped in a wet condition, yet the Committee had not been able to obtain any direct evidence of wool having been seen in flames or in a state of glowing combustion.

Prior to the loss of the “Pitcairn Island” and the outbreaks on the steamships “Perthshire,” “Gothic,” and “Rimutaka,” fires on board ship which had been attributed to spontaneous combustion were normal, and did not call for special comment. A special committee of Lloyd’s, which was appointed on the 26th November, 1903, to consider the question of fires on ships, collected a considerable amount of valuable information on the subject, and reported to Lloyd’s. This report will be found in Exhibit No. 22, p. xlvi, and is of a most interesting nature.

The recurrence in a short space of time of fires in vessels laden with New Zealand produce caused alarm among underwriters, shippers, and shipowners, and on the 31st July, 1903, the Secretary of Lloyd’s, London, wrote to the Secretary of the Board of Trade, London. This important letter, which has special reference to vessels loaded with wool coming from New Zealand, may be found in Exhibit No. 27, p. li.

Another important letter which calls for attention is one written by the Produce Commissioner in London to the High Commissioner for New Zealand, in which he states that “the occurrence within a short space of time of the series of fires on board vessels carrying cargo from New Zealand has caused widespread concern in shipping and commercial circles.” (Exhibit No. 9, p. xx.)

CAUSES OF THE FIRES.

In dealing with the probable causes of fires, it will be necessary to separate the classes of cargo in which it has been presumed that the outbreaks occurred.

Flax and Tow.

Throughout the whole of the investigations of your Commissioners, no single case of spontaneous combustion has been indisputably proved to have taken place in either flax or tow. On the contrary, the weight of evidence has been to prove that spontaneous combustion has not occurred in flax or tow. We have already drawn attention to the evidence of Sir James Hector in Exhibit No. 1, p. ii: “There is no record of any conflagration that was clearly proved to have originated from combustion of phormium fibre in bales.”

In the course of a report by the Produce Commissioner to the High Commissioner for New Zealand in London on the subject of the fires which had taken place in vessels carrying cargoes of wool, flax, and tow, he writes (Exhibit No. 9), “It is satisfactory to report that the hemp cargo, which has generally borne a bad character for damage

with the shipping people, has come out of the above-recorded events with a clean sheet. In no case has any sign of spontaneous combustion been discovered in a bale of hemp." Among cases of actual fire which have taken place in cargoes of flax, the "Leading Wind" fire brought forth a controversy as to the possibility of spontaneous combustion arising in such cargo, and an extract from the *Australasian Banking and Insurance Record* on the subject may be referred to (Exhibit No. 15, pp. xxix, xxx). The following may be quoted from the article: "If conjecture is allowable upon such a matter which is at present shrouded in mystery, it seems more rational to suspect some of the more common causes of fire than to set up a theory of spontaneous combustion with respect to a material which has been stored and shipped for the past fifty years without producing a single authenticated case."

Direct testimony bearing on this subject may be found in the evidence of Messrs. Scales (pp. 14 and 18), Chaytor (p. 67), Mardon (p. 67), Wakely (p. 68), Coley (p. 69), and Seiffert (p. 70).

In the course of his evidence before the Select Committee of the Legislative Council inquiring into the subject of shipping wet wool, Mr. William Ferguson, Secretary to the Wellington Harbour Board, said (Exhibit No. 1, p. x), "I made an experiment with a bale of rejected flax. It was slightly heated when I got it. I put it into an iron tank and put it away in a warm place, closing out the air to see whether it would generate sufficient heat to burst into flame. It simply rotted. The conditions were somewhat the same as on shipboard. There is no risk of sudden fire from damp flax."

In view of all the circumstances, your Commissioners are of opinion that the probability of flax or tow having through spontaneous combustion been the cause of any of the fires which have occurred upon vessels leaving New Zealand with such cargo on board is negatived, although on occasions there have been suspicions. The highly inflammable nature of flax or tow renders it exceedingly liable to fire from extraneous causes, and that liability is increased if by any means there is a mixture of oil with the flax or tow.

The question of covering tow for shipment has been prominent throughout this investigation, and the evidence as to the utility of the practice is somewhat conflicting. It has been contended on the one hand that covering tow with jute hessian minimised the possibility of fire from extraneous causes, while on the other hand evidence has gone to show that as jute hessian in itself is of an inflammable nature, the utility of such covering is doubtful. At some of the ports of the colony the practice of covering tow with jute hessian prevails, while at other ports it is shipped without covering of any kind. In our opinion it would be an advantage if bales of flax or tow were covered, and we are also of opinion that tow should be inspected.

Wool.

We now turn to the possibility of wool in its many qualities and conditions as being the cause of fires by reason of spontaneous combustion. The yolk^a of wool is a fatty material, and contains among its constituents oleic acid, which absorbs oxygen. In a properly packed and stored bale of wool this action nearly always takes place, and is accompanied by a slight increase in weight and by the generation of a small amount of heat. This heat is nearly always concentrated near the centre of the bale, as it is here that the air has practically no access, and the non-conducting properties of the wool store up the heat. If the wool is moist, the increase of heat in the centre of the bale becomes excessive. Where large numbers of bales are stored in the hold of a ship, it is well recognised that such moisture will cause damage to the wool, even though not resulting in a temperature approaching ignition.

From a review of all the circumstances—the reports of investigations, the opinions of scientists, and the evidence which has been before your Commissioners—there is no room to doubt that spontaneous combustion does take place in wool. Numerous instances might be quoted where the interior of bales of wool has been actually on fire after being exposed to the atmosphere.

"*Greasy Wool.*"—The evidence as to the possibility of even burning greasy wool by the application of extraneous fire has been most conflicting, and, taking the evidence of those who have spent almost a lifetime in the wool trade, the weight of evidence is against the theory of spontaneous ignition of greasy wool. The absence of evidence, however, does not negative the theory, and, given the necessary

On page ivg, line 24, for "lxxix and lxxx" read "lxxxvi and lxxxvii."

conditions, we are of opinion that spontaneous combustion is possible in greasy wool; but, has it been the cause of any of the fires which have recently occurred? The total shipment of wool from the colony for the year ending the 30th September, 1906, amounted to 415,643 bales. Of this—on the ratio of the preceding year—82 per cent. or thereabouts was greasy wool, 16·82 per cent. of scoured and slipped wool, and 1·18 per cent. of washed wool, so that greasy wool has had ample opportunity to demonstrate its possession of any inherent vice and likelihood of being dangerous under abnormal conditions. Excessive moisture, or moisture above that which is absorbed by wool in its natural state, is necessary to bring about the action of bacteria in generating heat in wool when baled and dumped under pressure. The season of 1906 being exceedingly damp had the conditions necessary to bring about the action of such bacteria. The wool season of 1906 was an exceptionally wet one, and the possibility of there being more moisture present in the greasy wool shipped from the colony during that season has been in evidence before your Commissioners. Mr. Walter Hill, a wool buyer and exporter of considerable experience and well-known ability as a wool expert, in the course of his evidence (p. 101) stated that there had been a bigger percentage of damp wool in 1906, taking New Zealand all round, and that he thought the sheep had been shorn before the wool was in a fit condition to shear, in order to catch the sales. Subsequently the witness transmitted to the Commissioners a list of lots of wool which he had during the season 1905-6 specially noted in the catalogues of sales which he had attended as being "wet," and had consequently avoided them for shipping purposes, considering they were not in a fit condition. These lots comprised lines of wool offered at auction in the four centres of the colony, and might be taken as a fair sample of greasy wool containing, in the opinion of an expert, an undue percentage of moisture. Each of the lots mentioned has been traced, and it will be seen from the correspondence (Exhibit No. 18, p. xxxv) that in no case was such wool the cause of any of the outbreaks of fire which have occurred. Indeed, only one line was aboard any of the vessels which took fire, and that lot was not damaged even by fire or water.

Considerable evidence was submitted to support the contention that sheep were frequently shorn in a wet condition, although few particular instances could be cited where this had actually taken place. One witness in the course of his evidence (Mr. Young, p. 206) handed in two letters which he had, three years previously, received from two shearers who had complained to him that they were compelled to shear wet sheep (Exhibits Nos. 23 and 24). The wool therein referred to as having been shorn when the sheep were wet has been traced to its destination, and it will be observed from the copies of the correspondence (Exhibit No. 24, p. xlviii) that the wool arrived at its destination in good condition, realised full-times prices, and was not the cause of any damage to itself or ship or cargo.

Coming now to a review of the circumstances surrounding the fires which have most recently occurred upon vessels carrying wool-cargoes from New Zealand, it has been fortunate that a closer investigation into the probable cause of the fires was made in the case of the "Gothic," "Waimate," and "Rimutaka" than had been in previous cases. It is, however, to be regretted that, having gone so far in their investigations, the authorities in London, who might be expected to have instituted a searching investigation, did not make such a complete inquiry as was hoped at the outset. It appears to have been left to the shipping companies to move in the matter of ascertaining the probable cause of the outbreaks. However, with the assistance of the High Commissioner for the colony in London your Commissioners have been furnished with such data as were available at that end, and it has been of considerable assistance to your Commissioners in arriving at a solution of the problem set before them.

The Produce Commissioner in Great Britain, in the course of a report to the High Commissioner on the more recent outbreaks, said (Exhibit No. 9), "In each case the trouble arose in connection with wool-cargo, and it is safe to say that the cause of all the fires was spontaneous combustion in the wool. Although it is known that the past season in New Zealand was an exceptionally wet one, thus possibly tending to the baling and shipping of damp wool, the present extraordinary series of fires has led the opinion to gain ground that other causes than dampness are responsible for the trouble. In the search for the originating centres of the various fires, slipped wool has been very much in evidence; that from one company in the colony in particular. The theory has been broached that possibly a new method of

treating the skins—*i.e.*, the use of a depilatory agent—may have caused some chemical residue to be left in the wool which has led to the combustion. The action of some new sheep-dip is another theory of somewhat similar nature. Samples of wool taken from the ignited bales at the seat of the fire on the 'Gothic' have been secured by the Shaw, Savill, and Albion Company, and submitted for analysis to a specialist."

In the course of a report by the Salvage Association of London on the fire which occurred on the "Gothic" (Exhibit No. 35, p. lxiii) the following passage occurs: "When the discharge at first commenced we noticed that two bales . . . which had been carried on deck after the fire in No. 4 were still smouldering at the time they were discharged. We lowered these into the water to extinguish the fire, and afterwards opened them, and found that the interior of the bales was badly burned, the wool being charred to a cinder, while the exterior, with the exception of a small hole which had formed an outlet for the fire, had retained its original appearance."

Fleece Wool.—The evidence shows that there is no risk from fire from fleece wool if free from any but its natural moisture. An excess of moisture over such natural conditions is, however, dangerous. This excess of moisture may arise from various causes, such as wool baled from sheep shorn wet, moisture gained in transit during wet weather when the sheeting is faulty, shipment during rain, and loading through the surf.

Your Commissioners are of opinion that although there may be some shearing of wet sheep, yet this does not happen to any great extent, and there is no proof that it is the cause of any of the fires brought under our notice. The experiments conducted by Mr. Burridge (Exhibit No. 40, pp. lxxix and lxxx), in which 18 to 25 per cent. of water was added, convince your Commissioners that where in the case of wet shearing the question in dispute between the station management and shearers is whether or not the sheep are in a proper condition for shearing, the additional unnatural moisture can be present only in a very small degree. This leads your Commissioners to an unhesitating conclusion that it is unlikely that fires have been due to this cause. We are also of opinion that the Railway Department and those concerned with shipping exercise great care, and no case of fire has been shown to the Commission arising from their neglect. Shippers are on the alert to get clean receipts.

Locks, Pieces, &c.—In respect of locks, your Commissioners consider that there is danger of fire taking place spontaneously by reason of the vegetable matter which is frequently left therein and generates heat. Most of this class of wool is treated locally, but a considerable quantity is exported, and in our opinion this exportation constitutes an element of danger.

Slip Wool.—In each case of fire where the cause has been traced, it has been in fellmongered wool, but in the lower sort only—*viz.*, skin-pieces—and this is fully supported by a recent fire in a colonial fellmongery. We do not hesitate in stating our opinion that this class of wool is largely responsible for the frequent fires that take place on wool-laden ships and in fellmongeries. On this matter we may well refer to the report of Mr. R. J. Friswell (Exhibit No. 30, p. iv).

False Packing.

It has come to the knowledge of the Commission that cases of wilful false packing have been discovered, and it is to be regretted that no action has been taken against the perpetrators. Evidence has been given of the packing of low-class wool of dangerous conditions inside a bale containing wool of a superior class.

Skins.

Although no fire has been traced directly to this class of shipment, your Commissioners think that there is undoubted danger, unless the skins are properly prepared for packing and shipment. (See evidence of Captain Rolls, at p. 203.)

Dips.

We have had no evidence to show that any of the dips in use in the colony can be traced directly or indirectly as the cause of fires on wool-ships, and we do not hesitate to free them from any responsibility therefor. This conclusion is confirmed by the investigation of the Government's departmental experts.

Extraneous Causes.

Your Commissioners have no hesitation in stating that in many cases the fires on ships carrying wool, flax, and tow have arisen from extraneous causes. Men are still allowed to go into the holds of ships with pipes and matches in their clothing. What more likely than that matches should get astray in the hold, and, after being some time in the confinement of the hold, take fire by reason of friction, and thus originate a fire in a temperature and under conditions specially ready to produce the same? Ventilators may indirectly be an extraneous cause of fire by reason of matches being thrown down same, or by reason of sparks from the funnel or galley being blown down.

EXPERIMENTS.

Your Commissioners have made experiments with various classes of wool under many conditions of moisture, and the results have been negative so far as spontaneous combustion is concerned. We have also experimented with flax, but with the same result. The temperature has increased, but only to a degree far below the point of ignition, and has then receded; and in case of flax, the only difference has been the rotting of the flax. We have just to hand a cable stating that the wool sent Home by us—a portion of that which had been under experiment by us—has arrived there in normal condition. The experiments conducted here have proved nothing in respect to the spontaneous combustion of wool, flax, or tow.

INVENTIONS AND APPLIANCES.

We have had submitted to us many inventions and appliances for detecting excessive moisture in wool, flax, and tow, and for registering temperature in holds. Most of these have distinct merit, and some of them are well worthy of earnest consideration. While recommending the subject for investigation by the Government, we do not consider it as coming within the scope of the Commission to make any recommendation thereon.

RECOMMENDATIONS.

As the result of our examination and inquiry, your Commissioners desire to confirm in every respect the conclusions arrived at and the recommendations made in our interim report, and to add the following:—

1. That it be compulsory on shippers to have the nature or class of their wool clearly marked on the outside of each bale.
2. That sheep-skins should be inspected under the same conditions as wool.
3. That tow should be inspected under the same conditions as wool.
4. That flax and tow should be covered, and if possible with a material less inflammable than hessian.
5. That wool should not be stowed with oil, fat, tallow, tow, or flax, or in contact with packages containing any of these products, or in contact with any other material more readily combustible than wool itself.
6. That in our opinion every ship carrying a cargo wholly or partly composed of wool, flax, tow, or other combustible material should be fitted with an adequate chemical fire-extinguishing system.

We have the honour to forward herewith the printed copy of the evidence adduced before us, as taken down and transcribed by the official stenographers.

We have the honour to be

Your Excellency's obedient servants,

A. W. MCARTHUR, Chairman.

W. G. FOSTER, Commissioner.

H. S. BLACKBURNE, Commissioner.

Wellington, 15th April, 1907.

I have signed the attached report, but dissent from the statement under the subheading "Flax and Tow": "On the contrary, the weight of evidence has been to prove that spontaneous combustion has not occurred in flax or tow"; and the subsequent statement under the same heading that "the probability of flax or tow having, through spontaneous combustion, been the cause of any of the fires which have occurred upon vessels leaving New Zealand with such cargo on board is negatived."

HAROLD SEWALLIS BLACKBURNE,
Commissioner.

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- No.
1. Copy report and evidence *re* shipping wet wool : Committee, Legislative Council.
 2. Extract from judgment of Woods, V.C., in *Hepburn v. Lodon*.
 3. Extract from Watt's Dictionary of Chemistry—"Spontaneous Combustion."
 4. Extract from lecture by Professor Lewes on spontaneous combustion.
 5. Extract from notes on stowage by Hillcourt on spontaneous combustion.
 6. Evidence in inquiry *re* fire on "Strathgryfe."
 7. Statement of shipments of flax and tow from Wellington, by G. H. Scales.
 8. Statement of number, marks, and description of heated wool passing through the Wellington Harbour Board.
 9. Report of colony's Produce Commissioner in London to High Commissioner, London, dated 26th June, 1906, relative to fires on vessels carrying New Zealand produce to Great Britain.
 10. Copy of judgment of Mr. Justice Bingham, Q.B. Div. Commercial Court, High Court of Justice, *in re* Owners of wool-cargo ex "Waikato" *v.* The New Zealand Shipping Company (Limited).
 11. Extract from log of s.s. "Waikato," voyage 6 Home, 1899.
 12. Copy of report of Captain Croucher, master s.s. "Waikato," relative to voyage 6 Home.
 13. Copy of evidence of Professor Vivian B. Lewes *in re* exhibit 10.
 14. Copy of report of "Beltana" fire.
 15. Extracts from *Australasian Record and Banking Record re* fires, &c., in cargoes.
 16. Extract from "Fire and Explosion Risks," by Dr. Von Schwartz, 1904.
 17. Correspondence, Canterbury Frozen Meat Company and Railway Department, Christchurch.
 18. Letter from Walter Hill, dated 5th September, 1906, *re* damaged wool.
 19. Three survey reports by Captain S. Willis.
 20. Extract from Shaw, Savill, and Albion Company's letter, 30th June, *re* "Gothic" fire.
 21. Correspondence *re* damaged wool : Captain Willis.
 22. Report of Special Committee of Lloyd's on fires on ships.
 23. Letter from C. McDougall to W. F. Young, 17th November, 1903.
 24. Letter from C. McDougall to W. F. Young, 1st December, 1903.
 25. Letter, 29th August, 1906, Levin and Co., with report by Captain Friswell.
 26. Letter, 22nd September, 1906, to Rutherford, and reply.
 27. Letter, Lloyd's, 31st July, and covering letters.
 28. Letter, Lloyd's, 29th June, 1906, and covering letters.
 29. Letter, 1st September, 1906, Department Navigation, Sydney, and enclosures.
 30. Letter, High Commissioner, 27th July, 1906, with report by Cameron, Produce Commissioner.
 31. Letter, John Leach, 22nd August, 1906, and 3rd September, 1906.
 32. Schedule of period of dipping and materials used.
 33. Evidence *re* "Tarawera" fire, Dunedin, 25th October, 1906.
 34. Letter from High Commissioner, with Shaw-Savill letter, 27th September.
 35. Letter from High Commissioner, with enclosure and statement of damaged wool, skins, flax, &c., ex "Rimutaka" and "Waimate," and Salvage Association's report thereon, and on "Gothic."
 36. Statement of shipments of wool and sheep-skins out of New Zealand for year ending 30th September, 1906.
 37. Table showing extraordinary rise in values of wool in the Home markets during past four seasons
 38. Correspondence, Canterbury Frozen Meat Company (Limited).
 39. Correspondence, Christchurch Meat Company (Limited).
 40. Report by Burrige, and wool experiments.

MINUTES OF PROCEEDINGS AND EVIDENCE.

WELLINGTON, MONDAY, 13TH AUGUST, 1906.

THE Royal Commission appointed under the provisions of section 2 of "The Commissioners Act, 1903," to inquire into and report upon the cause of fires on ships whose cargo is wholly or partly composed of wool, flax, tow, or other combustible material, commenced its sitting in the Upper Court, Magistrate's Courthouse, Lambton Quay, Wellington, at 10.30 a.m. on Monday, the 13th August, 1906.

Present:

ALEXANDER McARTHUR, Esq., LL.D., Stipendiary Magistrate, Chairman;
 HAROLD SEWALLIS BLACKBURNE, Esq., Nautical Adviser to the Marine Department, Commissioner;
 WALTER GEORGE FOSTER, Esq., General Manager of the Assets Realisation Board, Commissioner.

Mr. O. F. Dunreath-Cooper, shorthand-writer and secretary; Mr. H. E. LeGrove, shorthand-writer.

The Chairman read the Commission, which was as follows:—

PLUNKET, Governor.

To all to whom these presents shall come, and to Alexander McArthur, of Wellington, Stipendiary Magistrate; Harold Sewallis Blackburne, of Wellington, Nautical Adviser to the Marine Department; and Walter George Foster, General Manager of the Assets Realisation Board, Wellington.

WHEREAS it is provided by section two of "The Commissioners Act, 1903," that the Governor in Council may appoint any person or persons to be a Commission to inquire into and report, amongst other things, upon any question arising out of the administration of the Government or the working of any existing law: And whereas it is expedient to appoint a Commission to inquire into and report upon the cause of fires on ships whose cargo is wholly or partly composed of wool, flax, tow, or other combustible material, and as to what such Commission considers necessary to insure the shipment of such cargo and its conveyance from New Zealand to its destination in such a condition that it will not be liable to fire from spontaneous combustion, or any other cause, and also as to the necessity or expediency of amending the existing law with respect thereto:

Now, therefore, I, William Lee, Baron Plunket, the Governor of the Colony of New Zealand, in exercise of the powers conferred by "The Commissioners Act, 1903," and of every other power and authority enabling me in this behalf, and acting by and with the advice of the Executive Council of the said colony, do hereby appoint you, the said

ALEXANDER McARTHUR,
 HAROLD SEWALLIS BLACKBURNE, and
 WALTER GEORGE FOSTER,

to be a Commission by all lawful ways and means to examine and inquire into every matter or thing touching the premises in such manner and at such times as you deem expedient.

And for the better enabling you to carry these presents into effect, you are hereby authorised and empowered to make and conduct any inquiry under these presents at such place or places as you may deem expedient.

And you are hereby authorised and empowered to have before you and examine all books, papers, plans, and writings whatsoever as you deem necessary for your information on the subject-matter of this inquiry, and also to have before you and examine on oath or otherwise, as you may be allowed by law, all witnesses and other persons whom you judge capable of affording you any information touching or concerning the premises.

And I do further require you within thirty days from the date of these presents, or as much sooner as the same can conveniently be done (using all due diligence), to report to me under your hands and seals your several proceedings, and your opinion touching the premises.

And I do further declare that these presents shall continue in full force and virtue, and that subject thereto you shall and may from time to time proceed in the subject-matter hereof at such times and within the prescribed limits as you judge convenient.

And I do hereby further declare that the said

ALEXANDER McARTHUR

shall be Chairman of the Commission, and that these presents are issued under and subject to the provisions of "The Commissioners Act, 1903," and "The Commissioners Act Amendment Act, 1905."

Given under the hand of His Excellency the Governor, this second day of August, one thousand nine hundred and six.

WM. HALL-JONES.

Approved in Executive Council,
J. F. ANDREWS,
Acting Clerk of the Executive Council.

The Chairman: We propose, this morning, going through the list of witnesses which it is proposed to have called, and to whom subpoenas will be issued, giving them twenty-four hours' notice at least. However, as some witnesses will be available to-morrow morning, we shall commence the taking of evidence at 10.30 o'clock to-morrow morning, and in view of the fact that the transcription of the evidence will be supplied from time to time—not left to the end—we will sit each day at 10.30 a.m., and then on till 1 o'clock. Commencing again at 2.15 p.m. we shall sit on till 4 o'clock.

For the information of the Commission the report and evidence taken by the Select Committee appointed to inquire into the shipping of wet wool, which was laid upon the table of the Legislative Council on the 16th August, 1894, was put in and marked Exhibit No. 1.

The Commission conferred.

The Commission adjourned till 10.30 a.m. to-morrow, Tuesday, 14th August, 1906.

WELLINGTON, TUESDAY, 14TH AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

SAMUEL VICKERY BURRIDGE sworn and examined. (No. 1.)

1. *The Chairman.*] What is your name?—Samuel Vickery Burridge.
2. What are you?—I am a fellmonger by trade. I am manager of the Gear Company's fellmongery-works at Petone.
3. The Commission is desirous that you should give some information relative to the matters before it, and we should be glad if you would assist us. First of all, what experience have you had?—I have had thirty years' experience of the wool trade. I have been for the last seventeen years with the Gear Company, managing their fellmongery department. For four years previously I was with the Wellington Woollen Company as their buyer and classer.
4. Have you formed any opinion—definite or otherwise—as to the fires on wool-ships?—Well, following my own experience, I might say that during the last ten years I have prepared and shipped, on behalf of the Gear Company, about forty-six thousand bales of wool, and I might add that I have never had a bale of wool upon a ship that has caught fire.
5. You have never shipped any in a vessel that has caught fire?—I have never had any wool condemned as being damaged; I have never had any wool returned from the Harbour Board or from the stores since I have been in the company's employ. So far as handling wool is concerned, I have never had any trouble with wool being heated or otherwise after it had been baled. I have taken the precaution always to have the wool thoroughly dry, and I invariably spread it out to cool till the next day before packing it. This, in my opinion, removes any possibility of its retaining any moisture or heat. At one time, during my apprenticeship, I did see a woolpack burning, but this was in a stack of bales of locks stacked up in the yard owing to our having no accommodation for them in the building. That is the only fire I have ever known or seen during the whole thirty years of my experience. Following up this subject of the belly-wool and locks—now that I look back, as I have done during the past two or three months, and given the matter more consideration owing to the serious loss there has been to the country—I think it all points to the low qualities of wool. What I mean is, that if these fires have been caused in the wool at all, then I say it must be in the low qualities of wool. You will know that during last season and this season wool has been at a very high price, which has, no doubt, induced the farmers to ship more locks and pieces than they hitherto did. Previously most of this class of wool was scoured—

6. You say, so far as you can see, it is owing to the low class of wool being sent away?—The low qualities—that is, wool with a lot of vegetable matter in it, such as “burrs,” and “dags” in the locks and “crutchings.” Farmers, as a rule, are not so particular as to whether the wool is dry when they crutch the sheep, owing to the fact that they have no accommodation or conveniences for doing it in a dry place. I have seen considerable quantities of it heated in my time, and it is possible also that if it had been left a longer time it would considerably increase in heat. I have never seen it to the same extent in any good-quality wool after being packed. The whole tendency to heat has been in the low-quality wools where insufficient care has been taken before shipment. I could not say, at the same time, whether the heating I have seen would be sufficient to cause fire, because when wool heats up to a certain point it sort of comes down again. If the fires have been caused by wool at all, I am sure it is owing to the vegetation which has been left in the wool. For instance, I have known of sheep being driven across a stream—quite knee-deep—and shorn the very next day. With the amount of vegetation there would be in that wool it would be impossible to have the wool dry. This season—and that before the fires—has been very bad for shearing. I have known of a man taking a station for classing some nine thousand sheep, and he has taken five weeks in doing so. Then, owing to the limited accommodation which many of the farmers have at their disposal, it makes one think, when it takes such a length of time to cut out a shed, that the lower qualities of wool would not be properly dried. However, from my own personal observation during my time with the Wellington Woollen Company or with the Gear Company, I have not seen any of my wool damaged in any way at all.

7. *Captain Blackburne.*] In the instance you have just spoken of, where did the fire originate? Where did you first discover the fire?—On the outside of the pack.

8. On the outside?—Yes. On the outside of the bales. Little or no wool was burnt at that time.

9. You did not see any actual flames?—No, only smouldering.

10. I take it this was in a stack outside the shed, covered over with a tarpaulin?—Yes; about forty bales were stacked up together and covered with a tarpaulin.

11. I understood from the evidence given by you before a former inquiry that the fire originated in the centre of the stack?—It was between two bales, yes. But these bales were near the outside, as far as I can remember. It was thirty-five years ago.

12. *The Chairman.*] That was in your apprenticeship days?—Yes.

13. *Mr. Foster.*] In your evidence, then, you stated that you actually found certain of the bales on fire. Was there any actual fire, so far as you can remember?—The pack itself was on fire.

14. You mentioned three bales as being on fire?—Two at the bottom and one on the top on the outside, and between that they were on fire.

15. They were smouldering?—Yes. I think, if I remember right, the covering—the sheeting on top of them—had blazed, but that was not the wool itself.

16. You were satisfied that the fire was the result of spontaneous combustion?—We thought it was spontaneous combustion. We put it down to that, owing to the amount of vegetation that was in the wool.

17. The conclusion I draw from what you say is that, in your opinion, wool of that class, and in that condition, will spontaneously fire?—Yes, we think so, when packed wet. But a bale of good wool, or ordinary-conditioned wool—I think it would be impossible for it to spontaneously fire. It is the vegetation, if anything, that causes this spontaneous combustion.

18. In your earlier days—before going to the Gear Company—when gaining your experience, had you at any time experience of spontaneous combustion in wool?—No, not before going to the Gear Company—in fact, never since, either. I have heard it rumoured that the recent fires were caused by spontaneous combustion. I had the opportunity of examining a large quantity of the wool that was on that ship that caught fire in Wellington some years ago. That wool went to the Woollen Company. The bales had been left for a fortnight or three weeks before being opened, and there was little or no damage done to the wool at all; but then it was not stacked.

19. What class of wool was that?—Good clean fleece wool.

20. *Captain Blackburne.*] Were these bales wet on the outside only, or did the wet extend right into the wool?—About 6 in. all round. Some of them were damp right through; in fact, it astonished me the amount of time it took for the water to penetrate right through the bales, although there were tons of water poured into the ship.

21. These bales were stowed in a well-ventilated place when they came into your charge?—They were outside.

22. *Mr. Foster.*] Have you noticed any cases of a very perceptible rise in temperature in slipe wool at all?—After being dried?

23. At any stage at all?—Only with the seedy wool. Wool with vegetation in it will not remain long packed without heating. It is perfectly harmless when it is thoroughly dry.

24. Have you ever known slipe wool to reach such a temperature as would cause an outbreak of fire?—It would have to be very badly dried indeed.

25. Assuming it to be in the very worst condition?—Without being confined, I should say, No.

26. In the condition it would be on board ship?—I could not say.

27. Then, you think the condition of seedy wool is more dangerous than fleece wool?—Yes, such as crutchings or pieces. The greatest danger is in the dirty belly-pieces. The belly-pieces and pizzle-pieces retain so much moisture that it is hard to get them dry, and more particularly in those lots coming from the small sheds.

28. Have you had any experience of baling sheep-skins?—Yes. I have packed about a hundred bales a year.

29. Do you consider that there is greater risk with sheep-skins being packed damp than in the case of wool?—Well, it just depends upon the accommodation you have to finish them in. In

many cases—outside, for instance—it is very difficult to finish them, because they have not sufficient shed accommodation. In such cases it is very much harder to finish them dry.

30. Taking into account what you know of the conditions throughout the country districts, do you think there is risk of sheep-skins being packed damp?—Yes, there is great risk.

31. Supposing they are packed damp, would you consider them more likely to generate heat than wool?—I do not think so, but I have had very little experience of drying skins.

32. Another point that occurs to me: have you found that sheep-skins when flayed have a deal of fat about them—country skins particularly?—Yes.

33. Would that not tend to generate heat—to promote the generation of heat?—I would say, No. It turns the wool more greasy or oily.

34. Sir James Hector has stated in his evidence before a Committee that if it had been smeared with grease or oil—?—There is a great deal of difference between oil and tallow.

35. Oil becomes tallow at a certain temperature?—It has a very different effect upon wool. Oil will make wool heat more quickly.

36. I was assuming that skins were packed damp. It would generate a certain amount of heat—possibly not sufficient to be dangerous, but if that generated heat, would that fat not tend to become tallow?—If the skins were packed damp and created heat over 120° the skin would be useless. It would not be a skin at all. It would be quite useless if it rose to that heat.

37. That goes beyond the question. I was asking you, supposing the skins were packed damp, would they generate heat to a sufficient extent to liquefy the fat, which, becoming distributed in the wool, would cause fire?—I do not think so myself.

38. Sir James Hector says, "Wool in bales will heat if damp and smeared with oil, or if full of woolly grease. Vegetable fibre in contact with grease and moisture and not under pressure will ignite much sooner. Moisture in promoting decomposition supplies sufficient oxygen to produce the point of incandescence. If putrefaction commences heat is generated. This heat may reach the point of incandescence"—I do not think so myself, not from the experience I have had. If you put oil on it I should say Yes, because I know as a fact if you put oil on the wool it will create heat in less than half the time than without the oil.

39. Have you ever seen any bales broken out of the ships' holds in a condition that they have been dangerously heated?—I have known of them being returned—undumped.

40. Have you ever seen them?—I do not think so. I have seen bales of crutchings or locks heated, but not from the ship's side.

41. To what temperature do you suppose they had become heated—so hot that you could not put your hand in?—Yes, about 120°.

42. Have you any idea of the conditions under which the locks had been from the time they were packed?—The condition was that they were damp at the time of packing.

43. Have you been able to form any idea of the time it took to reach the temperature you mention?—No, I have not.

44. I would like to ask you whether you consider that wool of good quality packed damp would be likely to heat to a danger point?—I do not think so; it would have to be more than damp.

45. If wet?—Well, if wet I would not say. I have never seen a bale of good-quality wool heated in my experience.

46. So that, in your experience, would you be able to say that, in your opinion, good-quality wool would not be likely to reach a point of heating to cause fire?—I am prepared to say that is my opinion.

47. And by good-quality wool you mean wool thoroughly well treated?—I mean wool free from any vegetable matter, not such as would be present in dirty locks.

48. Have you ever had any experience of the operations of shearing which prevail in the country?—A fair amount.

49. During your experience what were the conditions as to the control of the shearing? Who decided as to whether the sheep were wet or dry?—Times have altered, but at one time the classer had the say, but now it is the owner in most cases. I have known the classer leave the works for that reason. For instance, last season I know of a man who spread out sixty fleeces on his own account because they were not dry, and that was done rather than stop the shearing.

50. You are aware that just now the Shearers' Union have a set of rules—I do not know whether it is an award of the Court—by which the condition of the sheep is put to the vote of the shearers, and the vote decides whether the sheep are wet or dry. The owner has the right if he chooses to turn the sheep out. That is the present condition?—I think, myself, a good-conditioned wool would be very hard to make heat to any extent detrimental to the wool itself.

51. It would be safe for a flockmaster to shear it wet, so long as it is not locks or bellies?—No; I should never advocate shearing any wool wet. If he knew exactly how far to go—but you find they would generally stretch it a little. I think it should certainly be dry.

52. We are inquiring as to the causes of fire, and I want you to say if, in your opinion, it matters little whether the fleece wool is shorn and packed wet or dry, so long as the good quality only is packed in that condition?—I should be misunderstood if I said that. I have a very strong objection to having the low-quality wools packed damp at all, and I think the fact must have some weight that I have packed some forty-six thousand bales of wool, and have never had any complaint at all. I have never had any of my wool on any ship which has caught fire; I have never had any wool returned as unfit for shipment, and I think that clearly shows that if wool is treated in a proper manner it is not liable to fire. We ship all qualities—good and bad condition—and I know of no case of a bale having been heated.

53. Supposing wool manipulated by an unprincipled fellmonger, or an ignorant man, do you think there has been anything in the state of the market for wool just now—as to value—that would lead him to rush his wool forward in a damp condition?—I have known it to occur.

54. In the present condition of the market he would be likely to rush it forward?—Some of them have such very bad accommodation, but it has been done. With the accommodation it is almost impossible to do otherwise.

55. *The Chairman.*] That would be the case under all circumstances, but what Mr. Foster asks is: is it not owing to the state of the market that the output has been hastened?—Yes. It has a tendency in that direction.

56. *Captain Blackburne.*] Some few weeks ago I noticed a letter in the papers from a stevedore drawing attention to the great danger there was in baling wool hot when it had been dried by machinery. What do you think about that?—Well, I have tried it both ways—one as an experiment, but I never adopted it. I always understood that wool should be left till the following day before being packed. There are three reasons for that. Wool finished off at 120° if allowed to remain has a better feel, a better colour, and a better touch; it has more body. In every respect wool will work up better if packed thoroughly dry than if packed hot. It is very much against the owner himself to pack it hot; in fact, I do not think it is carried out at all.

57. It is only in the case of a rush that it is done?—It would take $\frac{1}{2}$ d. per pound off the value of the wool. I do not remember ever having done it myself. I have tried two bales myself as an experiment after seeing that in the paper. I packed it as dry as possible, put it in a shed by itself, and left it for three weeks and opened it up, and it was perfectly safe; still, I would not adopt it.

58. You are thoroughly satisfied that there is no danger in it?—Yes, I have proved it beyond doubt; but it is not beneficial to the owner of the wool. It would, as I have said, take $\frac{1}{2}$ d. per pound off the value of the wool. I do not think that practice is carried out at all.

59. *Mr. Foster.*] The letter referred to pointed to the opinion that some of the fires might be attributed to packing at too high a temperature. Is it your opinion that it would increase in temperature by that fact?—I have used the thermometer for four hours, and I found it remained the same temperature for eight hours, then immediately began to go down.

60. So you do not think the packing of the wool at too high a temperature right from the drying-tables has had anything to do with the fires?—I do not think so, because I have never seen it carried out. You must remember that it would be detrimental to the wool, and we generally try to avoid any process that would be detrimental. We always leave it till the following day, and I am sure all the other works do the same.

61. I think you have said that you sweat your skins?—Yes, most of them.

62. From your experience, do you think there is any likelihood that the chemicals which you use for freeing the wool from the pelts would have any effect in the direction of sending up the temperature? I suppose you use lime and sulphide of sodium?—If the wool were thoroughly dry, I should say not. Low-quality wool, such as locks and pieces, would heat, but to what extent I do not know.

63. What I understand is this: you say that in the low-quality wools the tendency would be to heat; but would not the sulphide of sodium tend to further increase the possibility to heat?—As regards the sodium, No. Once the lime is slaked it is thoroughly free from any heat. I do not think it would have any detrimental effect. Some people, however, slake their lime very badly, and leave little particles—

64. You mix your sodium some little time before you paint your skins?—Yes.

65. Well, with the time that it is in the mixture and then packed skin to skin, would that not be sufficient to slake the lime?—The lime would become thoroughly slaked if it was not drowned—that is, not properly slaked. But, really, I think it comes back to the low qualities of the wool.

66. As regards the chemicals, that would only be present in the trimmings?—Yes, you paint the skin round the edge of the wool; that is the only portions that would be effected.

67. Would you, by your system of washing, get all the lime out of it?—Yes; the lime would all be washed out before packing.

68. Have you known of these trimmings being packed without washing or scouring them?—Yes, some years ago they used to, but not latterly. Some years ago they used to pack the whole lot. There is a great deal more care taken with the low qualities now than there was some four years ago.

69. Supposing woolpacks stripped from the wool and thrown in a heap saturated with the grease, do you think they would be likely to have any effect in the direction of causing fire?—I have never known it. I have seen as many as two thousand packs bundled together in a heap and left there till the following season with no detrimental effect whatever. That was in the Woollen Company's works. They were greasy packs and were stacked up for twelve months, and showed no sign of heat.

70. In the case of the wool you referred to as having been discovered on fire, was it the woolpacks that were on fire or the wool itself?—The woolpacks were burning, and the wool on the outside was singed or burnt. I have tried to burn wool many times and you cannot burn it; under ordinary circumstances it is impossible to burn it. In the particular case I referred to the wool was charred to a certain extent—not very much, but the pack was smouldering. The middle of the bases, as far as I remember, was not burnt at all.

71. I suppose you mean that the inflammable quality depends upon the amount of animal fat present?—Vegetation and animal fat. You take a bag of dags and weight them, and put them into a sack as I have done during the past two weeks. Tie them up, and the next morning they will be up to 132°, but they will never go any further.

72. There is this point: you say that the vegetable matter is a danger. The vegetable matter sets up the first heat. I would like to know if this vegetable matter is inflammable?—I think both together would be. As the vegetable matter becomes heated and continues for some considerable time it becomes dry, then as it dries there would be a sweating caused. What the

result would be eventually I cannot say. I know it was a common thing for these low-conditioned wools to be returned from the ship's side in years gone by.

73. Is there anything you could suggest in the way of a precaution against packing the low-conditioned wools in a damp state?—If it is the wool that causes the fires there is nothing to prevent its being packed wet. The owners will please themselves whatever you suggest. The only way to detect it is inspection. If it is inspected and any heat is found it might be remedied. The only precaution I know is inspection.

74. Of course, it remains to be proved whether it is the wool or not; but, assuming it is the wool, it would be a difficult matter to detect it before shipment?—If it is going to heat after being packed and there is any vegetation in it, the heat would be showing in thirty-six hours.

75. Is it not possible to conceive that wool might be packed and practically on board the ship within that time. Might that not be so?—I have never known of it being so. Not within thirty-six hours. I know I have tried to catch a boat in pretty quick time, but have not been able to do it in that time.

76. The time you specify within which the temperature would show itself—would that depend upon the degree of moisture in the wool?—My experience is that if it is going to heat, if it does not show it within thirty-six hours, it will not heat at all.

77. Would the increase in temperature depend upon the density of the packing?—That might be so, dumping may hasten it; but I have experimented with ordinary pressure such as a bale up to 4 cwt.

78. But, assuming it was only 2 cwt., would that heat quicker or slower?—Wool of low condition, and damp, of that weight of a bale, would not stand by itself.

79. *The Chairman.*] The more densely it is packed the sooner it would show heat?—Yes, it would rise quicker.

80. *Mr. Foster.*] In what way do you think it would be possible to detect heat in thirty-six hours?—You would have to put a trier into it—a steel rod—and allow it to remain in the bale for a few minutes.

81. *Captain Blackburne.*] A few minutes would not be time enough?—Then use two or three. I think if there is any heat in the bale the skewer would be hot and would show a tendency to heat, and then the bale could be put aside for examination.

82. I understood from Captain Bendall that it would take three or four hours, or longer?—Well, I suppose he could do it with a thermometer if he had it inserted into a tube.

83. They found a difficulty in inserting a thermometer—they broke. In the dumped bales it would be more difficult still, would it not?—Yes; but if you inserted a rod into the bale it would show heat if it was present.

84. Within thirty-six hours?—It would have a tendency to heat at once, and it would show itself within thirty-six hours if it was going to heat at all.

85. *Mr. Foster.*] Do you consider that wet wool will heat quicker or slower than damp wool?—Damp wool would heat much quicker than wet wool. I think it will show itself under any circumstances within thirty-six hours. Wool will always stand a certain degree of moisture.

86. Assuming the wool to be wet, how much longer would it take to show a rise in the temperature?—From the experiments I have carried out it would take another six hours.

87. Could that heating be confined to a small area in the low-conditioned wool? That wool when heated would show itself by the smell of ammonia?—Yes, if there was any heated wool in the shed I could detect it when passing through the works by the smell of ammonia.

88. *Captain Blackburne.*] If a bale of wool became wet through having rain upon it, would that penetrate for any distance?—No.

89. As a rule, it would just run off?—If the bale was well packed it would be very trifling. I do not think it would cause any tendency to heat at all; it would only go in a few inches. That is my experience. If it were left for weeks it would probably soak in some distance.

90. I understand that sometimes the small farmers when carting their wool have no tarpaulins: should that wool get wet do you think it would penetrate to any extent?—Well, about five years ago a farmer sent me eight bales to the works to be dried which had become wet in this way. I left them for two days before I could attend to them. When I came to look at them I found there was nothing to be done to them. The moisture had dried out of them. The owner was a very careful man, and would not run the risk of shipping the wool damp; but I found it was perfectly dry.

91. In summer-time it is frequently wet through crossing the rivers?—It gets saturated and would have to be dried. If the river was very high and very wide it would get sufficiently wet to require to be opened up and dried.

92. *Mr. Foster.*] Taking the case of a damp bale being received in store, would there be any indication on the floor of the shed under the bale of its damp condition?—On greasy wool, Yes. It would leave its mark for twenty-four hours after shifting the bale.

93. What is the nature of that mark—grease or moisture?—Grease comes out with the moisture and settles on the floor.

94. What do you attribute the expulsion of the grease to?—It is liberated from the fibre by the water.

95. You would not consider the damp on the floor was the evaporation of moisture through increase in heat?—It would have to be very hot before it would do that. When the evaporation showed through any one could feel it with his naked hand.

96. Have you ever noticed such a case?—In the shearing-sheds with the greasy wool, yes. It is not necessarily damp, but the yolk from the wool will leave the grease-marks on the floor.

97. It is within your experience that the shed-floors show damp?—Yes, more so with fleece wool than with slipe.

98. Have you any suggestion to make as to ascertaining the condition of the centre of a bale of wool?—Only by inspection—by drills.

99. Do you know of any satisfactory form of drills?—No, I do not. A drill might be inserted.

100. Would it be an easy matter to insert a drill into a four-hundredweight bale?—I do not think it would be a very easy matter. It would have to have a very sharp point.

101. The ordinary two bales dumped—it would be impossible to do so?—I think it would be impossible.

102. Apart from such a method, have you anything in your mind that could be devised?—Well, I think if the bales lay in store for so-many hours before being dumped it might be detected.

103. Could you, in your experience, detect any moisture or heat in that time?—I think an expert should be able to do so. A man used to it would detect the stain.

104. Is it possible to detect the difference between a grease-stain and a rain-stain?—To my mind that would be possible. The grease-stain would be very much heavier in colour; but I have so little experience in the ordinary way that I know nothing about damp bales of wool.

105. What, in your opinion, would be the effect of heating, say, right in the centre of the bale? Would it attract the moisture from the outside and send it up to the top or all round?—I think it would absorb it on the outside and middle. I remember a bale of low-quality wool which heated a hard dry heat. That showed signs of discoloration, but it was packed close together.

106. What I had in my mind was that it would carry the moisture from the sides to the centre and then be thrown off as steam to the top, and would thus show moisture on being thrown off?—The bottom of a bale is more likely to show the moisture if there is any present.

ALFRED TYER sworn and examined. (No. 2.)

107. *The Chairman.*] What is your name?—Alfred Tyer.

108. You are a fellmonger?—Yes; I have been in business as a fellmonger for over forty years, and as a classer and buyer.

109. You carry on business in Wellington?—Yes.

110. The Commission is anxious to hear your views on the probable cause of the fires in wool and flax cargoes—whether they have been caused by spontaneous combustion in the wool or other causes. Can you give us some assistance in this direction?—I think a great deal of it is to be traced to the high prices which have been ruling this season. The trade has changed considerably in this way; some years ago the grower sent his wool away scoured, but now it is all shipped in the grease. Locks and pieces are shipped in the-grease, and very little is fellmongered. They just dry it and ship it. As far as the locks are concerned, I have had them sent to me, and I have taken as much as 2 cwt. of dags out of a bale. This should have been done before they left the station, and the locks dried. Then, again, I have had locks come down to be scoured which had heated to such an extent that you could not put your hand in them.

111. *Captain Blackburne.*] Have you known a case of them taking fire?—No; it is a difficult thing to get wool to flame at all. It gets very hot, and as the moisture goes away so it becomes as dry as dust; you could crumble it up in your hand.

112. But if that had been fanned by air it would burst out into flame?—No. If it was packed by flax it would most likely cause the flax to catch fire. I might say that I have never seen wool take fire. I have seen it after it has been on fire—that is, locks and pieces.

113. You have not heard of a case where a wool-bale has been on fire?—No, but I have seen a bale that has been burnt—I have handled wool after it has been through fires, but I have never had a fire on my own place.

114. What temperature would it require?—It goes very high—I could not say what temperature; but it would get so hot that you could not bear your hand near it. Steam would rise from such wool, and if it was stowed close to flax it would absorb the steam, and by this means the flax would become more dangerous than the wool alone. In the case of wool coming down from the stations which gets wet, it is stood up in the sun to dry, because they have no room to open it up and spread it. It is allowed to stand for a day or so to get dry. You would not know then that it had been wet, but when that wool gets on board ship I have no doubt it becomes heated, because it is not dry inside.

115. How long would it be before you would detect the heat in a case like that?—A very short time—a few hours.

116. Would it be so hot that you could not put your hand upon it?—No; but the steam would rise, and you would notice the smell coming from it. Any one with experience will tell in a moment when there is wet wool about. If I go into the factory and smell any sweating wool, I can detect it at once by the smell.

117. *Mr. Foster.*] You mentioned wool which you had seen spoiled by great temperature. Can you tell us anything of the conditions under which that occurred?—I have had it from ships after a fire, and the wool has only been scorched on the outside, otherwise it has been quite sound. It would take a great deal of fire to cause wool to flame.

118. You have had wool from ships which have been on fire: You say the wool was simply scorched on the outside. What inference do you draw from that fact—that the fire was in the wool-pack?—In the case I mentioned I do not think the fire was in the wool; it did not start there; it must have started in the flax or other goods.

119. Were those packs burnt very much?—Yes; it burnt the packs and the wool on the outside, and for a couple of inches in. It would be charred by the heat.

120. Have you any knowledge as to whether any other goods touched this wool?—No, only the flax which was stowed in the same vessel. I have a piece of wool here which I will show you. I have applied two matches to it, and you will see that it shows little sign of burning [exhibiting a sample of wool].

121. Supposing you maintained a very high temperature and then applied a match, what would be the effect?—Most likely it would burn then, after all the grease had been taken out of it.

122. Have you any idea of the maximum amount of heat it would stand?—I have no idea. I only know that it has been so hot that you could not touch it.

123. Then wool at that temperature would flare up pretty easily if free?—So long as the moisture was out of it. When it has been reduced to such a state it would crumble up in the hand into little pieces.

124. Will it be safe to say that it will not burn by itself in its present condition? You would not like to say that at 150° it would flare up?—No. I know that in the case of a fire at a fellmongery I have been called to see the extent of the damage, and in that case a bale of wool had gone to nothing. You must have a big fire to burn it, and a very great heat.

125. It is a matter of temperature?—Yes. If you only put a small fire under it it would burn for a time, but it would not burn like flax.

126. You heard the questions that were asked of Mr. Burrige as to the chemicals in the wool?—No; I am rather hard of hearing, and did not catch them all.

127. Do you consider that the chemicals you use in the slipping of your skins are likely to be a factor in the cause of fires on wool-ships?—No, it would have spent itself. There is no doubt lime should be well slaked. The chemicals are sodium, caustic soda, sulphur, and lime, but they will have spent themselves before the wool is finished with.

128. Owing to imperfect crushing of the lime, particles of it would be likely to remain: have you found that so in your experience?—Being in the water, I think it would have spent itself; it would be reduced to a state of chalk. There would be nothing in it to cause any damage.

129. In the slaking of the lime for your purposes, do you find that there is a tendency to lump?—Yes. So long as you do not put sufficient water on it to drown it, it is perfectly slaked.

130. But if it is imperfectly slaked there will be some danger?—It would not stay on a second; it would remain at the bottom of the tub, and the brush would clean it off. Nothing of any size at all would stay on the wool. It is well washed under any circumstances.

131. The class of instrument you use to paint the skin is not a brush, but it is more often a piece of carpet?—That is only done in country places.

132. But where the brush is a piece of carpet, would it not be likely to pick up the lumps?—No; they would be so small that they would spend themselves, and after the washing there would be little or nothing left.

133. In most cases the trimmings would be picked over and washed?—Yes, it would be all washed off. We always scour them.

134. In trimming your pelts, is it the practice now to pack them and ship them as glue-pieces?—No, they are too valuable.

135. The trimmings?—No. Very little fellmongering is done now except by the companies. The skins are dried and shipped. Forty years ago, when we used to sweat the skins, we used to lay them out and allow the water to drain off them, then lay them one on top of the other for about twenty-four hours; after that they were shifted, and they were so hot that you could not touch them. Now, most of the skins are brought into Wellington and sold by auction. They are hung up in the stores. There is no doubt whatever that there is a fault there with the skins. It is impossible to dry them under such conditions and in the time. I know it takes me from twenty-one days to five weeks to get skins properly dry. There is no doubt there is a great quantity of skins as well as locks and pieces sent away in a very bad state.

136. Do you consider that the fat usually found adhering to the skins about the neck and fork would be likely to cause an increase in the temperature?—Yes. I have known the fat when heated run right out into the woolpack. Of course, that fat will heat, and when it gets on to the woolpack it might cause flame, or if it got near flax it might cause fire.

137. In a bale of dried skins, do you find that there is a greater proportion than in the wool?—Yes; when the heat gets into the skin it melts, and runs away like oil.

138. Do you think the risk would be greater in that case than with wool alone?—Oh, much. When you fellmonger the skins they are well washed, all dirt and blood taken out of them.

139. Do you think there is greater risk in packing damp wool from, say, a fellmongery, where they simply have atmospheric drying, or from factories where they have mechanical means?—There is no doubt the machines are the best. There are times of the year when the wool is more damp. In the case of small fellmongeries, where they have placed the skins over the stove, they take them off and dry them outside if the weather is favourable.

140. Do you think that, if it were packed at the temperature at which it came off the drying-machines, it would be likely to heat—to rise in temperature?—No, the temperature would go down. I tried that myself some thirty years ago when machines were used, and I found that the hotter you took the wool off the machines and put it in the wool-bins or packed it up, the temperature would go down. I have opened up a bale after being so packed, and found that it was in splendid order.

141. You say, then, that no matter how much overdried wool may be, it will always recondition?—You can hardly overdry it. If you overdry it you pinch it. I do not think you could overdry it; it is put into bins after being dried, and then no harm whatever would occur to it.

142. Would you consider it possible to take wool off the drying-machines and put it into the bales so quickly as to raise the temperature?—I have done it hundreds of times. I have taken wool off the machines and put it into the bales at once, and the temperature always goes down.

143. *The Chairman.*] Does it not lose temperature in the process of taking it off the machines and putting it in the bales?—Yes. It is always the case in fellmongered wool that there are a few pieces which are not quite dry, and by having the bulk well dry and hot that absorbs the moisture there may be in these pieces.

144. *Mr. Foster.*] You mean that no matter how hot the wool might be on leaving the dryer, there could be no possible danger from fire by packing it straight-away?—None whatever.

145. *Captain Blackburne.*] And less danger than if it was left?—Yes, less danger than if left. Of course, I have no doubt there would have been more fires in ships had it not been for the dumping. Dumping saves it a very great deal.

146. Do you think so?—Yes. We have had wool come up after having been dumped, and inside the bale the wool was as hard as a rock. There would be no sign of fire in it at all, and yet inside the bale it would be charred, and if that had been a bale undumped it would have shown right through. I think there will be less danger with dumped wool than otherwise.

147. *Mr. Foster.*] Do I understand you to say that when wool goes up to a certain temperature it will go no further: then it begins to fall?—That is with greasy wool; but the scoured wool has the grease out of it, and there is nothing but wool in it—not so in greasy wool, for there is the grease which maintains the heat.

148. The point I want to get at is this: I assume that as soon as the moisture is evaporated there would be no further increase in the temperature?—I think it would go down.

149. I suppose the range of temperature will depend upon the amount of moisture?—Exactly.

150. Can you conceive an amount of moisture to go beyond the point you have referred to, and thus make it flame?—I do not think it would go into flame unless it was stowed against other old woolpacks or flax in a vessel.

151. Have you any means of knowing the height of temperature it would require to flame?—I do not think it would be possible. The heat would drive the moisture out of it, and unless it were packed alongside of other woolpacks or flax it would cause them to heat and thus cause fire.

152. So you think the temperature that might be generated might be sufficient to cause a fire between woolpacks?—Yes, for I have seen a bale of wool come in with the pack charred and the wool burnt a little.

153. *Captain Blackburne.*] After being dumped?—Yes, after being dumped.

154. *The Chairman.*] Where did it come from? Did it come from the ship?—Yes, from the ship. Of course, there is a lot of wool that gets wet with salt water, and when it does they will send it to me, and simply tell me to dry it. You know that wool which has been wet with salt water will always absorb moisture again.

155. *Captain Blackburne.*] I see by the papers that wool getting wet like that has been opened up in the sheds and sun-dried and packed up again?—Well, I have not been in the Harbour Board's sheds, but I have seen it on the railway-trucks where it has just been opened up and set in the sun to dry, and when it appears dry it is sent away. If the wool gets wet on its way to the station it is treated like that. In the case of the "Jessie Readman" I got 1,100 bales of that wool, and after it had been in 6 ft. of water for some time it was not wet through.

156. Were the bands still on it?—Yes. Some of it was very hot, but it was not wet through.

157. *Mr. Foster.*] Mr. Burrige told us that in his opinion good-conditioned wool would not fire, but that the low-conditioned wool with vegetable matter in it would undoubtedly fire?—Clean wool will get heated, but it takes longer, and, of course, it all depends upon the amount of grease in the wool. Where there are a lot of damp locks and dags there is no doubt there is a tendency to heat.

158. Do you find that the crutchings are in a worse condition now than formerly?—Yes. In the case of sheep lying down on the wet ground they will pick up a lot of moisture, and when they are shorn enough care is not taken to dry them thoroughly before packing them.

159. Is it a fact that there has been a considerable quantity—a large proportion of locks and pieces shipped owing to the high prices of wool?—Yes, nearly all of them are being shipped, and, indeed, very little is being fellmongered. In the case of the sheep-skins, they are sold in Wellington, and are hung up in store and then shipped. They have no proper means of drying them.

160. Can you suggest any method by which damp packing can be prevented or detected?—I understand that Captain Bendall, who represents the fire underwriters, used to condemn any bales he found showing any heat. I think that should make them more careful.

161. Any method of testing the bales would necessarily take considerable time?—I think if a bale of wool or skins had been packed for twenty-four hours, and there was any sign or suspicion of heat by putting the rod into it, it could be detected.

162. Would you suggest shoving the rod through a bale of skins?—No, I would not; it would destroy the pelts. That is the only method I know of.

163. *Captain Blackburne.*] You mentioned having received some wool from a ship which had caught fire. What vessel was that?—I think it was the "Jessie Osborne," that was in 1902; then there was the "Turakina" and the "Waimate." I know I was called in question over that case. I remember it was wool that had been scoured, and it was on the wharf. It had been stowed near some tallow, and the tallow had become liquid and had run through the wool. I considered at that time that it was dangerous, and would have nothing to do with it. It was slightly damp and was dangerous. However, the wool was shipped in the vessel. It might have got Home all right, but it was certainly in a dangerous condition. The tallow was right throughout the bales.

164. *Mr. Foster.*] So, in your opinion, the necessary conditions for a good fire were there, but it did not come off?—Yes, exactly.

165. *Captain Blackburne.*] In the case of the "Waimate" it was stowed by flax. There must have been something warm to start the tallow running out of the casks?—Yes, the tallow was right through the wool. I would have put that wool on the hopper and driven steam right through it, and driven the tallow out of it. That would be the only way to get it out. That is what I would have done if I had taken the wool.

For the information of the Commissioners an extract from the judgment of Woods, V.C., *in re Hepburn v. Lordan* on the spontaneous ignition of jute was put in and marked "Exhibit No. 2."

An extract from Watts's "Dictionary of Chemistry," being an expert opinion on spontaneous combustion, was put in and marked "Exhibit No. 3."

DILNOT SLADDEN, Managing Director, Wellington Meat Export Company, sworn and examined.
(No. 3.)

166. *The Chairman.*] Would you be good enough to give the Commission some information in regard to the matters we are inquiring into: will you give us the result of your experience?—I am afraid I cannot give any direct evidence on the subject. I have no recollection of having ever had to do with either wool or flax that is heated to any serious extent. I am afraid I am very much like other people, I can only surmise.

167. *Mr. Foster.*] I thought, Mr. Sladden, that, at any rate, if your experience in connection with the heated conditions of wool was not very wide, you might be able to give us some suggestions as to the direction in which we could look for the information we are seeking?—Well, I have been looking for information on the subject myself, and I do not know where to get it. I have no definite theory or any particular views to advance on the subject.

168. Would it be likely that any of your employees would be able to give us any information which would throw light on the subject?—Well, the man in charge of the fellmongery has had a good deal of experience; he has been connected with wool all his life, and has a good deal to do with packing both greasy and slipe wools and skins.

169. Would that be particularly since he has been with your company or prior to that?—Prior to that; he had a good deal more experience before he was employed by our company than since.

170. He was in the employ of Mr. Tyer?—Yes.

171. *Captain Blackburne.*] You do not know of any experiments having been made with wet wool?—I do not know of any experiments. There have been some experiments made with charcoal, and I have noted myself the results of dry animal matter very often; but that does not come into the question. Heat is very readily generated in that case, especially with blood.

172. *Mr. Foster.*] Might not that have some bearing in regard to blood on dry sheep-skins?—I do not think so. I should say it is more often from moisture left in the pelt itself than from moisture left in the wool.

173. Assuming that moisture was left in the skin or wool, and with the presence of blood about the neck as is usually the case with wool from country stations, would that promote a further heat?—I do not think there would be sufficient quantity. The peculiarity about blood appears to be that it is more difficult to extract moisture from it than from other animal tissue, and I think it will heat with a smaller percentage of water in it—there is a smaller percentage of blood than, say, dry tissue.

174. Does blood attract moisture from the atmosphere to any extent?—Yes, very often. If you dry blood down to a dryness—or wetness—of 6 per cent. of water, and expose it to the atmosphere—if you were to expose it in such a room as this with the same atmosphere, the 6 per cent. would increase to 16 or 17 per cent., and possibly even more, of water that it would take from the air.

175. *The Chairman.*] It would absorb that?—Yes.

176. *Mr. Foster.*] And would that be sufficient to create fermentation or heat?—Yes. You must not take my figures as absolutely correct, but I think that with 17 or 18 per cent. of moisture, if you put dry blood into the bag it would generate heat in a very few hours.

177. So that blood, from atmospheric conditions, may become dangerous?—Yes, in quantity; but I think it would have to be in greater quantities than possibly could be found in a bale of skins, for instance.

178. Have you had any experience in regard to the shipping of wool that might benefit us in any way?—I do not think so. With regard to heated wool, we had one bale sent back from the wharf some years ago—sent back warm—but it was unpacked as soon as it was sent back, and it was then found that it had been packed before it was quite cool from the driers, and it was repacked at once.

179. But the temperature found at the stage you speak of, of course, had not gone up from the time, but merely held its heat?—It had gone down, I think. I understood afterwards that the surveyor, Captain Bendall, said that he had not intended sending it back, but was going to put it by for a day, and if he had done that the temperature would have gone down a good deal; but, as a matter of fact, the manager of the fellmongery heard there was a bale warm on the wharf, and he sent for it at once to unpack it.

180. Could you make any suggestion as to preventative means—first, of detecting damp, and then as to detecting damp in the event of there being any dampness in bales?—It would require a very complete system of testing and supervision to be of any value, because I take it that in some instances it might be not only days but weeks before any heat is generated worth mentioning.

181. *Captain Blackburne.*] Do you think it would take as long as that?—It might, yes. Of course, the number of fires that occur in proportion to the large quantity of wool that is shipped shows that it is only under extremely exceptional circumstances that anything like spontaneous combustion can take place, supposing that it does take place. It is impossible to believe but that there must be slightly wet fleeces sometimes packed by accident or carelessness, and out of so many hundreds of thousands or millions of fleeces that are packed, no doubt there must be some wet bales occasionally, and yet the fires are very few and far between, so that to be able to provide any test that would reach these exceptional cases you would, I think, have to be very careful.

182. *Mr. Foster.*] Does it strike you that the fires that have occurred recently are in any way due to features of the market and conditions of weather this last season?—Well, it certainly has occurred to me that it has been one of the dampest seasons; to use a farmer's expression, it has been one of the greenest seasons. The grass has been green all the year, and there has been a very well-spread rainfall throughout the summer, and also a great deal of rain during shearing-time, so that I certainly have thought myself that the wet season had probably something to do with it,

for the reason that wet fleece wool being packed was possibly owing to the difficulty in drying wool that had been washed or scoured and dried outside; but, of course, that is only surmise.

183. *Captain Blackburne.*] There seems to be a general impression that there is very much more risk in what is called dags and locks?—No doubt there is a lot of foul animal matter about it that would undoubtedly tend to make it heat much more quickly.

184. Are such bales marked differently so that they could be easily distinguished?—Well, I can hardly tell you. My experience with sheep is in the time when there were none of these long-wool sheep in the country; they were all merinos, and there were no dags with merinos in the old days on the tussocks; it is the product of English wool and closer-feeding sheep, so that I cannot offer any opinion upon that subject. Of course, we do not, as far as the fellmongery is concerned, pack any wool in that condition. If it is daggy it is either worth washing, or so bad that it has to be thrown away.

185. *Mr. Foster.*] Has it come under your notice during the past season—in the spring of last year—that the sheep were very much dirtier about the breech than in an ordinary season?—I do not think so. Of course, in the early part of the year the sheep are shorn and they do not show it. I do not remember hearing anything about it, or noticing anything about it.

186. Have you any set rules in your fellmongery to insure that the wool is in a proper condition for packing?—No, there are no written regulations; but with the way in which we dry our wool, where every drying-table is superintended by a man and the wool turned by hand, there is less risk of its being passed as dry when not dry than there is in those machines that take it in at one end and deliver it at the other end dry. The men are continually handling the wool on the drying-table just in the same way that men handle the wool on the ground to dry. The men feel it, and generally as it is dry—they pass it in.

187. *Captain Blackburne.*] You do not consider there is any danger from baling the wool hot that comes straight from the machine?—I do not think any one does bale it straight from the machine—it is always piled in bins. I never saw it baled straight from the drier, but I do not think that if it was properly dried it would make any difference.

188. I noticed that a stevedore wanted to make out that that was one of the likely causes?—Yes, I noticed that; but I do not think that is so—at least, that is not my opinion.

189. I think Mr. Burrige said that it would be rather the reverse—that there would be less risk, and I think he made some experiments. Do you know anything about it?—No; I do not know of any experiments having been tried in that direction.

190. *The Chairman.*] Is there anything else you would like to say?—No, sir; I have really nothing to say. Anything I have to say on the subject would be purely surmise. I am sorry I cannot give you anything more definite.

191. You have, from your knowledge, had no wet wool sent back from the ship except that one bale you mentioned?—No. I have never had any indication in any wool reports which pointed in any way to there having been any wet wool packed. Of course, we get some report on the wool; if it is seedy or limy we get a report, but I have not had any indication that the wool was wet.

192. *Captain Blackburne.*] How many years does that cover?—About sixteen or seventeen years.

193. *Mr. Foster.*] How do your weights come out in London—do you find an increase or shortage?—I think there is very often an increase, but, of course, you cannot tell; something has to be allowed for the inaccuracy of the scales, but I think, on the whole, the tendency is for a better sale weight than weight shipped.

194. Would that indicate, in your opinion, that your wool was put in, if anything, extra dry?—Well, yes. The only way one would suppose it could accumulate heat is by taking in moisture.

195. Then, wool being affected by the condition of the atmosphere, if put in extra dry, would come back to the condition of the atmosphere?—I think so. You find if you put skins enclosed in the hold of a ship they will take in moisture in the tropics. Where the air is heavily laden wool will do the same.

196. *Captain Blackburne.*] Were you affected by the fire on the “Gothic”?—Not that I know of. I do not think we had any wool in the “Gothic”; but I am waiting on the reports, hoping like other people to get more detailed accounts—in fact, to get a copy of the proceedings, but at the present time I know nothing whatever.

ALBERT EDWIN EXLEY sworn and examined. (No. 4.)

197. *The Chairman.*] What is your name?—Albert Edwin Exley.

198. What are you?—I am one of the directors of the Wellington Woollen Company.

199. We are trying to fathom, as far as three men can fathom, what is the cause of these fires in ships, and it has been suggested to us that you could give us some information on the matter?—I do not know that I have any suggestion to make by way of preventing them. It seems a very difficult thing to devise a preventative.

200. What has been your experience?—I have never had any experience of wool catching fire on the way Home. I have been shipping—

201. How many years have you been shipping wool?—About twenty years before I went out of business.

202. You have never had any case of the wool catching fire?—No.

203. *Mr. Foster.*] Have you ever had any of your wool heated in packing?—Perhaps on three occasions they have sent a bale back from the wharf wet. It has generally been stained by the rain going in. I have not seen any wool in my experience that has come back overheated.

204. Have you ever seen any wool that has been heated on board ship to the extent of almost firing?—Yes, we have had wool scoured and wet-packed quite hot—burning hot.

205. And did you form from what you saw and heard any theory as to the cause of it?—The cause of it is simply it is wet and grease combined which produced the heat and spontaneous combustion. I cannot see that wool would ignite spontaneously—I mean get into a blaze. I cannot credit that wool would blaze.

206. *The Chairman.*] You do not think it could get to the point of incandescence, I suppose?—No.

207. You do not think it would heat sufficiently to set fire to the gunny-bag?—There is that point; it might do that, at any rate. It is certainly gross carelessness to send wool in that condition—I mean it is wilful carelessness.

208. *Mr. Foster.*] Have such cases of carelessness ever come under your notice?—No, I do not remember any. The wools that I referred to that had been sent back to be scoured and packed have been ship-damaged wools damaged in shipwrecks.

209. You have been a fairly large buyer in local markets?—Yes.

210. Have you ever found it come into the sale-rooms in a wet condition?—Oh, yes; this last season it was quite notorious—wet wool in the rooms.

211. *The Chairman.*] Quite notorious?—Yes; it was quite notorious amongst the shearers that they were shearing damp wool.

212. *Mr. Foster.*] You mean, I suppose, North Island wool?—Yes, North Island wool that I have heard of. I have heard many cases round the district of shearers growling at having to shear it so wet.

213. Have you any idea of what became of the wool which was wet in these rooms?—It was shipped.

214. In that condition?—Yes. You would not call it wet, but from a buyer's point of view there was too much wet.

215. If you had known about wool being placed on board a boat in that condition, would you have any hesitation in taking a passage in that boat?—I do not think so, not that it would be dangerous. I think it is in the bellies and pieces where the most danger is.

216. The locks?—Yes, the locks and pieces.

217. You have also been a buyer in the skin-markets?—Oh, yes.

218. Have you noticed skins coming forward in a condition of dampness?—They are not what I call in a shipping condition by any means.

219. Do you know of any cases where they came forward, and if they had not been sold would have been placed direct on board ship?—The baled skins are generally dry enough. I never noticed any damp in the bales. It is in the big heaps that come loose from the butchers.

220. They would not be likely to be shipped in that condition?—Well, I do not think they get much treatment. I think they are baled up within a week and shipped. I do not think they are taken to be redried to any great extent.

221. Do you think, Mr. Exley, from your experience, that it would be safe for a runholder to shear his sheep, as they call it, wet, providing he did not pack the belly-pieces and locks, &c.?—I do not think that a moderate amount of moisture would be dangerous in the body-wool—in the fleece wool—but I think it would be in the bellies and locks.

222. A former witness was asked as to whether he thought the chemical used for slipping the skins would be likely to prove dangerous if there was any quantity of the wool packed. Have you had any experience of that to lead you to form an opinion?—I should not think so. Of course, in a condition of moisture the chemical would act very severely on the wool, but it would not make it blaze. It would crumble it—destroy it. It is sulphide of lime and calcium, and if you packed it damp it would burn the wool—destroy it and crumble it.

223. But it would burn it more from a chemical action than from heat?—Yes, not so much heat as a chemical action.

224. *The Chairman.*] You do not from your experience think the high price of wool at the present time is likely to be any inducement to those who have wool to push it along too fast?—I do not think that was the inducement; but they are so urged by buyers and brokers for quick delivery that that might induce them. You mean trying to secure the high price in London?

225. Yes, trying to secure the high price in case it should go down?—They were certainly very eager to catch the early boats, and they were moving all they knew to get the wool off early.

226. Might that not have induced them to bale the wool earlier than they should have done?—No doubt it led to the carelessness in the condition of the wool last season.

227. *Mr. Foster.*] Have any cases come under your notice where in transit wool has got seriously wet and heated in consequence?—Oh, yes; that often happens with country wool coming in by rail.

228. *The Chairman.*] Do you mean to say that it would get damp to any considerable extent coming in?—Yes, sometimes there is considerable rain through a leaky tarpaulin. It would run right to the centre of the bale sometimes. You can generally detect it, and they would generally notice it on the wharf—they would see the stain.

229. And then it would be opened up?—Yes.

230. *Mr. Foster.*] In the ordinary way of covering with a tarpaulin or even in a slight rain, the uncovered portion—or, I suppose, wool packed in a shed gets a certain amount of water?—But it would dry out again without doing any damage. It is only where there is a persistent drop, drop, drop where it penetrates right to the centre.

231. Or where the bale lies quite flat and the water would not run off?—Yes.

232. Can you suggest any method by which the packing of damp wool could be prevented or detected later on?—It ought to be detectable if it was examined by inserting a thermometer. Of course, it is a tedious thing. Twenty-four hours after packing ought to indicate by a rise in temperature if it is not safe to ship. In forty-eight hours you might be perfectly sure if the temperature has not considerably risen that it is safe to ship.

233. *Captain Blackburne.*] Can you detect that by the hand?—Not on the outside of the bale. You would if it lay there for a month.

234. Mr. Burridge seemed to think that twenty-four hours would be sufficient to indicate by the hand?—It all depends on the degree of dampness. Slips wool would increase much quicker than scoured. It would show itself much quicker where it pressed on another bale; but if you had, say, one, it would take a longer time to detect it by the hand, but where two bales were lying on top of one another, remove them and put your hand in, you would detect it, say, within forty-eight hours, but I do not think you would detect that in any other part of the bale exposed to the air.

235. With regard to the bales that have been sent back to you that you were speaking of, what temperature do you suppose they got up to?—My own wools?

236. The bales that have come under your notice that had been wet in transit in the railway or wagons?—I think the temperature would be getting on to 180°—you could not bear the hand in it.

237. That would have been in a comparatively short time?—Rapidly going to pieces. I should say it crumbles, but I cannot believe that it would blaze—it would disappear in dust.

238. And unless it was in contact with jute or flax?—Just so. I do not know that it might not in that case.

239. *Mr. Foster.*] Do you think, after wool reached a temperature of 170° to 180°, if it was maintained at that temperature—do you think that it would not then fire?—I do not think so. It would rot just like dung, and shrink to ashes.

240. Has it ever come under your notice that in a grass fire the wool along the bellies of sheep is very much burned? There, of course, it hangs where the air can get amongst it?—Where it has been exposed to the sun and got very dry?

241. Yes, that is approaching the degree it would be at in 180°?—It would be moist as well as hot in the bale. In the bale it would not become so bone-dry as when exposed to the sun in the field.

242. But would it not be the case that if it was still a little bit damp at 170° it would go on until all the moisture was exhausted—evaporation?—I suppose so.

243. And then at the highest point it might catch: Might it not be inflammable then?—I cannot say—I have never known of it. I have seen wool almost disappear by its own spontaneous shrinking—that is what you call spontaneous combustion—no flame. If you put a heap of wool out in a paddock piled up and left it there to do as it liked, it would gradually shrink and shrink to nothing—go to dust on the surface. You must have seen also on the stations heavy fleeces go to almost nothing—in fact, the sheep as well, and the carcase, too.

244. Rotted on the ground?—Rotted away to almost nothing. A sheep that would weigh 120 lb. has simply melted away to nothing, only the bones and a little sign of wool left.

245. Might it not be the case that in regard to fleeces of wool, you apply a flame to it—it looks fibrous, but it will not burn until it has become solid—is not that the case?—Yes.

246. Could you see the condition of the temperature that is on the outside of the woolpack that would come to that condition?—I think you would reach the temperature, dissolving the fibre first.

247. On the inside; but what about the outside edges where it was in contact with the wool-packs?—Well, I cannot say; it might be able to ignite. I do not know at what temperature that would ignite.

248. From your experience with regard to heated bales, the outside of the bale has been in contact with the air all round it?—Yes.

249. But under altered conditions—a ship's hold, for instance—where there is comparatively no circulation and where the temperature gets up to a high degree, can you imagine this outside wool-bale getting so hot as to burst into flames?—I can certainly imagine it setting fire to the pack—the hemp and the packs.

250. Have you ever had a quantity of old wool-bales heated—saturated with grease, and found any heat at all?—Yes, only when there is moisture—grease only would not do it.

251. *Captain Blackburne.*] Or any piece of oily jute?—Yes, damp with water as well. I do not think jute and oil alone would generate heat.

252. *Mr. Foster.*] I think it has been demonstrated that jute sacks saturated with grease will fire spontaneously?—Without moisture?

253. Well, I have seen that, without moisture—for instance, fires in boiling-down establishments have been traced to that—leaving sacks on one side in a heap. An expert opinion has been given [Exhibit 3]: “Instances are known of olive-oil igniting upon sawdust; of greasy rags from butter, heaped together, taking fire within a period of twenty-four hours”?—Butter contains a considerable amount of water—that is not pure fat.

254. Then, again, “instances are known of olive-oil igniting upon sawdust” [Exhibit 3]?—The sawdust might be damp.

WELLINGTON, WEDNESDAY, 15TH AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

GEORGE HERBERT SCALES sworn and examined. (No. 5.)

1. *The Chairman.*] What are you, Mr. Scales?—I am a ship-charterer.

2. You have had considerable experience in connection with the shipping of wool, flax, and other produce?—Yes, some years. About ten years. Most of the ships I have loaded have been with wool cargoes, although some portions have been flax and tow, but mainly wool.

3. Have you supervised these loadings yourself?—Yes, I always do.

4. Perhaps you would give the Commission the benefit of your experience and observations relating to the subject of the Commission?—Well, I have given the matter very full consideration, and unless we begin at the beginning it is hard to know where to commence. However, I have some notes here from which I can give you some of my experience and observations. It seems to me that we have to consider the possibilities of circumstances arising with each of the subject-matters of the inquiry, so as to give the opportunity to the combustible elements to operate, and to do this the process attaching to each from the beginning needs to be followed. This process I would divide into three heads. First, there is the manufacture; second, the removal; and, third, the sea transit. Of course, what I am giving you is my own opinion—I may be right or wrong; but, so far as I know, the main cause of spontaneous combustion would be dampness owing to wet getting into the bales of wool or flax. It has been freely suggested in the colony this season—since the fires have occurred—that it has been owing to the very wet season which we had that has caused a greater degree of dampness. Another factor which has been attributed is the high value of wool, flax, and tow which has prevailed recently. However much that may be true, I do not think that materially altered the general course of business in the case of flax and tow. They are products which are very seldom exported on behalf of the owner, being almost invariably sold to merchants or speculators, who sell them abroad. The high values ruling in the wool-market, however, during last season almost entirely changed the usual disposition of the entire clip. Practically one-half of it was sold at auction in the colony, besides a very large portion of the remainder was sold privately. This, no doubt, had a tendency to hurry forward the delivery, and the high prices also probably tended to assist it. I think it was a fact that the growers who ship on their own account sought to get their wool on to the market at Home as soon as possible. Then, let us admit all this—not only the desire to press forward the clip, but that as a matter of fact it was actually pressed forward. If we are to investigate this matter we must begin by ascertaining during each month or given period throughout the shearing season—as far as wool is concerned—whether the climatic conditions obtaining were uncommon or merely common. Assuming for the moment that the climatic conditions universally were common, we obtain a factor that has been prevalently expressed as an important one in the theory of spontaneous combustion during the last season. I think it may be fairly assumed, if there is logic in the argument, that it would only be reasonable to expect to find the effect produced throughout the entire season's shipment; but, on examination of the fires that have occurred, it will be found that, at any rate, with the exception of one—that is, the "Pitcairn Island"—they were confined to vessels sailing from New Zealand after the end of March. I am not in a position to state where the wool carried by the steamers that "fired" came from, or when it was shorn, and I have no doubt this will be available in evidence before the Commission, and, although it would be reasonable to assume that in the main it would consist of late-shorn wool other than washed, still it is quite possible that even a considerable portion of it may have been shorn in quite the early part of the season. On analysing the total shipments from the colony we find that 360,386 bales were shipped in vessels sailing between the 1st July and the 31st March out of a total of 415,378 bales shipped for the whole season, and out of this enormous proportion of the whole not one solitary instance of spontaneous combustion occurred. It might be unwise to assert that this fact alone negatived the theory of the prejudicial effect of uncommon climatic conditions. To a great extent it does, but until all the conditions attaching to the wool on board those vessels that caught fire have been examined, it cannot be denied that some truth may be found in the hypothesis. If, however, it can be shown conclusively that the whole of the wool, or such part of it as was shipped in the grease, was late-shorn, or, if not, was shorn under favourable circumstances and climatic conditions, then it clearly must be held that the uncommon climatic conditions obtaining throughout the colony during the shearing season could not have been a factor in the matter of spontaneous combustion in wool-ships, not even when taken in conjunction with the uncommon commercial conditions coexistent. With reference to the flax and tow, the same contention holds good, and the supporters of the theory under discussion have not left to them the same ground to stand upon, inasmuch that it may be asserted with confidence that the whole of the flax and tow shipped in those vessels on which fire broke out was of late production, and that the whole shipments for the season—up to the middle of April, consisting of 86,939 bales of flax and 21,148 bales of tow were not subjected to any ill effects owing to the uncommon conditions now under consideration. As is probably known—and you will no doubt have expert evidence before you to prove—flax to be successfully scutched must be practically dry. If it is not thoroughly dry when scutched the flax and tow on leaving the scutch-house should be dry. Many years ago the flax-millers considered that if the flax, after being bleached, was stacked for some weeks a better-quality article would be produced, and I have known at mills of my own the manager to have large stacks consisting of many tons of half-dressed material out in the paddock for weeks. It is questionable whether the flax picked up from the ground could be considered absolutely dry; unless this was so, if spontaneous combustion was a reasonable result to anticipate owing to the compression of flax in a damp state, these stacks should, it may be considered, have evidenced at any rate some inclination to fire, as, although the pressure that is applied to the bales when dumped was missing, still the stacking to a considerable height of several tons applied no inconsiderable pressure, and, so far as I know, never was a case of spontaneous combustion heard of, or even any degree of heat above normal. In stating this it must be borne in mind that I was not personally handling the material, and therefore the evidence of millers who have handled it would naturally be of more value upon this point, as heating to some extent might have taken place without my knowledge. Tow is usually cleaned from the scutch-house, and was—though it may not be now—stacked in heaps to be shaken out and baled up for transport. The value of the article until recently has been so low that many flax-millers deemed it not worth while to bale up and sell, therefore it was customary for the tow to lie in the open until some of the hands cared—in their own time—to take on the baling as an extra, the cost of baling, as a rule, plus the cost of transport, absorbing the greater part of the value. For

many years, I think I may say, that was the custom, and there is no doubt this led to great possibilities of the tow being baled up damp. Lately—say, during the last eighteen to twenty-four months—the value has gone up enormously, and is now from 200 to 300 per cent. above what it was two years ago—that is in figures from about £2 to £2 10s. per ton to £7 to £9 per ton. Under the circumstances, and speaking without actual knowledge, it is not unreasonable to assume that millers have taken during the last twelve to eighteen months considerably more care of this by-product. The tow is pressed into bales and bound either with hemp, rope, or wire ties, and is then ready for shipment. Assuming then that the tow has either not been taken in hand for baling from the outside heap when damp, or has been confined in a shed after removal from the scutching-machines, it should under any circumstances be thoroughly dry. Now, the only other matter to be dealt with in this connection is the preparation of the wool. I think it is very well known that sheep should be shorn dry, and the process of preparation must be so well known to every one that I need not take up your time by going over it again. Outside the question of climate, or whether with proper shearing accommodation, it is plain that wool should be in a fit condition for shipment after being baled up in the shed. Whether locks and pieces are entitled to be so regarded is a question that is possibly open to doubt, and one on which expert opinion would no doubt be forthcoming.

5. *Captain Blackburne.*] We were told yesterday that it was notorious among the shearers that a great deal of wool has been sent here from sheep shorn this year more or less wet, owing, I suppose, to the high price and owing to the wet season they were anxious to get the wool forward as soon as possible. Do you know anything about that?—No. It only seems to me that if it is true then the theory that damp wool will combust is knocked on the head.

6. *The Chairman.*] There would have been fires long before they did occur if that had been the fact?—Yes. I believe that October was the wettest month during the season. Any wool shorn in October would have been rushed in in order to be shipped in time to catch the January sales. I would not say that the wettest month from a meteorological point of view would necessarily by any means be the wettest for shearing, for you will realise that there might be considerably more rainfall in a month extending over a few days, whereas less rain in light showers spread over a greater number of days would interfere more with a shearing. The quantity of wool sent away for the January sales must have been—the bulk of it—October shearing, and I say that if the statement made be true that a very considerable number of sheep have been shorn during the season with the wool wet, then that wool has been shipped and it has arrived Home safely without any sign of fire whatever. In that case, how does the argument stand that wool when wet is liable to spontaneous combustion?

7. Would it not more likely be in the early part of the season that they would hold over their wool, and not rush it so much as they did later on?—The sheep-farmer?

8. Yes. In the case of those who are shearing—or are accustomed to shear in October; they find it wet, are they likely to hold over? He will not be so particular as the farmer who is shearing late and cannot afford to wait?—Those who shear in October have a desire to catch the January sales. Of course, you will realise that all or most farmers have a fancy for some particular sales, either from habit or as the result of some profitable experience of them—however, they like to catch some particular sales. I am not going to say that the man who shears in October will run the risk that a man who shears later will not. From what Captain Blackburne said—that it has been stated that a great deal of the wool was shorn wet during the season—then, if that is so, why did not the wool that left Wellington earlier ignite, instead of that which left all within a week?

9. *Captain Blackburne.*] You have seen letters written to the papers purporting to come from shearers?—Yes.

10. *Mr. Foster.*] You are consignee of wool-shipments: has it come under your notice that complaints have been made by shearers that the owners sheared damp sheep?—No; I have never heard of any.

11. Have you had many occasions to return wool to be reconditioned owing to being wet in transit?—I do not know about many; I have had to occasionally—only occasionally.

12. And have they been very wet or only slightly?—I should say not very. Of course, the measure of wet varies in the bales.

13. Of course, where you have to get it reconditioned the underwriters pay for it?—Yes.

14. And it would not occur to you to make any inquiries as to whether the damp was greater or lesser of late?—I was just coming to that point. The position has lately changed to what it was before, and I was about to deal with the question of removal generally. The conditions attaching to removal appear to me to apply equally to wool, flax, and tow, as all three pass through exactly the same process, and I fail to see that the inherent qualities of either render one more susceptible than the other to any of the causes that might tend to spontaneous combustion, always provided that reasonable and proper care is taken, as otherwise a very slight shower of rain, which would have no appreciable effect on the bale of wool, might soak into and damp the bale of tow if uncovered. The removal will consist of cartage, railage, or water carriage. What is necessary in the way of clean and dry carts, trucks, and coverings is obvious. The onus of supplying clean and dry carts with their coverings would naturally fall on the carrier, be he the mill-owner or the contractor. The position, however, when it gets to railage, is possibly not so clearly defined. The railage supplies the trucks at a siding, and in the truck they will probably leave a tarpaulin, the carrier having to do the loading. In the event of rain having fallen since the truck was side-tracked, on whom does the onus of cleaning and drying fall?

15. *The Chairman.*] The cleaning and drying of the truck itself?—Yes. It would be side-tracked by some evening train, and when the carrier comes to load his wool or flax he finds there is an inch or two of water in the truck. Again, after loading, the carrier presumably covers over the tarpaulin, and makes it fast. The truck then goes out of his control, and whether from faulty handling, tying, or quality of rope, the tarpaulin is liable to come adrift. Serious consequences

are not yet assured owing to the fact that on discharge the wet may be noticed; but it is possible that the bales may have dried before discharge, or, in the case of wool, the packs may have dried, in which case the risk of detection is remote, unless the amount of water is so great as to be perceptible when the bales are dumped. Wool, flax, and tow arriving in Wellington for shipment are received by the Harbour Board, whose officials, so far as can be learned by results, exercise considerable care so far as the examination of wet bales is concerned. Until recently they were assisted by a surveyor in the employ of the underwriters, but I believe at the beginning of last season his services were dispensed with. The Harbour Board officials continued, however, to stop from shipment all bales observably wet, pending instructions from either owner, agent, or the ship.

16. *Captain Blackburne.*] Do the railway-trucks not have some dunnage in the bottom, such as hurdles, or anything for the bales to rest on?—I do not think so. I do not know of anything of the kind.

Mr. Foster: By "dunnage" is meant loose dunnage?

Captain Blackburne: Yes, loose dunnage.

Mr. Foster: No, they are flush on the floor.

Captain Blackburne: In that case no water could lie in the truck.

Mr. Foster: That is so. I noticed that Mr. Scales said there might be an inch or two of water in the truck, but they have a flap door, and the very fact of opening it would liberate any water which might otherwise be held in it.

16A. *Mr. Foster.*] In your opinion, might wool generate heat, although insufficient to create spontaneous combustion in itself, yet sufficient to be a danger to a more easily inflammable material, such as hemp or tow;—or cause a conflagration that would not eventuate without the presence in the vessel of the more inflammable matter?—I have given this matter some reflection, and am of opinion that on consideration it will be seen that the conflagration would ensue whether the flax or tow was in the vessel or not, owing to the fact that if the heat generated by the wool be sufficient to ignite the hemp, it would be also sufficient to ignite the woolpacks in which the wool itself is baled.

17. *The Chairman.*] There would not be a stringer on the floor of the truck or anything to retain it?—No. But there is no doubt whatever but that large quantities of wool come into Wellington badly stained. I have had cases where we have been unable to trace the blame—whether to the carter or to the railway people.

18. *Mr. Foster.*] Where there are regular loading-warehouses at the railway-stations there would not be any such trouble, but at the sidings it would be more likely to occur?—In cases where there are proper goods-sheds and stations the trucks would be put into the sheds overnight, and would be dry.

19. If I remember right, the conditions of delivery are that when the consignor gets his delivery-note the goods-shed are responsible, are they not?—That is all right up to that point; but the sender loses control as soon as he has put his tarpaulin on and has tied his rope—some one else then takes control. I do not know who is to be responsible. I do not know whether it fixes it, but there is the point about it. What I have said on the matter up to this stage has been with reference to wool that is actually delivered into or on to the wharves. A large quantity of wool is brought to Wellington for transshipment overside from one vessel into another.

20. *The Chairman.*] There would be no inspection there at all?—No—that is, the Harbour Board does not concern itself about it.

21. They do not look at its condition?—Sometimes.

22. Where does this wool come from?—From Wanganui, Patea, and Blenheim.

23. Brought down in the river-steamers?—Yes, and brought alongside the oversea steamers for transshipment.

24. *Captain Blackburne.*] I suppose some of these small east-coast boats are really taken through the surf?—Yes; a lot of the wool from between Christchurch and Auckland is surf loaded.

25. *Mr. Foster.*] In your experience, have there been many claims for reconditioning in respect of the east-coast wool? I have seen a good deal of surf loading, and I have not seen much trouble arise from it?—Personally, no. My own experience leads me to say that I have not found much damage to be done to the surf-loaded wool; but, of course, it is a known quantity, and can be ascertained. I have had wool shipped at one or two places on the coast to me for many years, and we have never had to pay a claim for reconditioning it.

26. The extra premium for surf loading is trivial. It is not seriously regarded?—No. Prior to the surveyor being dispensed with, on wool being found to be wet on arrival at Wellington one of three courses was followed. If slightly wet the bale was cut open where the wet showed, and placed in a sunny spot on the wharf to dry. If it were very wet the surveyor ordered it to be scoured, but if it were too wet to be allowed to stand on the wharf to dry, and not sufficiently wet to require scouring, it was ordered to be merely reconditioned and repacked. Somewhat the same course has been followed during the past season by mutual arrangement and understanding and arrangement as between the agent and the Board's officials. With regard to flax, this all has to be inspected for the purposes of grading, and part of the system of inspection is comprised in drawing hanks from the bales, and, provided that a reasonable number are drawn, the inspection for quality should be sufficient also for dampness, though there is always the possibility that, although each bale was made up at one time, all the hanks comprising it may not have been subject to the same climatic conditions. With regard to tow, no inspection whatever takes place other than a general supervision as in the case of wool. After instructions are given by shippers as to shipment, wool, flax, and tow are dumped and then stacked in the shed pending delivery to the seagoing vessel.

27. *Captain Blackburne.*] I understand that the Flax-graders take a skein out of every third bale and open up every tenth bale altogether?—Yes; that is what I used to do when I was grading. For many years I graded most of the flax that passed through Wellington.

28. *Mr. Foster.*] You draw a sample from every few bales, and you take it that the whole quantity is similar in condition with the quality exhibited?—Yes.

29. Assuming, on opening one in ten, you find dampness, would you assume that the whole parcel was damp in consequence?—Yes, I have always done so. Should I see any sign of dampness I would immediately condemn the whole parcel.

30. *Captain Blackburne.*] You said there was no inspection of tow?—No, none whatever.

31. In your experience, you do not think it heats to any dangerous extent?—I do not think so.

32. *Mr. Foster.*] You mentioned a little time ago that wool found to be slightly wet was set aside to be dried, and if more seriously wet it would be ordered to be scoured. Do I understand from you that the Marine Surveyor had the right to say whether the wool would be scoured or reconditioned? Did it not rest with the owner to say what he would do with it?—I am inclined to think they used to accept his *ipse dixit*. I would like to qualify what I have already said on that question, because Captain Bendall is here and can give you the information first-hand. I was giving you my own experience. I know, if I was told that the surveyor had instructed that it should be scoured, I have said, "Well, let it be scoured," without questioning it at all. I may have taken it rather literally.

33. *Mr. Foster.*] I think the owner had the right to deal with it as he desired?—Yes, he should say whether it should be reconditioned or scoured; but where it was wet with salt water, I think it was a recognised thing that it should be scoured.

34. *Captain Blackburne.*] You were going to give us a few figures?—Well, I had finished the first stage and was about to pass on to the sea transit, and in dealing with that I should like to say that we may assume that this stage begins with or immediately after the dumping and stacking under instructions from the ship. The period during which the cargo is stacked dumped varies, and unless the application of great pressure is necessary for the generation of heat, or productive of and greatly accelerating combustion, it would not appear to greatly affect the question. If both the pressure necessary for the generation of heat, and productive of and greatly accelerating combustion, apply, and a time can be arrived at within which combustion under a specified pressure will ensue, the length of time given any parcel of wool, flax, or tow may have been stacked dumped may warrant a feeling of moral certitude as to the immunity from fire of such cargo. Instances will probably be obtainable of bales in the stack waiting shipment having generated a very intense degree of heat. On a vessel giving notice of readiness to receive cargo the bales are delivered by the Board's officials by carts or trollies alongside the ship, and left on the wharf to be taken on board the ship by the stevedores. This all takes place in the open. I would like it to be understood that from this stage my remarks must be taken to apply to sailing-vessels only. Well, between the time the bales leave the shed-door and are placed in the hold of the ship the liability to get wet or damp—apart from rain falling on them—is the possibility of their being placed on the wet wharf or on the deck of the vessel when wet. I have always found the greatest possible care exhibited by both the Harbour Board officials and the masters of the vessels, the latter, as a rule, insisting upon dunnage being laid upon the deck under the wool. Masters are also invariably careful in seeing that the hatchways are covered during rain. The vessels carrying wool-cargoes all have to obtain a certificate from Lloyd's surveyor as to their condition before loading, and the surveyor pays visits of inspection during the course of the loading. The stiffening under cargoes loaded by me generally consists either of ore or old iron, and I have never heard that on either of these any wool, flax, or tow received damage from dampness. With an insufficiency of dunnage there might be a risk of wool getting wet in the bilges with the ship heeling over. A greater quantity of dunnage would be required in the case of a modern flat-bottomed ship than in the old type of clipper. The "Pitcairn Island," though not as flat as some I have loaded, was more of the modern than of the old type. Her stiffening, however, consisted of several hundred tons of old iron with a few tons of rock, which rose to a height of from 1 ft. to 2 ft. 6 in. above the keelson from wing to wing. I have carried somewhere in the neighbourhood of two hundred thousand bales of wool, flax, and tow—of which only a very few bales were flax—and the tow has all been shipped uncovered. A few vessels may have been sent away with only wool-carcoes, but the great majority have carried wool and tow.

35. *Captain Blackburne.*] I thought you were obliged to cover the tow?—No. The steamers will give you a lower rate of freight if you cover the bales of tow with hessian.

36. That which was shipped in the "Pitcairn Island" was not covered?—No; I have never covered a bale of tow.

37. I understood that that which was shipped in the "Pitcairn Island" at Wellington remained in her for about two months before she left?—Yes. From about the middle of January to the end of March. It was taken in before she went south.

38. *The Chairman.*] It was taken in at Wellington at about the time there was some trouble about some oil?—Yes, before she went south to finish her discharging.

39. *Captain Blackburne.*] Was there any tow taken in after that?—No. She went south and took in the wool there. She took in about two thousand bales of wool at Dunedin, and then came on here in the month of March. The tow had been accumulating on the wharves here from about September. I do not think she took any tow that had not been dumped for three months. She had been here for three months before the balance of the cargo was taken in.

40. Do you stow wool and tow in the same holds alongside of one another?—Yes. You understand that the wool is at the bottom, and, as a rule, the tow is on the 'tween-decks by itself. Sometimes we stow it down below, but a good deal depends upon the stiffening these ships carry. The stevedores use it for trimming purposes.

41. Is it screwed in sailing-ships?—Yes.

42. That does not leave any opportunity for friction?—I do not think so.

43. Have you any opinion yourself as to the cause of the fire on the "Pitcairn Island"—any idea of the possible cause?—I do not know. The only wool I could put it down to would be some

wool taken in south. The wool we put on board here had been in store for a very long time. I am inclined to think there was bad weather at Dunedin during the time she was loading. I am not sure about that.

44. About March?—Yes. That vessel took wool from many places. I think from the Bluff, from Dunedin, Timaru, Christchurch, Wellington, Blenheim, Gisborne, and, I believe, Napier.

45. *The Chairman.*] In what order did she load her cargo?—She came here with inward cargo, and after discharging it she took in tow. She then went to Dunedin and discharged the balance of her inward cargo, took in stiffening—some four or five hundred tons of iron, and I had to give her a little rock besides, that was to bring her up here. If she had finished loading there that would not have been necessary. She then took in about two thousand bales at Dunedin, and came on here and took in another 3,500 bales.

46. Which had arrived from various ports?—Yes.

47. Did she sail direct for London?—Yes. She only loaded at Dunedin and Wellington.

48. That 3,500 bales which she took in here came from various places?—Yes, it was collected here from various places. I am not sure whether she took in Christchurch wool here or in Dunedin; but, speaking from memory, I think she took Christchurch, Timaru, and Blenheim wool here. I am doubtful if she had Napier or Gisborne wool here or not. I can find out from my books and let you know.

49. If you have any reason to correct that you will let us know?—Yes, I will.

50. *Captain Blackburne.*] I see they have corrected the telegram about the fire being due to spontaneous combustion in the tow, and the finding of the Court at Valparaiso shows that is was in the wool?—You have a copy of that telegram. London cables me that the opinion there is that the wool is responsible and not the tow.

51. What length of time do you suppose that Dunedin wool was on board the ship up to the time it caught fire?—The Dunedin wool—I think she got away from here on the 19th March; I think a good deal of that would have gone in between the 20th and 25th February. I should say it was put on board the last thing before leaving Dunedin, and put on board quickly. I could let you have the exact dates within a day or two. I should say it had been dumped just previous to shipment, for I think a considerable portion of it was scoured. To return to the question of the tow, I would like to give you a few particulars about my shipments. I have shipped during the last few years, on my own account, nearly thirty thousand bales of tow, all uncovered, in nearly a hundred vessels, and I have not yet heard of one instance of any tow arriving in a damaged condition, or showing any signs of dampness. These figures, of course, do not include nor do they refer to shipments made to the Australian Colonies—and I do a good deal of shipping to Australia. It would be safe to assume that wool was carried in every one of those hundred vessels I have spoken of. At the same time, it must be borne in mind that my own shipments represent only a moiety of the whole export from the colony which has been spread over each year, and in the carrying of which probably some hundreds of vessels have been engaged, each of them also carrying wool and flax. Evidence as to whether any of these shipments were landed in bad condition will doubtless be forthcoming from those interested. I have never had any trouble so far as my own shipments are concerned, and I have never had one solitary letter or word in any shape complaining as to the condition—

52. *Mr. Foster.*] Except as to the few bales you mentioned?—That was flax, and I did not ship it. I think it was shipped by a Christchurch firm. I sold it, and the letter was just passed on to me. It was complaining that I had passed some bales of flax which were damp. That was some twenty years ago. I am talking now of within the last four or five years. The first case of fire I can call to my mind occurred in the barque "Alice," loaded, I believe, entirely with flax in Wellington. It is many years ago, and, although I was engaged in the survey as a representative of the insurance companies, I cannot be sure as to what the finding of the Court of Inquiry was. To the best of my recollection the fire broke out either at the dinner-hour or just after the hatches were put on, and was attributed to a spark from the galley-funnel.

53. *Mr. Foster.*] At the wharf here?—Yes. That fire was discovered either at the dinner-hour or when the hatches were put on. There was the "Moeraki" fire in Wellington here. We know that was not a case of spontaneous combustion.

54. *Captain Blackburne.*] In the case of most of the fires in harbour there is a strong suspicion that they are due to an outside cause?—No one would attempt to deny the extreme inflammability of a bale of either flax or tow.

55. Yes, I know that, also, in the case of jute, for I have had experience of a ship I was in?—The only other case of interest I can call to my mind is the four-masted barque "Strathgryffe," which left Sydney in March, 1901, with a full cargo of wool, and put into Port Chalmers on fire.

56. What vessel was that?—The "Strathgryffe." She left Sydney in March, 1901, with a cargo of wool, wheat, and tallow, and put into Port Chalmers with her cargo on fire. The cargo was discharged, and it was found to have originated in the wool on the 'tween-decks. She left Sydney on the 8th March, the fire broke out on the 16th, and she put into Port Chalmers on the 24th March.

57. *Mr. Foster.*] Have you formed any opinion as to a theory as to the causes of the fires on ships?—Well, I have given you a digest of my opinions from which you must deduce a theory.

58. Yes, from what you have said we will draw deductions; but what have you yourself drawn? Have you any idea—any theory that you could attribute to it?—No, I cannot ascribe any particular reason for the fires.

59. And you do not care to hazard guesses as to how they originated?—I do not think it will be denied that during the past ten years several very severe cases of generation of heat have been discovered in the Harbour Board's sheds at Wellington.

60. In the wool?—In the wool, ready for shipment.

61. That is exactly what we want to get at?—I have not referred to that, because I take it the Harbour Board's officials will be able to give you that information, and from me it is only second-hand.

62. Have you heard of a case of wool being treated last season and breaking out again—the case of the “Ruapehu,” for instance?—There was a steamer on fire at Napier, just before the “Jessie Osborne” case.

63. *Captain Blackburne.*] The “Waimate”?—Yes; I think a lot of that wool was reconditioned and was reshipped, and a fire broke out in it again next day, and it had to be again reconditioned.

64. *Mr. Foster.*] Did you see anything of that particular case?—I forget. I cannot call it to mind.

65. Can you say anything as to the temperature of these particular bales? Have you handled them in a heated state?—I really could not say, because I have seen it in that condition more than once; it was only the other day that we had a case on the wharf. The Harbour Board's people noticed a smell, and turning down the stack came to a bale which had heated. Of course, you could not bear your hand in it.

66. You have no theory as to the necessary temperature required to be generated before becoming dangerous?—No.

67. Have you inspected any of the wool at the wool-sales during last season?—None.

68. It was given in evidence that wool came in in a bad condition to the wool-sales, and it was also stated that where the wool was too damp to be sold here it was sent on in the same condition?—I do not know anything about that.

JAMES SCOTT MACLAURIN sworn and examined. (No. 6.)

69. *The Chairman.*] You are the Government Analyst?—Yes.

70. You understand, I suppose, the object of this Commission?—Yes.

71. Perhaps you may be able to give us some information with reference to the causes, or what may be supposed to be the causes, of spontaneous combustion in wool and flax?—Yes. Well, of course I have no special knowledge of the subject. I have a general knowledge of both matters, but I have no special knowledge in regard to wool and flax, and so on; but I should say that the cause was due to oxidation, caused either by the action of oxygen alone, as in the case of wool with oil. Many oils oxidize very rapidly: linseed-oil is the extreme case of oils of that kind, but most oils oxidize more or less. Any oil will absorb a certain amount of moisture from the air, and so become heated if spread over a sufficient surface. Then there is another cause of heating, which would be the action of bacteria, which would naturally be an initial action. They could not cause combustion, because they would be killed by the time combustion was reached, but they might start the action. We have all sorts of fermentation set up by bacteria, and you have a case of wool or flax containing organic substances: wool, for instance, containing dirt of any kind, animal matter, and so on, would, of course, clearly contain a number of bacteria, and these under favourable conditions would set up a certain amount of fermentation; they might heat the cargo to a certain extent, and then oxidation would go on and cause combustion.

72. *Mr. Foster.*] Have you made any special study of the conditions of wool, &c.?—No, I have not made any special study.

73. Do you think you would like to make an investigation before saying anything definite?—I think so. I think before this Commission comes to a finding on independent grounds, that information obtained by it should be laid before one or more people who are competent to make an investigation.

74. But I suppose you would not be prepared to go very much further than the statement you have already made until you have had time to investigate?—No; I can only go on general lines—of chemical actions that take place under certain conditions. It is well known that spontaneous combustion is caused in rags containing oil, and also it is well known that cargoes of coal take fire spontaneously. That is due to the oxidation, the coal being broken up very fine and absorbing a large amount of oxygen. The heat cannot get away—that is the main cause. Oxidation does not take place more rapidly than it does in a case of this kind; but the heat cannot get away, and, of course, there is overheating, especially where the coal is very much broken up.

75. *The Chairman.*] And that exposes a very much larger surface?—Yes, of course; and, as I say, the heat cannot get away—that is the great point; but as to the best methods of shipping wool and flax, and so on, of course I cannot say anything very definite.

76. *Mr. Foster.*] Would the presence of moisture add to the risk of increasing the temperature in wool?—Well, in the case of wool I am doubtful if it would; but I think that in the case of clean wool the action would be oxidation and the oil; but in the case of dirty wool it would probably add to the risk, because there the bacteria action would take place, as the moisture is necessary for them. Of course, a certain amount of moisture is necessary for oxidation, but it is only a small amount of moisture that would be present; but for the development of bacteria to a high extent a considerable amount of moisture is necessary.

77. *Captain Blackburne.*] Would this be greater if wool or flax was stowed in a hot place like over the boilers than it would if stowed in a cooler part of the ship?—That gives a higher initial temperature. If it is purely a matter of oxidation, then the hotter it is the more readily it will ignite.

78. Can you suggest anything with regard to a system of ventilation which you think ought to be adopted on steamers?—Well, that is hardly a point I can go into at the present moment.

79. Some years ago they used to ventilate coal both by surface ventilation and through ventilation, but they came to the conclusion that through ventilation was very dangerous in ventilating a coal-cargo. A Royal Commission was set up in London, and they recommended that nothing but surface ventilation should be adopted?—What was the form of through ventilation?

80. Well, shafts through the coal?—Just a few shafts, I suppose.

81. Yes, causing a current of air to go right through the whole of it?—I have no doubt that if ventilation could be carried out to a very much larger extent it would stop the heating, but I do not suppose from an economical point of view it would be possible.

82. You cannot get ventilation to go through the bales?—No; I was thinking of coal.

83. *Mr. Foster.*] I suppose there should be a certain amount of ventilation in a hold?—Yes; that would keep the temperature down.

84. *The Chairman.*] Would you be able, Dr. Maclaurin, if you could get information as to the way in which wool is stowed on board ships, to give us some idea as to what takes place there?—Well, I might; it is rather difficult to say beforehand.

85. But supposing we put it into your way, if we got the information for you, would you take the trouble?—Do you mean to experiment?

86. Yes?—Oh, yes, I should be quite prepared to go in for any experimental work, but I could not do it offhand; it would require perhaps months to do it.

87. *Mr. Foster.*] If you could take a little time now and follow the preparations of wool and get information together from the packing on the stations, carrying to the port, method of dealing with it in the Harbour Board sheds, and putting into the hold, I suppose you could give evidence later on which would be more material to us than you can at the present moment?—Well, I should be very willing, if you could give that information. I do not know that I should have anything very definite; I cannot say beforehand.

88. But it would enable you to form an idea?—I should certainly have a better idea. Of course, I have a general idea of what is done now in regard to packing, and so on.

89. Well, from what you know, then, have you drawn any inference as to the cause of the fires?—Do you mean as to the best conditions of shipping?

90. What I mean is, have you formed any idea as to the actual cause of these fires? At present it has not been ascertained whether they originated in flax or wool; in fact, we do not know anything yet?—I think that either or any of these causes might be liable to result in combustion; but, of course, there is no doubt that dirty wool and not-properly-cleaned flax would be worse than properly cleaned flax or good wool. There is no doubt about that, to my mind.

91. Do you think that damp flax without any oil in contact at all would fire?—I think that damp flax might; I cannot say definitely. There is no doubt that oxidation would take place very rapidly in a case of that kind where there is a very large surface. I think it is extremely likely. Haystacks are liable to combustion.

92. *The Chairman.*] Is it not the outside of the haystack where it takes fire: where it is in contact with the air?—Possibly the flames would be first noticed there, but I think the smouldering goes on inside first. Of course, there could not be any real flame inside, because there would not be sufficient oxygen inside; it would smoulder away, but, of course, no doubt the heat is generated from the inside.

93. Well, taking the woolpack—that is, the wool dumped—and the heat having generated inside, do you think it is likely or not that it is the outside covering, the pack itself, that may take fire? It is very difficult to ignite wool?—The difficulty there is that the outside of the pack—the covering of the wool—would be much cooler, would it not, because there would be a certain amount of air circulating round it.

94. Supposing it was in the ship's hold: there might be sufficient heat to ignite the outside covering itself, but not sufficient to ignite the wool?—Yes. My only difficulty is, the outside of the pack being less liable to become heated—that is to say, if the wool is liable to the heat that is in the ship—it would still be kept cooler on the outside pack. I think it would be possible, especially with oily wool.

95. *Mr. Foster.*] Under the conditions of dumping, the packs are frequently completely saturated with grease—the jute?—Yes, I see.

96. And jute and grease together are much more inflammable than the wool?—Yes, that is so.

97. *Captain Blackburne.*] Do you think the friction which might result from a ship rolling heavily, if the bales are not stowed very tightly together, would add to the risk at all?—Well, of course, it would add to it, but I do not think there would be very much in it. The friction would not be likely to take place over the same spot again and again; it would very likely be at different spots.

98. It may be slow, but it may go on for a long time?—It might help a little, of course. I do not think it would be sufficient to start ignition by itself.

99. Do you think it is possible that spontaneous combustion can take place in damp wool?—Yes; I think it is quite possible. Of course—take silk, for instance, that is not very readily inflammable, but it is more so than wool, and the temperature of that has been raised to the extent of 200° in two hours in the presence of oil. That is, of course, not in the condition of a pack, but in the loose.

100. *Captain Blackburne.*] Can you indicate the time it would generally take to start combustion?—It is extremely hard to say that; it would depend so much on many conditions.

101. Could you tell us at what temperature spontaneous combustion would take place in, say, wool, flax, green grass, or green flax?—Well, I should say probably over 400° centigrade. A low red heat is 500°, and it would need to be very close up to red heat, unless, of course, gases are evolved, and, if so, the temperature would be very much lower. The bacteria action which I said might take place—in that case gases might be evolved which would cause combustion.

102. There would be charring before any flame?—Yes, before any possible sign of it.

103. Do you think the risk would be greater if wool and flax were stowed alongside one another?—Yes, I think it would, because oil from the wool would then get on the flax, which would certainly make it more inflammable.

104. *Mr. Foster.*] Would you consider it necessary to have a fairly large body of flax in contact with wool before there would be that danger?—Well, no.

105. Well, that being so, the woolpack, which has practically the same constituent parts as flax, if that was full of grease, would that take the place of flax?—There is the point that it is very thin—there is no body to it—that is the only difficulty. I think that it might probably take the place, but I think it would be less liable than even a small amount of flax, say, even a quarter of a bale of flax or a single bale. It would be more liable to take fire than the flax itself.

106. You see, where two packs were stowed together with a body of wool on either side?—Yes. I suppose the contact is very close.

107. *Captain Blackburne.*] And with organic matter inflammable gases may accumulate?—It might. With organic matter carbonic-acid gas is given off, which, of course, is not inflammable; but sometimes there are inflammable gases given off.

HUGH FREDERICK DAVID sworn and examined. (No. 7.)

108. *The Chairman.*] What is your name?—Hugh Frederick David.

109. You are master of the s.s. "Corinthic"?—Yes.

110. As you are in charge of a large steamer, you may be able to give us some idea as to the risks, and the remedies which you would adopt to avoid these risks, in regard to wool and flax or in regard to preventative means?—Yes. Well, I take it that you briefly want me to tell you what I know about it?

111. Yes?—Well, up to the present stage that has arisen lately with reference to the fires in these steamers, I have never had any experience of spontaneous combustion either in flax or wool. The precautions that we should take would be those which would suggest themselves in regard to cargoes of that nature, such as examination before shipment of the exterior only of the bale or bales, as the case may be, the attention to the hold being dry and ventilated in the usual way. Our means of extinguishing these fires when they do occur—in our ships, at any rate—is by steam. We have steam fire-extinguishers fitted to each ship—in each hold—but they do not seem to have been quite effective in the case of the "Gothic"—at least, they were effective inasmuch as they subdued the fire until the hatches were removed. I am, of course, speaking without any direct evidence on the subject, more or less from hearsay, but I believe that was the case, that until the hatches were removed the steam kept the fire under control; it did not assume any great magnitude.

112. *Captain Blackburne.*] Are none of your ships fitted with the Clayton fire-extinguisher?—None at present that I know of; we use steam only.

113. I suppose you have had conversations with those who have used the Clayton machine?—Yes, I have had a little conversation with one or two people on the subject, and they seemed to be very much impressed with the reliability of it. I think it was the "Turakina" in which they had some slight trouble with a fire here, and it was suppressed easily, the real principle of it being that I think they use what is chemically known as SO_2 pumped into the hold by means of a machine. In other words, it practically means pumping burning sulphur into the hold.

114. Captain Jaggard was so impressed with the value of it that he said he would not mind leaving Wellington to start on a journey round the Horn if he had this Clayton machine with him, and it was in order?—I quite agree with him. There is no doubt that from the experience we have gained from it, it is superior to steam—no doubt about that.

115. Do you store the wool in the warm places like over the stoke-hold or round about the boilers?—In our ships we have no place which is in what you might call the vicinity of either the engine-room or stoke-hold that is not insulated. For instance, above the engine bulkhead it is an insulated hold, and in most of our ships—the Australian and colonial ships—that bulkhead is insulated with a view to reducing the temperature which might arise in the hold.

116. You do not take meat there, I suppose?—Oh, yes. It is insulated for that purpose. I am only speaking of this one instance in the engine-room bulkhead—it divides the engine-room from the hold. We have no cargo-carrying space any closer to the bulkhead of the engine-room; it is always subdivided by a bulkhead.

117. It would not be in the 'tween-decks?—Oh, no. [Sketch drawn, and explained to the Commissioners.] All our ships are practically of the same design.

118. What is used for the bulkhead insulation?—Silicate of cotton. All the latest ships of ours, the "Athenic" and "Ionic," are insulated with silicate.

119. Charcoal is practically given up now?—Yes. Silicate is lighter, it is a little more expensive, but, of course, the weight is much less, and it is considered a much more effective insulator or non-conductor than charcoal.

120. In a former inquiry, ten years ago, Sir James Hector spoke against charcoal and recommended calcined pumice?—Yes; I think pumice is used, but I think the principal steamers have silicate in lieu of it.

121. Do you test the holds systematically at all on the voyage to see whether any of the holds are heating?—If we are carrying a general cargo?

122. Yes, when you have wool?—Oh, yes, we make a practice of taking the temperature daily when we have a large quantity particularly.

123. In taking cargo in at Wellington or other places, do you work right through the rain?—No; we knock off if the rain is at all likely to damage or even to wet the exterior of the bale to any appreciable extent. In light mist we might probably work through, but certainly not in rain.

124. Is the wool and flax often stowed in contact with one another—close together?—We stow them in the same hold, but we always separate them. If they are put close to one another they are always separated by battens of wood and mats to absorb—for instance, the flax has a tendency to absorb the grease from the wool to a certain extent.

125. And you put dunnage between?—Dunnage and mats—both as a rule.

126. The hold is kept well ventilated?—Yes, all our ships are fitted in much the same way: the ventilators go up and down and bulkheads, and they extend from the top into each deck. They are always kept shipped at sea except in very abnormal circumstances, which seldom arise. I mean abnormal circumstances in regard to weather.

127. I suppose one turned to the wind and one from it?—Yes, of course, with exceptional weather and sea, but particularly in moderate weather they are controlled to form a current of air passing through the hold, the lee one towards the wind and the weather one away from it.

128. Do you think there is any possibility or likelihood of sparks getting down the ventilators sometimes from smokers or the funnel or anything of that sort?—It is possible, of course, but we protect the mouth of the ventilator with a wire covering.

129. All of them?—Those that are in the ordinary reach of the passengers and crew are protected in that way, and if we have any inflammable cargo underneath the mouths of the ventilators we take some precautionary measures, and I have even put sawdust underneath so as to prevent the sparks getting at the cargo.

130. Do the electric wires ever run through any part of the hold so that there may be any danger of one of them fusing?—We have none. All our cargo circuits are above the deck, and we lead down a line into the hold with portable wires.

131. Have you ever found bales of wool or flax heated much?—In my experience I cannot recollect any.

132. *Mr. Foster.*] With what has come under your notice, did you form any theory as to the cause of these fires?—I have thought over the matter a good deal, and judging from the average period which seems to have elapsed between the ships leaving New Zealand and the outbreak of fire, it seems to me to be from some unusual cause, something which has not occurred in the usual running of the steamers. I have been on this trade both as officer and master of a ship for some seven or eight years, and I have no recollection of an epidemic of this sort before, and the reasonable deduction from that experience would be that in this particular instance or instances it must be due to some abnormal circumstances, either in the wool itself or the handling or packing of it in the colony. I was in the "Gothic" for some two years or so, and we carried many bales of wool and flax during that time without any outbreak of fire or any damage.

133. *The Chairman.*] Would you say that the cause is something outside the ship itself?—I should say so.

134. Not connected with the stowing?—I should say not. Of course, you can only generalise on the subject, and it would appear now that, having carried wool to and fro in these same ships of the company without any epidemic of fires such as have occurred recently, you could look to other causes than to the ship for it. I do not mean to say that it is impossible for the cause to arise in the ship, but it is certainly abnormal.

135. *Mr. Foster.*] You have seen heated wool?—I have seen it, but not coming out of a ship.

136. I do not mean at the end of the journey; I mean some may have been found hot and rejected?—Those instances have occurred on the wharf from time to time.

137. Do you think wool in that condition at the start would take so long before getting sufficiently hot to catch fire: for instance, the "Gothic" was practically right Home when she fired?—Yes. Well, I can only speak from my own experience, and I have never come across a similar case. If a bale was discovered on the wharf in a heated condition, it would not be shipped; it is obviously unfit for shipment.

138. If damp was the cause of it there must be something approaching that hot condition which would not be detected?—I can quite understand that it is possible for a bale to escape notice and be heated internally without there being an external evidence of it, and going into the ship in that condition.

139. That being so, it would surprise you that the outbreak of fire would be so long delayed as in the case of the "Gothic"?—Yes, for the experience is certainly abnormal.

140. *Captain Blackburne.*] Do you think it is at all likely that the wool got wet on the latter part of the voyage by bad weather—down the ventilator?—In that case I think it most improbable. You see, for at least three weeks prior to the outbreak of fire she would pass through the tropics, where the weather is never anything more than moderate. For water to break on board ship in that part of the world is almost next door to impossible.

141. Say within three or four days of her arrival in England?—Well, you see the fire occurred in the "Gothic" in the No. 3 hold, which was about as well protected as it possibly could be from weather-conditions. It is improbable for water to have found its way there.

142. No likelihood of a pipe in the hold?—Well, that question can only be reasonably answered by the people on the spot. There would be no reason for the crew to have access to that hold. Of course, it is possible. The ship called at Teneriffe, and something may have occurred which we know nothing about, but in the ordinary way I should think the theory of its being set fire to by some cause in the ship has not very much to support it.

143. I mean through a considerable amount of wet having got into the cargo through some accident or bad weather. We have heard of rats gnawing pipes, and that may occur?—All those things are possible.

144. We cannot get any information about that yet?—No; you would require, of course, to come into contact with some member of the ship's crew who was there at the time.

145. Is the wool stowed so closely together that there is no chance whatever of its creating friction through the heavy rolling of the ship?—But I think, generally speaking, wool is packed so tight that the probability—you mean such as sparks from the bands, and so on?

146. I mean the heavy rolling of the ship might set up a certain amount of friction?—But it would have to be very badly stowed, in my opinion, to give you any uneasiness on that score.

147. You do not think it would?—No; as a rule, it is stowed rather too tightly to anticipate that.

148. And then, if it did roll, it would all roll together?—Not absolutely necessary. Ships roll so little now as compared with what they did in years gone by. There is no doubt that ships fitted with the bilge keel roll very little as compared with ships of ten years ago.

149. *Mr. Foster.*] But if it is, the friction is so slight as to be of no effect?—I think that can be disregarded.

150. Unless other conditions were so favourable that it only requires something to set it off?—Yes, I think you are right. In other words, the rolling of a ship of itself is not likely to cause sufficient friction to produce fire by the rubbing of one bale against another.

151. Then, to come back to the previous question: you formed no opinion in your own mind at all as to what may have been the cause of these fires?—No; I cannot give any feasible explanation, except I consider it is more likely to have occurred in the wool than in the flax.

152. You carried a cargo of wool, of course, in the last season?—Yes; we were the ship prior to the "Gothic."

153. Had you any reason to suppose that the wool was wetter last season than in previous years: did anything come under your notice as to the condition of the wool, or any remarks about it?—No; I had no reason to suspect that the condition of the wool was anything out of the ordinary.

154. Have you any suggestions to make, Captain David, as to precautionary measures ashore and afloat?—I think it would be advisable in the interests of all concerned if wool and flax or tow was subject to examination by some outside official other than the ships' people before shipment to test it in whatever way may be considered desirable.

155. Of course, you are aware that the Harbour Board to a very great extent does exercise that supervision?—Yes.

156. As to the carrying-out of the tests so far, I think the hand and the nose is pretty well depended upon to ascertain whether wool is heated. Have you any method in your mind which could be applied to give an actual test of the interior?—No; I must confess I have not.

157. Because that is where the seat of the trouble is, and it may be getting fairly bad inside before there is any outward indication?—Yes, exactly. It seems to me that short of opening the bale you have no real absolute proof.

158. It has been suggested that a sort of stiletto with a thermometer in could be used, but that would seem to be a big undertaking for some of our people?—Yes, a good deal would depend upon the muscles of the examiner.

159. *Captain Blackburne.*] Captain Bendall always used a steel spike; but that was only when his attention was called to a bale that was apparently heated?—Yes.

160. *Mr. Foster.*] It would require to be forced in with a hammer?—Yes.

161. But to test the temperature the thermometer would have to be in a tube?—Yes, on account of the risk of damaging the thermometer.

162. Are any steps taken during the voyage to ascertain the temperature of the holds in the various parts where inflammables of this kind are stored?—Yes, we take the temperatures daily. We take the temperatures of frozen cargo very regularly indeed, every four hours; but in any of the holds in which we have combustible materials I take it daily.

163. In the event of any serious heating, it would be quite detectable?—You would get a rise of temperature in passing from the Southern Ocean into the tropics; but the taking of these temperatures would give you at least some warning of anything abnormal in the condition of the cargo itself.

164. Of course, the increased temperature of water, &c., is a known quantity pretty well owing to the latitude?—Oh, yes. I think that by taking the temperature regularly, and taking the temperature of the outside air as a criterion, you would be able to gauge fairly accurately if the condition of the cargo was anything but what it should be. Any abnormal heating of the air would be detected easily.

165. *Captain Blackburne.*] We have had a letter from a gentleman at Wanganui, informing us of a bell which acts if the temperature rises to any great extent. Have you heard anything about it?—No; that is outside the scope of the average mariner. I dare say it is quite workable; but if you take the temperature—that is, you let the thermometer remain there for anything like a quarter of an hour, and do that twice a day, or if you have any reason to suspect, do it oftener—in fact, open the hatches and do it that way, but it is better to do it through the ventilators—I think that would be better than using appliances of that sort which have electrical conditions connected with them, I suppose. What I mean to infer is that such an arrangement might lead you to neglect other precautions which you might consider yourself justified in neglecting. You might be relying upon this apparatus, which, for all you know to the contrary, might be out of order. Personally, I do not think much of these devices, because the close personal attention which you would otherwise give you would probably neglect.

166. Of course you would require a great number of them?—Yes.

167. *The Chairman.*] You would rather rely upon the regular attention to the finding of the temperatures twice a day?—Undoubtedly. In respect to taking the temperatures of the meat, we do that without any automatic apparatus. It takes a considerable time, and is done every four hours, and there are thirty or forty thermometers to take the reading of, and I think it is a far better indication than by any automatic apparatus.

168. Besides, the man is there to report on the matter?—Exactly.

JAMES HENRY NAPIER ANDERSON BURNS sworn and examined. (No. 8.)

169. *The Chairman.*] You are the manager of the New Zealand Shipping Company?—Yes.

170. You understand the reason for the setting-up of this Commission, Mr. Burns: can you give us any enlightenment on the subject?—I am afraid I cannot as to the causes. However, we take what precautions we can in regard to finding out wet wool, or rather heated wool, and we have

the Clayton fire-extinguisher on board our ships. One of the curious things about it is that nearly all these fires have occurred near England—a long time after sailing in the case of the “Gothic” and “Waimate.” It was only a few days before the “Gothic” arrived in London, and in the case of the “Waimate” it was two days after, when she was in the docks.

171. Can you give any suggestion in regard to that?—No, I cannot.

172. *Captain Blackburne.*] You have known of cases when the wool heated on the ship, have you not?—I only recollect one case of heating in a ship, and that was in wool shipped from one port and transhipped to another.

173. You can tell us what happened in regard to the “Waimate” at Napier?—Yes; that is about three years ago. Some of the wool was saturated with tallow, and when it was scoured they had great difficulty in getting all the tallow out of it. It was some of that wool that was found heated there after it had been reconditioned. It was transhipped to the “Whakatane” from the “Waimate,” and then reshipped to the “Whakatane.”

174. *Mr. Foster.*] And did that reconditioned wool subsequently fire or heat?—No; it had to be rescoured here again. It was done in Napier originally.

175. All the tallow was not taken out?—No.

176. *Captain Blackburne.*] You did not find out how the fire originated in the “Waimate”?—No.

177. *Mr. Foster.*] Was any inquiry held?—Yes, an inquiry at Napier. They never do find out. The same thing happened in the “Turakina”; they could not give any reason for it. That was put out with the Clayton fire-extinguisher in two days.

178. Was the commencement of that fire absolutely located to a bale?—A place was found, but you could not be certain what it was.

179. But the exact spot or bale where it started?—I do not think they found out whether it was wool or flax; but they found out the exact spot on account of the fire in the deck. The machine kept it under all the time in the “Turakina.”

180. And the material immediately under the deck, was that flax or wool?—There was both flax and wool there that had been in some little time; it was stowed from the Bluff and then was shipped to Dunedin, and then here, probably a fortnight at least.

181. I suppose inquiry has been made as to the condition of that wool or flax at the port of shipment?—Yes.

182. Were there any peculiar circumstances?—No, nothing was found out about it. One of the steamers that a fire occurred on will be here on the 28th—the “Rimutaka”—but the fire occurred in the dock in London, and not on the voyage.

183. Have you formed any impression as to the cause of these fires?—No, none whatever.

184. Do you know of anything in the method of examination which would prevent wool not in proper condition from being put on board vessels?—Not unless they were to examine every bale with a pricker or something of that sort. It used to be done a great deal with a pricker.

185. And was there any particular reason for the discontinuance of that method of testing?—I think Captain Bendall used to do it, but he has not been doing any examination at all lately, except when he has been called to do so. They did away with his services.

186. By whom was he employed?—He was employed by the underwriters. When we find heated wool it is generally pointed out to us by the Harbour Board officials, and I fancy they used to inform him also.

187. I suppose the Harbour Board is not responsible in a case of that sort?—No, they are not.

188. And what they do they do voluntarily?—Yes.

189. And so long as they get a clean sheet from the vessel their functions are ended?—Yes.

190. *Captain Blackburne.*] Do you know what shipment caught fire in the “Rimutaka”?—No, we do not.

191. Would you be likely to get advice by the next San Francisco mail?—Probably we shall. We have advices that there were 114 bales burned; that is all we know.

192. *Mr. Foster.*] Will you have advice as to whose consignment it was in—the brand?—I expect we shall have the brand; yes.

193. Have you formed any conclusion as to whether the fires have been in fellmongered wool or country wool?—No idea which it is.

194. Do you happen to know, Mr. Burns, whether there has been a greater proportion of locks, pieces, and low-conditioned wool shipped this year than in previous years?—Only by seeing in the paper that it has been so.

195. No knowledge?—No.

196. Do you receive specifications of the different shipments of wool as to quality?—No; we never know what sort of wool it is.

197. Who does the weighing?—The Harbour Board does all the weighing; we do not do the weighing. At some other ports they would know.

198. *Captain Blackburne.*] Does the Harbour Board weigh all the bales?—No, only when instructed to; they weigh the bulk of it.

199. Are the different kinds of bales of wool distinguishable?—They generally mark what class of wool it is. It is difficult to see what the shipping companies can do in this matter.

200. *Mr. Foster.*] This inquiry is so very much in the interests of the shipping companies and underwriters that I think if we met we might discover something which can be done?—Of course, anything they can do I am quite sure they would.

201. Have you noticed whether there has been a greater quantity of sheep-skins shipped this season than in previous years?—No, I have not noticed it.

202. Have you ever formed any opinion as to the greater inflammability of sheep-skins than of wool?—No.

203. I suppose you know the condition in which sheep-skins are in the bales?—Yes.
204. Where, especially in country skins, there is a considerable amount of fat about the neck and crutch?—Yes.
205. Do you think that would be much more likely to spontaneously combust?—I do not think so; it is perfectly dry and hard.
206. And you have no knowledge as to whether skins have been the commencement of any fire on any occasion?—No.
207. If there is anything in the theory of grease and fibre being more likely to fire spontaneously, I think the better conditions are in the skins—there is more grease than in the wool?—Yes, a great deal more grease.

WELLINGTON, THURSDAY, 16TH AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

GEORGE GORDON SMITH sworn and examined. (No. 9.)

1. *The Chairman.*] What are you, Captain Smith?—I am Superintendent of Mercantile Marine.
2. I presume you know the object of the Commission, and I think you can assist us somewhat, more directly with regard to the probable causes of fires on ships loaded with wool, flax, tow, and suchlike. You have had considerable experience of this class of cargo?—Yes, I have had a little experience. I served five years' apprenticeship in wool sailing-ships trading between Sydney, Melbourne, and London, in the Aberdeen Clipper Line. I have also served as second officer and chief officer in sailing-ships trading between Port Natal and London, carrying wool. I have seen wool heated where they were breaking it out of the tiers in the London Docks; when one bale has been broken out from the top of the layer of bales it would be as much as you could do to put your hand upon the bales, the wool had become heated to such an extent. I never saw any flamed or smouldering during my apprenticeship, but I can mention a case which I saw occur in another ship. This was the case of the "Omar Pasha," a ship belonging to the Aberdeen Clipper Line. She arrived in London from Sydney or Melbourne, and when she arrived in London Docks, and the hatches were taken off, it was discovered that several bales were smouldering, and also that some of the beams of the ship were smouldering too, but there were no flames. I presume if the hatches had been taken off during the voyage for any purpose they might have caused the beams, at any rate, to flame; I do not know about the wool, but there is no doubt the wood would. That is really all my experience of wool being on fire. I have never seen anything myself of wool fires.
3. *Mr. Foster.*] By "smouldering" you mean that fire was there—alive?—Yes, live fire.
4. Not merely steam and smoke?—There must have been live fire, because it burned through the sacking on top and around the bales. It was immediately under the beams, and the ship's beams were on fire.
5. So the woolpack had actually burnt and communicated the fire to the beams?—Yes. Of course, you realise that that is now a very long time ago. It is thirty years ago.
6. *Captain Blackburne.*] You were aboard that vessel?—Yes; she belonged to the same owners as my ship, and we boys mustered up and went there to see what it was like. I remember the case very well indeed.
7. Was water applied at once to put it out?—No; they got it out without water. They may have used it, but the bales were not burnt much; but, of course, they would not allow any burning wool to land on the docks. I could not say what became of them.
8. *Mr. Foster.*] Supposing a bale, the covering of which had been burnt, had been lower down in the hold of the ship, in the body of the cargo, would there have been greater danger of a general conflagration than if it were close up to the beams?—I do not know that it would. I think coming in contact with the beam that the beams burnt when the wool would not.
9. What I have in my mind is this: that woolpack must have become alight before the wood ignited. Very well; if that bale which did ignite had been down in the body of the cargo, do you not think there would have been greater risk of its causing the fire to spread among the bales surrounding it, and thus cause a bigger fire?—Yes. I believe it would have been very serious if it had been any lower down.
10. Besides, it would have increased the temperature in the hold generally?—It certainly would, down below.
11. The fact of it being lower down would give it more area over which the heat could extend, for the heat would ascend?—Yes.
12. So that the fact that it was not a serious fire was probably due to the fact that it happened to be on top instead of down below?—Undoubtedly.
13. *Captain Blackburne.*] You were telling me of an experience you had of an oilskin coat being burnt when rolled up and stowed away?—Yes, but that is a common experience when making oilskins at sea. This was a case where I had a coat made ashore—of cotton—and I oiled it at sea with linseed-oil, boiled and raw. I oiled it and dried it in the tropics, for the purpose of using it when running down the easting. I did not use it owing to having another, so I rolled it up and put it away, and when I came to open it out I found that it was burnt through on the inside. The oil, I presume, was the cause. That is a common occurrence with oilskin coats.
14. *Mr. Foster.*] It would have the same effect on calico as it would have on oily waste, which will combust?—Yes, just the same.

15. Have you had any experience of the receiving and despatch of wool here in Wellington?—No. That does not come under my notice.

16. Have you formed any opinion at all as to the probable cause of these fires?—No, I have not. It is rather a big thing to form an opinion about just now.

17. Have you any suggestions as to the steps that might be taken to guard against the possibilities of fires? Have there been any facts brought under your notice that would lead to any conclusions in this direction?—No.

18. *The Chairman.*] You cannot suggest anything as to supervision?—The only thing I can suggest is to see that the wool is in a thoroughly dry condition—as dry as possible before being shipped.

19. *Mr. Foster.*] You are satisfied, then, that wool put up in a wet condition would be likely to end in conflagration?—Yes.

20. Have you thought whether wool being heated to a certain temperature—whatever that temperature may be—would be likely to catch fire when saturated with grease? Would a greasy woolpack be likely to fire before the wool?—Yes, that was the case in the “Omar Pasha”; the fire was on top of the bales and the woolpack was burnt.

21. That being so, do you think the danger could be lessened if it were possible to saturate the woolpacks when being manufactured with some chemical that would render the woolpack itself less combustible?—No doubt that would very greatly assist.

22. *Captain Blackburne.*] I suppose that wool on board the “Omar Pasha” had been on board three or four months at the least?—Oh, yes. We used to lie in Sydney in those days—about 1869 and 1870—for four months at a time. It might have been on board eight months, some of it. Not those bales that fired, because they were on top; but the bottom bales may have been on board for eight months.

23. It is not so likely that wool would be shipped in a damp condition in Sydney as here?—No.

24. How do you suppose that wool got in that condition in which it was when it fired?—It might have been damp, or it might not have been damp at all; it might have been only greasy. Not wet with water at all.

25. Was it near the hatchway at all?—No, just about under the mainmast, alongside the fresh-water tanks.

26. Was there any possibility of there being a leakage from the fresh-water tanks?—No. I do not think so.

27. Or from wet getting down the mast-casing in any way?—There might have been a drop through the seams of the deck. There is always a weep more or less with wooden ships.

28. And if they had been straining a good deal—the decks—the calking would allow of a weep?—Straining would be likely to cause some spring in the calking, and that might have been the case in the “Omar Pasha.”

29. *Mr. Foster.*] Have you had any experience of the stowing or packing of jute goods from Calcutta?—I have loaded several cargoes of jute bagging from Calcutta to New Zealand.

30. I have been told that the dumping-pressure which the jute gets is so tremendous as to eliminate any possibility of its heating?—I do not know if that is so. I know they are dumped at a greater pressure than wool is dumped at, but whether that greater pressure would eliminate any possibility of heating I cannot tell. I have never seen much heating in them.

31. Do you know of your own knowledge that wool is now dumped lighter than it used to be?—I would say that it is dumped lighter now.

Captain Blackburne: Wool is not stowed so closely in steamers as it was in the old sailing-ship days.

32. *Mr. Foster.*] I know as a matter of fact that the wool-owners object to the wool being heavily dumped—it felts some fibres. It is objected to alike by owners and buyers. As a matter of fact, I know it is not dumped so heavily on that account?—I have seen cases in Wellington where they were screwing the wool into a wooden ship, and they started the ship's decks. That occurred on one of Mr. Scales's vessels loading at Wellington.

33. But the pressure they would put on with the screw would be hardly as great as that of the dump?—No.

Captain Blackburne: The dump presses to the extent of about 90 tons.

34. *Mr. Foster.*] Although the screwing of the wool might put a different shape on the ship, they might not put much of an impression on the bales?—No. There are times when there is a certain amount of friction through the vessel labouring heavily in a sea-way—sailing-ships—and one tier of wool would work on top of the other like this for days and days [illustrating], just as you would rub two pieces of wood together, and it would no doubt heat.

35. I admit that, but you would hardly expect friction like that to cause it to burst into flame, although, if all other conditions were favourable for a fire, it might be the “last straw”?—Yes, it might assist.

36. *The Chairman.*] Do you know anything about flax or tow?—Only that we have carried it loosely in the Union Company's vessels, but I do not know much about it.

37. It has been carried in the same hold as wool?—Yes. It has only been aboard for a matter of two or three days.

38. On the coast here?—Yes.

39. Do you consider it a wise thing to carry it in the same hold as wool?—No; I do not think it should be.

40. Can you tell us if it is covered here before it goes away? Do they insist upon its being covered?—On long voyages? Not that I am aware of.

41. It is just bound round with wire ties as it comes from the mills?—Yes. It is shipped in the same manner as sheep-skins, just as they would ship it to Sydney or along the coast,

42. Do you know anything about the manner in which sheep-skins are packed for shipment on long voyages?—I have seen a good many sheep-skins shipped in bales in the same manner as flax.

43. Not covered?—No, not covered; bales of sheep-skins and leather are shipped just the same—in bales tied.

44. Do you not think that sheep-skins are more liable to spontaneous combustion in that condition than the wool itself?—Yes.

45. Do you think that is because of the animal matter adhering to the skins?—Yes. Very much so.

46. *Mr. Foster.* By that do you mean you would not consider it wise to put them in the same hold—say, not in contact, but in the same hold?—It does not matter about their being in the same hold, provided they are not in contact. That is what I mean.

47. *Captain Blackburne.*] I should imagine there would be great danger if tow were stowed on top of wool, because if the wool heated so far as to char, you could imagine the danger there would be if it were stowed on top?—Yes; that was the case with the "Omar Pasha."

48. *Mr. Foster.*] On the other hand, it would be less likely to be dangerous being on top than it would if it were underneath, for if the heat caused the grease to run it would tend to descend, and would be likely to saturate the wool below?—Yes; in the "Omar Pasha" case, if the bales of wool had been on top, instead of the ship's beams a serious fire would no doubt have been the result—that is what I mean.

49. *Captain Blackburne.*] You have never seen that done?—No; I do not think it is done. They might do it if there was no other space available.

50. The stevedores would probably not realise the danger?—They do not trouble about that; they go by the orders from the foreman. If he tells them to put it in they do so.

51. The loading is usually under the control of the shipping company?—Yes, under the direct control of the shipping companies.

EDGAR JAMES EVANS sworn and examined. (No. 10.)

52. *The Chairman.*] What are you, Captain Evans?—I am Marine Superintendent to the Shaw, Savill, and Albion Company.

53. I think you know the purpose of this Commission, and we shall be glad if you will assist us by giving us the result of your experience of the matters the subject of the inquiry?—I have had no experience of cargo being on fire at sea during the whole of my career. I was for thirty-two years at sea, and for five years of that time was in the Cape mail-service, where we carried wool and skins every voyage homewards from South Africa. I have been for fifteen years in the New Zealand trade on the steamers of this company, and have carried wool, skins, and flax.

54. You had no flax from South Africa?—No, and I have never had any cargo on fire.

55. How were the skins carried from South Africa?—Baled up, uncovered.

56. Are those bales very heavily compressed?—The South African ones were very lightly pressed.

57. *Mr. Foster.*] I suppose skins are either not dumped at all or pressed very lightly?—Nothing like as hard as wool.

58. It would injure the pelt?—Yes, I suppose there must be some reason for it, and that may be it.

59. *Captain Blackburne.*] How were they packed?—Only tied round with rope material. They do not put bands on them, as it would cause injury to the pelts.

60. *Mr. Foster.*] Have you taken particular notice of the handling of the wool at Wellington?—I have been here for nearly four years, but nothing has come under my notice in a special way, unless perhaps if I except one ship about two years ago, the "Kumara." She arrived here from Port Chalmers, and among her cargo were three bales of rabbit-skins which had been put aboard there. When we were about to put Wellington cargo into her we found that two bales were very much heated—in fact, were steaming. We got them up out of the ship and notified the shippers, who took possession of them. They were marked "T. & Co." in a diamond, and were shipped by a Mr. Tonkin, of Port Chalmers. These skins were reconditioned, and were reshipped a month later in the "Corinthic." When the bales were again shipped they were much smaller than when they came out, and that fact would lead me to believe that a good many of the skins had been destroyed.

61. *Mr. Foster.*] Would it come within your department to be advised of the brands of the wool that was on the "Gothic" when she was afire in London?—No; they have never written to me on the subject.

62. I have heard that the Shaw, Savill, and Albion Company have knowledge of the brands of that wool. Can you get that for us?—That may be so. If so, such a communication would reach Mr. Ritchie, of Dunedin, who is the principal of the colonial control of the company's business.

63. For such information you would recommend that we apply to him?—Yes. I have no information about the fire. When I heard of the fire I drew up some particulars which I thought would be of interest to them at Home, so far as my department was concerned here.

64. It does not come within the scope of your duties to watch the wool at all?—We have never anticipated fires until recently, as there have been no fires at sea prior to the recent occurrences.

65. What I mean is that you do not think it necessary to inspect the wool yourselves; you depend upon others?—The cargo ought to be passed to us in good condition.

66. So for that reason you are not likely to have much of it come within your own notice?—No. The generation of heat may take a considerable time. You might receive a bale of wool, which, if you opened it, might be warm in the interior, and before it reached the end of the voyage it might fire.

67. Have you heard of any quite recent cases of the heating of wool on ships?—Some of the Wellington shipments have been found heated.

68. Quite recently?—Yes. Since the "Gothic" left. That has been mentioned to me, but the Harbour Board officials could give you more information on that point.

69. Have you theorized as to the cause of the recent fires?—No, I have not.

70. We are not likely to drag anything out of you, then? It is a curious thing that one hears many fixed conversations outside and a great many theories, but when you get that same individual into a witness-box it is a different thing to what has appeared outside?—When this fire occurred in the "Gothic" a great many people theorized. I was asked for my opinion, in conversation, and I then said, "I have no opinion; I will wait to hear more particulars." It was said it was in the flax—in fact, it appeared in the papers at the time that the opinion of some authorities was that it was the flax, and the opinion became general that it was the flax. Now, however, we find that it was not the flax, it was the wool. So that I am really no more reticent now than I have been outside.

71. *Captain Blackburne.*] Was there any flax in the "Gothic"?—I know how the "Gothic" was stowed as regards this port, and, in fact, all ports. The boats nearly all finish up here, and I prepare two cargo-plans of each ship's stowage, one of which I send Home and the other is kept here. As regards her fire, when the first report reached us it stated that the fire had been discovered in No. 4 hold shortly after leaving Teneriffe. Then I heard that she had arrived at Plymouth and that the saloon was burnt out. From that I at once knew that there must have been another fire in No. 3 hold. If there was one in No. 4 hold and at the same time the saloon was burnt, there must have been two separate fires, for No. 4 hold is abaft the engines and the saloon is at the fore part of the boiler-space and over No. 3 hold.

72. *Captain Blackburne.*] You have had no actual information by mail?—Perhaps they may have got the information through the investigations, but personally I have received nothing. I have, in anticipation of its being of some value, made up a statement of the facts as they appeared to me at this end, and have sent it on to London.

73. *Mr. Foster.*] The plans of the holds—would they show exactly where any portion of any consignment was stowed?—No, we cannot do that; only "wool," "flax," or "tallow," or "other cargo," as the case may be. It would show at which port it was taken in.

74. It is not a plan in the sense of a survey plan?—No; the scale of the ship is vertical, showing the different compartments.

75. It would not indicate whether a certain class of cargo was in contact with another description of cargo?—Oh, yes; it would in the case of the "Gothic." The No. 4 hold had wool in the lower hold up to about level with the tunnel. That was put in at Lyttelton, at her first call-port. On first call I put flax into her here in another hold to be shifted at Lyttelton, and it was taken out there and shifted. I remember that when the ship left here finally we put in about three bales of wool and four or five bales of skins, at the very last moment; these came from Napier, and were the last things put in No. 4, and were consequently uppermost, so that when I heard that No. 4 hold was afire I imagined it might be the Napier wool or skins. It seems, however, so far as I can understand, that they took a considerable quantity of cargo out of No. 4 hold the day after leaving Teneriffe. Of course, although No. 3 hold contained a mixed cargo, I should have filled it up entirely with wool if I had it; but the wool was limited in quantity, and we had plenty of flax. We did as we always do—put dunnage mats between the wool and the flax, as we do with all cargoes of different kinds of the bale class. Flax in this hold was not stowed over wool; the wool was put each side of hold and flax in middle.

76. *Captain Blackburne.*] You do sometimes stow bales of flax on top of the wool?—Yes, we have to do so at times; it is imperative when visiting so many loading-ports, and having to receive cargo at each port as it offers.

77. Was that the case with No. 3 hold?—Yes, you may say it was the case; it was stowed with a mixed cargo. But there is no evidence that the flax caught fire.

78. Only that the flax is so very inflammable, and if the wool became heated to a charring state it would catch fire?—It would be a greater conflagration with flax flaming than would be the case with wool alone.

79. *Mr. Foster.*] Captain David was asked as to the possibility of fire getting into the cargo by way of the ventilators or anything of that sort, and he said there was no risk of that?—Considering the number of years ships have been going without fires at sea, and then a number should occur in one season, I think the theory of matches being thrown down the ventilators is a hollow one. I know that in most of our steamers they have a small wire network over the ventilators to prevent matches getting down the ventilators, but there would be nothing to prevent a person deliberately throwing a match down if he wanted to, yet no sane individual would do such a thing.

80. *Captain Blackburne.*] Have you any pretty hot holds?—No, they are all divided with bulkheads; the bulkhead dividing the stokehold would be a harmless part.

81. Are there spaces cased all round about the stokehold?—No; all the spaces would be pretty rectangular. You are referring to recesses. In any case there would be plenty of coal against the bulkhead—that is, in the bunkers behind those bulkheads, and there could not be any heat unless the coal took fire.

82. *Mr. Foster.*] If there was sufficient heat to cause fire in the bunkers, the coal itself would catch before the cargo would catch on the other side of the bulkhead?—Yes. If the bunkers caught fire there would still be the bulkhead between them and the cargo, and although the fire in the bunkers might generate considerable heat, it would not be likely to be sufficient to set the cargo alight.

83. It would have to be pretty well red-hot?—Yes.

84. And the fire would be located before that?—I have seen a bulkhead pretty nearly red-hot with a coal fire which was subdued without injuring cargo or other side.

85. I should infer from what you say as to the "Gothic" that, whatever originated the fire, it must have originated in the cargo?—Yes, and I will go so far as to say that the primary cause was in the cargo itself before shipment.

86. *Captain Blackburne.*] Are there any electric-light wires leading through the holds?—No, we have electric lights throughout all the ships; but, as regards the holds, they are lit by portable clusters, which are lowered down the holds.

87. I mean wires leading up through the holds from the engine-room?—They would never go through the cargo-space. At times we have outward steerage passengers in the upper deck, but when we put them off the wires are disconnected, so that they could not be connected by any one by accident or otherwise.

88. I have heard from outside talk that occasionally they continue loading these ships while it is raining heavily?—We do not do that in spite of pressure or urgency. If it comes on wet we stop. And as regards the shipment of flax—practically all cargo, in fact—Captain Bendall used to see that it was never shipped in wet weather.

89. But now that Captain Bendall is no longer looking after that?—We are just as careful in that respect as when Captain Bendall was in office. Of course, we should not stop loading for a mere shower of rain.

90. Of course, if that were the case a good deal of rain might accumulate in the hatchways?—Yes, if they were left exposed for any considerable time; but I do not think any prudent man would allow it.

THOMAS GILMORE KEANE SWORN and examined. (No. 11.)

91. *The Chairman.*] What are you, Captain Keane?—I am Assistant Superintendent of Mercantile Marine, in the Shipping Office at present.

92. The members of the Commission believe that you can give them some information relative to the matters the subject of this inquiry, and particularly regarding the loading of wool, and in relation to the unfortunate occurrences which arose from the loading of wool, or flax, or tow. We shall be pleased to hear what you can tell us of your own experience?—Flax and tow I do not know anything about, but I have seen a good deal of wool within the last five years in South Africa and New Zealand. I saw a fire in South Africa in 1902 on board the "Dunrobin Castle," when she was loading wool in the fore hold at Durban. They started in the forenoon at about half past 11. The wool had been lying in the lighters all night covered with tarpaulins, and, as is usual in the tropics, there was a very heavy dew. The wool was damp in consequence of the dew. Well, they started and put in a few tiers, and after about four tiers were in they threw the other bales down on top of them. While we were at luncheon the wool in the fore hold took fire, and we had to put the hose on it. The wool had been in the wool-shed on the wharf for some time, but whether it was the friction of throwing the bales into the hold or the damp caused by the dew that caused the wool to fire I do not know, or whether it was both the damp and the friction is a moot point.

93. *Mr. Foster.*] Did you attribute the fire to the damp from the dew?—I attributed it to the damp condition of the wool. Of course, only one bale took fire, but thirteen or more were damaged by the water.

94. And do you think the dew was sufficient to cause the wool to take fire?—No; water will take a long time to penetrate wool, cotton, or textile cargoes; but I think that the exterior of the bale being wet before loading, or when being loaded into the vessel, is as dangerous as the interior of the bales being wet.

95. Were the bales covering the wool you refer to very greasy?—You could not detect any signs of it outside. They were baled in gunny bagging—burlap.

96. You think that a damp covering in itself is dangerous when with grease?—Yes, I think so.

97. It would add to the inflammability of it if there was grease on it, too?—Undoubtedly.

98. *Captain Blackburne.*] Was there an inquiry into the cause of the fire you spoke of?—In the company's office.

99. Do you know what conclusion they came to—whether they put it down to spontaneous combustion?—Had the bales not been damp at the time it would not have occurred. Nearly all those who were present were of the opinion that that was so.

100. *The Chairman.*] That the cause was partly due to the dampness and to the friction caused by throwing the bales down the lower hold?—I have seen a bale of jute being shot down a greasy plank, and, the outsides of the bale being wet with dew, I saw it catch fire as it slid down the plank.

101. You had the damp and the oil both present there?—Yes, and the friction, too.

102. *Mr. Foster.*] The bale of wool you refer to as having caught fire—did you see the inside of it?—Yes, when it was taken on to the wharf. The fire seemed to have eaten round the outside of the bagging, but the inside of the bale was almost intact.

103. Was there no possibility of the fire having been caused by a match?—No. Of course, there the ships are all loaded and discharged by Kaffirs, and they are inveterate smokers; but they are watched very carefully, and sent out of the hold and the hatches put on in the lunch-hour.

104. *The Chairman.*] That is always done?—Yes, during the meal-hour.

105. *Mr. Foster.*] Are you familiar with the handling of wool here?—No; I have seen none handled here at all.

106. *Captain Blackburne.*] You saw some bales of cotton on fire, I believe?—Yes, I saw some bales of cotton on fire in New Orleans, and inside the bales were found handfuls of lucifers. That was the "Tornado" loading with cotton in New Orleans in 1884. During that one year there were thirty-eight ships afire in the port, all loading cotton. That ship, the "Tornado," was totally destroyed—ship and cargo.

107. *The Chairman.*] Did they assign such an unusual number of fires to cases of incendiarism, or to unknown causes in the cargo?—There were, a great many of them, fires in the ships were lying alongside the wharf, and there are a lot of up-river steamers passing all day. These steamers have four funnels, and burn no coal; they burn wood. They carry passengers up and down the Mississippi, and, owing to the fuel, they discharge great quantities of sparks through the great number of funnels, and the bales of cotton lying along the levee—as they call the wharves—are likely to catch the sparks flying with a brisk wind. But I should imagine that if these sparks were in the cotton they would show themselves before it got into the ship.

108. *Captain Blackburne.*] They would not smoulder for days?—No.

109. *Mr. Foster.*] The matches you said were in the bales—they did not cause the fire?—The matches were intact almost in the centre of the bale, and very little damaged by fire or water. These were the common American matches, not in boxes but in cones. When you want to use one you break one off. They will not strike on any hard surface, only on soft fabrics, such as your sleeve. And in the interior of this bale was the handful of these lucifers. The man to whom the cargo belonged in which the matches were found ran away, but I believe he was secured and severely punished.

110. *Captain Blackburne.*] Where was the ship?—She was lying alongside the levee in New Orleans.

111. She had not started on her voyage?—No; nearly all the fires took place in the Port of New Orleans.

112. *Mr. Foster.*] Have you formed any opinion as to the causes of fires on wool-ships—that which we are inquiring into now?—I have formed none, and I should not like to be dogmatic about it.

113. I do not think any one can be dogmatic about it, but have you formed any opinion yourself?—I do not think there can be two opinions as to the loading of textile cargo. I think a fruitful source of the trouble is the fact of damp being in the material, and when this is put into the ship it generates heat; then there is the friction.

114. You consider that these fires on the steamers which we are most concerned about—do you think the weather they encounter is sufficient to cause this friction?—There is always bound to be a certain amount of friction in a ship's cargo, no matter how tightly it is stowed.

115. Yet in the case of the "Gothic" it was not during any bad weather that the fires occurred; she was either in or had passed through the tropics?—It is very hard to tell at what time the ignition took place.

116. Would you expect that friction at one time set up heat, and yet if the vessel lay quiet for a considerable time that heat would be maintained?—I think it would depend upon the force and direction of the wind on board. Of course, if there was a great quantity of smoke in the holds it would indicate itself through the deck ventilators. I remember the case of a sailing-ship, the "Rackney," of Liverpool, in which the whole cargo was found to be afire on the way Home, and before they got round the Cape of Good Hope they decided to run for St. Helena. They got there and then decided to take the ship on to Liverpool. They got there safely by keeping the fire in check by pumping water into the holds. When they took the hatches off in Liverpool the flames shot up as high as half-way up the mainmast.

GEORGE MAYO KEBBLE SWORN and examined. (No. 12.)

117. *The Chairman.*] What are you, Mr. Keble?—I am a settler.

118. I understand you wish to give some evidence?—I am going back to the times of 1860. A ship was wrecked in Wellington here, and she had a cargo of wool on board. The wool was got out after it had been in the water for some time, and it was sold to George Moore. We had a flour-mill down at the fresh-water stream at the time, and we gave him permission to dump down the wool in the paddock so that he could wash it with the fresh water. It had remained there about a week, and, as they did not want to open it up until they were ready to wash it, they allowed it to remain there on the paddock where it was carted, but they found it was so hot that they had to cut it open and strew it about, or it would have caught fire eventually. The salt water has some effect in heating wool.

119. *Captain Blackburne.*] Were those bales charred inside?—You could not touch them, they were so hot. The whole bale was hot right through. Another case I remember about some tow. We had some tow stacked in bales alongside the wall. When I came into the shed in the morning I noticed a peculiar smell, and again during the day. We eventually made search, and found one of the bales alongside the wall was smouldering. One of the millers acknowledged after that on the previous day at lunch-time he had dropped a match down between the bale and the wall. So, you see, that bale had been smouldering for twenty-four hours before it was discovered.

120. There was no access of air to where it was?—No. It was well down in the stack. If there had been access of air it would have flamed in no time.

121. *Mr. Foster.*] Have you formed any opinion as to the probable cause of the fires on the wool-steamers?—Ever since seeing that wool will get so hot I have had the opinion that it is due to the wool having been wet.

122. *The Chairman.*] Being shipped when damp. From that you conclude that the probable cause, or one of the causes, was that the wool must have been shipped damp?—Yes, it is always liable to get damp, being shipped at these out-of-the-way stations.

123. *Mr. Foster.*] Do you not think that fresh water would have the same effect as salt water?—I could not give any opinion about that.

124. *Captain Blackburne.*] There was only one bale of that tow which you say was smouldering?—Only one, and that one was against the wall, and it had almost charred the boards through.

EDWARD LOWDER LEES sworn and examined. (No. 13.)

125. *The Chairman.*] I understand you wish to give evidence?—Yes. I wrote you a letter.

126. Oh, yes. I received a letter from you this morning. What are you, Mr. Lees?—I am a wool-buyer.

127. We shall be pleased to hear any evidence you wish to give?—I might say at the outset that I have never seen wool take fire myself; the nearest approach to a fire was in the case of a bag of very fine wool—fine hair wool, locks and pieces—which was being put up for sale. We noticed that the bag was hot and we had it slit open, down and across, and as soon as a slit was made in it and it fell apart there was a violent flame for a second, and then it disappeared. I could hardly account for the flame not continuing except by the expulsion of the air which had collected.

128. *Captain Blackburne.*] There must have been some generation of gases?—Undoubtedly, for what I saw was a gas-flame. I could only say that I saw it. I remember my father speaking of a case of wool taking fire. He was driving from Strath Taieri to Outram, and ahead of him on the road he saw a wagon loaded with wool. He noticed a peculiar haze over the wagon, and when he got within a quarter of a mile of it the wool on top burst into flame. It might have been imagined that the wagoner had been smoking and had dropped a match on the woolpack, but he was not a smoker, nor did he carry any matches with him. They cut all the top bales away, and rolled them in the dust. I have seen wool myself extremely hot—so hot you would think that it would only require a little more to set it afire. I have noticed that some of the witnesses have been referring to vegetation in the wool. I can hardly see that vegetation would set up any heat—that is, the ordinary vegetation, which would be grass-seed or piripiri.

129. *Mr. Foster.*] What about dung?—I do not think so. For instance, you take crutchings, which are naturally the wettest portions of the wool you could handle. I have seen them so bad that I could not value the wool, as I could not estimate the loss to the manufacturer in wet. To my mind, the only liability to firing is through the greasiness of the wool. The finer the wool the more grease it contains. Merino wool, for instance, would contain from 55 to 60 per cent. of grease, while coarse wool will only contain about 30 per cent. I remember an experience about twenty years ago—when I was practically learning my business—on a sheep station. We had about a hundred and fifty sheep to cut out the shed; they got wet in the rain. They were fine-woolled sheep, and that means that they would take three days to dry, which meant a big expense to the owner, so he asked the shearers to shear them if he sent the wool to the fellmongery, which they agreed to do. The sheep were shorn, and it took perhaps thirty or forty minutes to shear them. The wool, instead of being put in the ordinary wool-bins, was put in a stack at the end of the shed; so soon as everything was fixed up in the shed that wool was practically red-hot—so hot that it had to be strewn out on the floor to cool.

130. *The Chairman.*] That was fine wool?—Yes; my opinion is that the finer the wool the more readily it will heat, and that is based on the fact that it contains more grease.

131. *Captain Blackburne.*] The bale of wool in which you saw the flame—had that been packed damp?—Yes, undoubtedly it had been. It was not very much charred, but a little on the top of the spot had gone yellow, which is the case when wool is exposed to a very great heat.

132. *Mr. Foster.*] You mentioned the fact that, in your opinion, the presence of vegetable matter in wool would not be dangerous?—Not ordinary vegetable matter.

133. I mentioned dung?—I do not think so.

134. You do not think that ordinary dag-locks would set up heat?—I have not seen it.

135. Would you go so far as to say that if these ordinary locks were wet that would not help to increase the heat?—To a certain extent, but I do not think sufficient heat to combust. I have seen heaps of locks outside of a station door lying for years, but I have never seen them take fire.

136. That perhaps might be compared with the ordinary preparation of a hotbed with straw for germinating seeds. If you prepare it in the ordinary way, in the open—a small layer of it—the air has access all round, but if you put it into a straw-stack the result is firing at once. You think that would be the case?—If you make a stack of dags as high as a hay-stack.

137. It has been urged that the low-conditioned wools—probably dag-locks, pieces, and pizzle-pieces—will generate heat more quickly than the better classes of wool. That is in evidence?—You are not speaking as to fineness, only condition.

138. Yes, condition; fleece wool as against dirty wool?—I should say that in my experience wool damp on the sheep's back will generate heat quicker than wool damp after being shorn.

139. Take the bag of wool you spoke of—what was that?—Locks and pieces—perfectly clean wool, with the manure taken out.

140. Did you attend the wool-sales in Wellington last season?—I attend all sales.

141. Did it come under your notice that the wool coming to the warehouses was any wetter than during previous years?—Yes; I have seen a number of lots last year that I would not value for that reason.

142. Would that be scoured or passed on for shipment?—I could not say, because in valuing them I did not make any note on my catalogue. I did not see any too dangerous to ship.

143. What do you consider is the measure of danger—giving a practical idea of the percentages?—The wool in Wellington is mostly coarse wool, and if I saw the same amount of dampness in fine wool I would draw the auctioneer's attention to it. Generally speaking, I should say that wool that feels cold to the back of the hand or cheek is unsafe for shipment. That is the test I always make. Wool should be naturally warm.

144. I know that the question of dampness is one which can only be settled by experience—experience alone will teach you to decide as to the presence of damp in wool. It is peculiar and it is impossible to explain it, but experience only will tell you?—I could tell if there was an excess of water in the grease. Fibre in its natural state contains from 8 to 10 per cent.

145. Have you had anything to do with the shipping of wool at the ports? Has anything come under your notice in connection with the possible cause of the fires at sea?—I think that the

trouble to a large extent is caused by the wool which comes from the farmers at the side stations, where there are no goods-sheds and no conveniences for loading and protecting the wool. I have seen wool in the Harbour Board's sheds which has been wet—no doubt, by the tarpaulins not meeting, and allowing of a drip on to the bales. If it is detected I believe the officials send it to be dried.

146. Have you any reason to believe that the Harbour Board's officials exercise any judgment as to the amount of water which would be contained in any bale of wool? I assume they would not deal with it in an offhand way?—If they think there is any risk they send it to be scoured. Of course, wool might be wet through the drip from the tarpaulin, and there be no mark left to show that it has been wet, yet the wool inside the bale will be wet. Might I make a suggestion to the Commission?

147. *The Chairman.*] Yes?—If you can get a bale of, say, fifty or sixty sheep shorn—pretty fine-woolled sheep, shorn damp—and get a bale of flax, and dump the two together. It would require to be observed, but I think it would show you to what extent you could go with this combination.

148. *Mr. Foster.*] Do I understand you to say that the wool and flax should be in contact in the one bale mixed up?—No. Have, say, the damp wool in an ordinary bale and another bale of flax—uncovered flax—and dump them both together. It might be possible to arrive at some conclusions in this way. Then the chemists might be able to give you some information on that point also. From my point of view, as a layman, I have found that there is a good deal of sulphur in wool; there is also lime, and I remember reading of an experiment in the distillation of flannel in which they got streams of sulphuretted hydrogen from the flannel—ordinary flannel without any dye in it.

149. *Captain Blackburne.*] Dr. Maclaurin stated that the bacteria from the vegetable matter started fermentation but not sufficient to cause combustion, although it would help some other elements in heating?—From what I have read on the subject, I think there are sufficient gases generated in the wool itself when damp to enable it to combust.

150. Do you think there is greater risk in a dumped bale than in an undumped bale?—I should not say so. As I said before, the wool which I saw heated was simply thrown into a corner.

151. *Mr. Foster.*] Is it not a fact that gases may be extracted from almost any material, and in a good many cases inflammable gases?—I have read that it is a fact that no textile article has so many component parts as wool. I think the comparison between cotton and wool is 56 items in cotton and 270 in wool.

Mr. Foster. I think the question of gases is pretty clearly demonstrated even in the case of a candle immediately after being extinguished. If a lighted match is held over the wick the gas is immediately observed.

WILLIAM BENDALL SWORN and examined. (No. 14.)

152. *The Chairman.*] What is your name?—William Bendall.

153. What are you, captain?—I am a master mariner, but of late years I have been carrying on the occupation of marine surveyor to the Underwriters' Association and surveyor to Lloyd's Register.

154. You understand the purpose for which we have asked you to attend here?—Yes.

155. We shall be very glad to get the results of your experience in this matter?—I do not know that I am prepared to make any particular statement. I can only say that my duties as surveyor to the underwriters were particularly in regard to the condition of wool, looking after wool and flax and other cargoes susceptible to damage, both inward and outward cargo; but I always paid great attention to wool, and specially to what they call fellmongered wool and also coastwise wool, and of late years we have had a good deal of trouble with wool conveyed by rail—fresh-water-damaged and rain-damaged.

156. *Captain Blackburne.*] What kind have you had the most trouble with?—The fellmongered wool I have considered the most serious to deal with.

157. Have you ever found any that is almost on the point of ignition?—Oh, yes, on many occasions—that is to say, they were charred in the centre and black, and it might be supposed from the condition they were in that if that process had continued they would have taken fire spontaneously.

158. When you examined a bale, has it appeared that the fire was in the centre of the bale first or on the outside?—Well, generally, in fellmongered wool it has been inside.

159. Do you know how long it would take for damp wool to heat?—Well, it depends upon the degree of moisture, I suppose; but if the bales are only slightly damp I think it would take a week or a fortnight to develop. For that reason I had steel spikes made to insert into the bales—about 18 in. or 2 ft. long. I had more spiked instruments for that purpose before with a thermometer inserted with a steel point, but they would not stand the pressure of inserting them into pressed bales.

160. Could you insert steel spikes into a dumped bale?—Yes, that is why I got them in preference to the others.

161. Do you think there is more danger in dumped bales than in other bales?—What, in carrying at sea?

162. More danger of fire?—I cannot say that there would be.

163. In a previous inquiry I think you mentioned the case of wool which was discharged in London and it broke into flame?—I have not the record of it. I heard of it that the wool was in that condition that when exposed to the air it became a blaze as it was being put over the side into the lighter.

164. Could you get that record?—No, I could not. The only case that I can remember myself of wool being actually on fire was a case of three or four years ago, where the wool which was shipped took fire on the "Waimate," at Napier. That ship had tallow and wool in the same hold, I believe, and the tallow, of course, became liquefied through the heat and got intermixed with the wool. These bales were partly reconditioned at Napier, and reshipped on to one of the shipping company's ships and brought here. When she arrived here at No. 1 wharf, and when the hatches were taken off, the bales were found to have been heated very much. The bales were put on the wharf, and as they were opened they blazed out, and were black in the centre.

165. Did they actually blaze?—Yes. I account for that by the action of the foreign grease mixed with the wool. With the natural grease, I do not think that is likely to take fire spontaneously, because I have passed wool many times with the natural grease protruding through the pack sufficiently to leave stains on the sheet or on the dunnage in the hold, and that has always arrived all right.

166. How are the bales of skins tested?—Well, sometimes we open them out if we are dubious about them. I have seen skins in a putrefied state here as hot as possible.

167. Do you think there is any danger of the heat getting to that stage which would start ignition?—I think undoubtedly so. I remember some bales of rabbit-skins last year, or the year before, in the "Kumara," shipped at Dunedin. When she arrived here the skins were found to be very hot, and they were landed in a state of putrefaction; and I suppose that if those bales had been stowed in a mass in the ship's hold, and that process had gone on, fire would have ensued.

168. Were they made up into bales?—The rabbit-skins were.

169. Did they have a gunny covering over them?—Yes, they had some kind of covering: I could not state exactly what kind, but they were covered as far as I remember. Possibly they were packed up in bales, but skins are sometimes packed without a covering. If they are tied up without a covering then you can lift them up and test them to see what condition they are in.

170. Is the fellmongered wool distinguishable from the greasy wool in the bale?—Oh, yes, because it is generally much cleaner and superficially in a better condition for shipping.

171. The whole bale?—You mean the wool itself?

172. I mean by the appearance of the bale?—From the appearance of the bale it looks very nice and clean. They are very deceptive. If they are brought straight from the fellmongery and put on board a ship, they are very likely to develop heat on the voyage, because, as I was going to say just now with regard to these prickers, I found fellmongered wool coming into the shed that you could not detect anything wrong with, but after they had been a few days in the shed I found they developed heat.

173. It takes a few days?—If they are very wet a few days will do it; but I have inserted prickers in wool coming from the fellmongery that I could not detect anything more than normal heat in, but after a week or a fortnight—some have been lying there for a fortnight—when I tested them again they were quite hot and unfit for shipment.

174. A previous witness giving evidence seemed to be under the impression that two or three days would be sufficient to detect if a bale was heating from dampness?—Two or three days if the wool was pretty moist.

175. Could you feel it with your hand?—Not on the outside, no; not in two or three days, not unless they had been very wet.

176. If they had been very wet they would heat pretty quickly?—Oh, yes.

177. There is great trouble generally, is there not, with greasy pieces and belly-pieces?—Yes, most of those used to be sent to the scourers, but they are occasionally sent Home. There must be a good deal of dirt and foreign matters besides wool in those bales, because I have known some of those bales weigh over 7 cwt., and it cannot be all wool.

178. Do the insurance companies accept the risk, or do they charge any higher rate of insurance for those bales?—I cannot say. I have seen wool in that condition shipped—they are generally scoured. If there is any moisture on the outside at all I have always recommended that they should be scoured; but they are sometimes brought here with instructions from the wool-growers to get them scoured, and that is mostly the case, I think.

179. Does the loading of cargo continue in rainy weather sometimes?—Well, we never used to, but now they are so anxious to fill up these ships that they carry it really too far sometimes. I am speaking of the days when sailing-ships only carried wool, and we were very careful then, and I could keep it all pretty well in hand. I knew pretty well the condition of every package and the condition of the ships. I had first of all to survey the ship to see that the limbers were clear and proper ballast put on board and proper dunnage, and before the wool went on board I had to give a certificate to that effect. I occasionally found stevedores screwing the decks up when stowing the wool in the 'tween-decks, and I had to have it taken out to put the decks in order, and recalk them and restow the cargo. When steamers come here they work day and night, and sometimes they carry on the work a little beyond what they should in rainy weather. I do not know that that has been sufficient to cause any damage.

180. In your capacity as surveyor, would you ask them to stop if loading in rainy weather?—Yes; I have often said, "I have no authority to stop you from loading, but if you continue I shall report that you are taking in cargo during the rain." That was the only way I could get at them.

181. But at the present time is there any one besides those on the ship who examines the cargo?—There has been no underwriters' supervision since last June twelve months.

182. Did you have any say in the matter of this stowage, as to how the cargo should be stowed in the ships?—Yes, I gave the master a circular on how we required the work to be carried out, and I visited the ship occasionally to see that that was being done.

183. And did you make any recommendation about jute, and flax, and wool not being stowed together?—Oh, certainly.

184. You would not allow flax to be stowed on top of wool?—No, nor near greasy wool without a partition between them.

185. I rather understood from Captain Evans this morning that they did that?—That does not apply to steamers here at all times, but I understand they do do it; but where they are loading and discharging steamers, one man could not look after that sort of thing.

186. You do make a recommendation not to stow flax on top of wool?—Yes. Well, they stow flax on top of wool, but they must have something on top of it.

187. They must have hurdles or wood of some sort?—Yes.

188. Do you think that there is a risk in some steamers of an accumulation of water through the ventilators in very heavy rain or bad weather?—Well, that might be so.

189. If they neglected turning them and they were not thought of in very heavy windy weather with a good deal of rain, do you think there is danger?—There is the danger of some moisture going down on such occasions.

190. A good deal might go down and lodge about the place: it could not get away very well?—No; it could not get away, but they say they always stop the ventilators in that kind of weather, so that it cannot get down, but whether they do it I do not know. I remember a ship catching fire going Home from here from sparks from the galley, which had got down through the ventilator immediately abaft the galley, and they fell down on flax; that was the "Merope."

191. And she caught fire?—Yes, she was abandoned at sea on fire.

192. The tow, I understand, is not always covered: most of it is not?—It is covered with scrim in some cases, but I think most of it is shipped uncovered.

193. In the steamers and in the sailers as well?—Yes.

194. *Mr. Foster.*] Do you know, Captain Bendall, whether it is optional with the shipper to have it covered or uncovered?—I think it is. I think they can do as they like. The underwriters moved in the direction at one time of making it compulsory to have it covered, but I do not think they succeeded in doing anything.

195. I suppose it is a matter of freight: is there a difference in the freight between covered or uncovered?—No; it is the expense of the covering that the shippers object to.

196. But does the ship charge any different freight?—No, I do not think so. I think that might bring it about if they did.

197. *Captain Blackburne.*] Is there no difference in the insurance rate?—No, I do not think they have made any concession. As a matter of fact, it is not very much good, because before it is stowed away in the hold the scrim is torn off going down into the hatches.

198. *Mr. Foster.*] And I suppose scrim is almost as inflammable as flax, and *vice versa*?—Yes.

199. Have you any theory, Captain Bendall, as to the probable origin of these fires on ships?—No, I cannot form any theory except that if they do as I understand they do—put a lot of this fellmongered wool on board—that is very likely the cause, I should say.

200. Have you been in a position to notice this last season whether country wool has been coming down wetter than in previous years?—I have noticed coast wool and also other wool apparently from an outside examination to come in frequently very wet on the outside.

201. Did you have any indication on the outside whether it was from the inside?—No, I think it was from the rain.

202. Rain in transit?—The outside appearances are not always the worst.

203. In what way would the wet condition be shown on the outside?—There was a good deal of surf-loaded wool and also wool exposed to rain this last season: you could not see very much—you could only see wet in patches over the bales. I have not had much interest in it lately—I did last year. I know it was a very likely season for wet wool to come in, because it used to fluctuate. The number of bales I sent away to get scoured some years amounted to several hundreds, and perhaps thousands, and next year I should perhaps send very few; perhaps it would be a dry season, with fine weather for surf loading.

204. *The Chairman.*] It depended upon the length of the season?—Yes.

205. And, of course, there being now no inspection or supervision such as yours, there is no one sending this back?—The Harbour Board people are very diligent in that respect, and they rendered me great assistance in my duties. They always sent for me if they had any suspicious wool, and if I was engaged in another part, and they took in wool from trucks or coastal steamers, they kept the wool out till I returned.

206. That was before your services were dispensed with?—Yes.

207. They do not send for you now?—No.

208. Have you ever known flax heat from dampness?—Oh, yes, but we have not had very much trouble from the flax since the grading of the flax, because they have taken flax out of the centre of each bale; but we have had up to the time I was supervising a great deal of trouble with tow. Tow would come in apparently all right externally, but in the centre there would be great lumps of saturated tow that they had picked up with the dry, and I have sent apparently a good bale of tow out into the press, and when pressed the water would squeeze out of it.

209. *The Chairman.*] Do you not think it would be a good thing if the Harbour Board had an Inspector to whom they could refer any suspicious wool, and on whose decision it would be compulsory for the ship to refuse to take it?—I think it would be a very good thing indeed. I think that is what is really required. I think that would be a desirable recommendation, and would be the means of stopping a great deal of defective wool being shipped.

210. Had you any means of knowing, Captain Bendall, whether the majority of the wet wool, or a large proportion of the wool which you had to send to the scourers, came from the small places?—Latterly it was mostly from the small places, because since these large works have had artificial means of drying we have not had the trouble we used to have previously. Formerly the meat companies used to send it in heated—from the Gear Company and also from the other company, and Mr. Tyer used to send it in. He was a very careful man in putting wool through, but even from him we used to get actually heated wool that had been sent to him to be scoured.

211. Owing to him probably not having the latest and best apparatus?—Yes. I think he got something of that kind afterwards; but I am speaking of previous to that.

212. *Captain Blackburne.*] We have received a letter from a man in Whangarei in regard to an instrument for testing the inside of the bales. Have you ever heard of anything of the sort?—An inventor came over here with an invention of the sort some years ago, but I do not think it was very desirable; at any rate, it was not adopted.

213. Do you know what kind of instrument it is, and how it gets at the centre of a bale?—Well, it could only be by inserting a thermometer, I think.

214. You could not do that in a dumped bale?—Oh, yes, you can do it, but you are very likely to break the guard in the thermometer.

215. Did you do that in the dumped bales as well as in the hard-pressed bales?—Yes. I broke so many that I got the spikes without the thermometer.

216. How long do you keep the spikes in?—Sometimes if there is any heat in the bale when you drive the spike in and leave it for a few minutes, you will detect it; it will be quite warm when you withdraw it. I used to insert them here and there in a block of wool when I was suspicious of any, and sometimes leave them in all night and withdraw them next morning, and if there was no heat in them I considered they were pretty safe.

217. Did you ever make any recommendation to the shipping people about not stowing the wool or flax in holds that would be hotter than usual—holds that would be next to the stokehold, for instance?—No, I do not know that I have ever made any recommendation of that kind; but if the bulkhead is liable to get hot, surely they would do that for their own sakes. In cargo, according to the regulations, dunnage has to be put in if it is likely to sustain damage through the absence of dunnage.

218. But some holds get very much heated—holds that are practically over the stokeholds?—Yes.

219. I know we have had trouble to know what to put in those places sometimes, and we gathered from information received that there is a greater risk if inflammable cargo is stowed in such places?—Undoubtedly there would be.

220. *The Chairman.*] Would you not be likely to use these reserves for putting the last thing in that came along?—No.

221. Captain Evans and Captain David said they used these spaces particularly for coal?—Yes, I think those spaces are generally utilised for coal. I know that was the case in the "Turakina," which caught fire here.

222. *Mr. Foster.*] Have you ever noticed, Captain Bendall, sufficiently as regards the heating of bales to be able to say whether the heat generates quicker in a dumped bale of wool than in an ordinary pressed bale?—Well, I do not know—I have never noticed that particularly—I have never ascertained, but I should say it would develop sooner in the pressed bale.

223. Can you give any reason why?—Well, I know there are opinions opposite to that, but I should think the compression of the bale would be more likely to create and retain heat than when the fibre was slack in a bale.

224. You think the heat would generate quicker in the dumped bale than in the ordinary pressed bale?—I think so.

225. I suppose, considering the dumped bale, the closer the pressure the more it would prevent the throwing-off of the heat?—Yes, that would be so, I should say.

226. It has been stated in evidence that wool will not burn. Have you had any experience to show that it will burn?—It would not blaze, but it would smoulder.

227. But will it only smoulder?—On that occasion I have told you about where it is mixed with foreign substances it will blaze.

228. You say "mixed with foreign substances": do you mean manure and that sort of thing that sometimes gets in the bale?—Manure and grease—foreign grease, such as tallow mixed with wool.

229. But say wool in its natural condition?—I know it will take fire and smoulder—I have seen it—but I have never seen wool in its natural condition—clean wool—blaze that I am aware of.

230. You referred to the accumulation of animal fat—tallow—in the wool on the "Waimate." That tallow getting into the wool resulted from the fire?—Yes. Then it was put under a process of partial scouring at Napier, but they did not extract the grease from the wool.

231. But in the first instance, the fire which subsequently melted the tallow which ran into the wool, do you know where it originated?—I think it was pretty well proved, as it was proved here, that it was from external application, either wilfully or accidental. I have never known a spontaneous fire on a ship to take place here.

232. *The Chairman.*] But then that caught fire a second time after being scoured: that was not from external application, was it? I think you said when it was opened here again it fired?—Yes, it fired and blazed on the wharf, and they had to apply a hose to put it out.

233. *Captain Blackburne.*] The fire on the "Strathgryffe," which put into Dunedin in 1901, appears to have originated well down in the hold, and was apparently due to spontaneous combustion?—I remember the ship being there. There was another called the "Beltana" that put into Dunedin, bound from Adelaide to London.

234. Was that in the wool?—Yes, I think they considered it was due to the wool. That was some fourteen or fifteen years ago.

235. *Mr. Foster.*] Was she purely a wool-ship?—I do not remember. I dare say she was. She may have had grain. They found her on fire when off the south end of New Zealand or off the Auckland Islands somewhere, and they bore up for Lyttelton.

236. Was an inquiry held here?—There must have been at Lyttelton.

237. *Captain Blackburne.*] Do you remember any other cases of ships putting in on fire in New Zealand?—No, I do not think I do. I remember the "Gothic" coming here with wool from Lyttelton in 1893, her first or second voyage, with fellmongered wool stowed in No. 2 hold.

238. Did she catch fire?—No; she did not catch fire. She came here to complete her loading, and as the stevedores went down below to make preparations for receiving the Wellington cargo they found the wool hot to their feet. I was on the wharf at the time, and they reported it to me, and I went down and found all the top tiers quite hot, some of them under the saloon. I then recommended that they should be broken out at once. Captain Babot was marine superintendent for that company, and I went to him and Captain Jennings, and they ordered them to be broken out at once and discharged on the wharf. Some of them were found to be very hot, and when opened up they were quite charred and black in the centre, and I have no doubt if that had not been discovered, and she had loaded here with other wool on top in a mass like that, that it would have taken fire spontaneously on the voyage.

239. Do you know what time of the year that was?—No, I do not.

240. As to the conditions of loading, I mean?—I think it must have been the winter-time. Captain Jennings was master then. The wool was discharged and cooled here, and then it was reshipped back to Lyttelton to be dealt with there; but a great deal of the fibre of the wool must have been destroyed.

241. It had come up from Lyttelton?—Yes, from Lyttelton and other ports, but I think this wool was shipped at Lyttelton. I do not suppose that could have been detected when going on board unless they tested it. That is the difficulty with that fellmongered wool—it looks very nice and clean outside, but when stowed away it heats.

242. *Mr. Foster.*] Have you seen any cases of country wool direct from the sheep heated?—No, I do not know that I have. I have known country wool to come in in a bad state from being brought through rivers where the water has got into the drays and wet it in that way.

243. But you have had nothing to lead you to suppose that sheep had been shorn so wet as to be dangerous?—I have no knowledge; but there is no doubt if they were shorn wet there would be that danger.

244. But if there were any of these clips that came forward they must have come under your notice?—At the time I was supervising I should very likely have noticed it.

245. Have you ever noticed whether low-conditioned wool—locks, and pieces, and crutchings—whether they heat more than fellmongered wool?—I have never noticed it particularly, but I should take it for granted that they would. That kind of wool I have always marked for reconditioning where the shippers have not ordered it to be reconditioned themselves.

246. That is, judging from the condition and the temperature?—Not the temperature, the appearance with the unclean dags and that sort of thing.

247. What is the outward indication of that?—Well, they are generally stained packages, and then you can tell the difference between dirt and grease and grease alone. Then I used to make an incision in the pack and examine the inside.

248. But if they were not in a heated condition, would you still order them to be reconditioned?—If they were very bad I should not consider they were fit to be shipped.

249. Would you consider dags thoroughly dried would be unfit to ship?—I could not say they would be; thoroughly dried I do not think they would be.

250. Do you know of any cases where tallow may have been stowed in a ship on top of wool?—No, I have never known of a case.

251. I understand that if there was a vacant space and the ship was nearly full they would practically dump anything in it?—I do not think they would go that far.

252. Supposing that there was a portion, say, in the hatchways that was not full, and a few casks of tallow came down, would they put them in?—No, I should think not. There would be a chance of the tallow liquefying and leaking out on the wool, and the owners would know that if there was damage they would be responsible for that damage.

253. *The Chairman.*] You say that since the grading of flax began during your career as supervisor you have had very much less trouble?—Yes, it relieved me of a very great deal of anxiety. I had a very great deal of trouble with the flax, and when the grading took place I was very pleased. As a matter of fact, it was more than I could do to look after them at the one time, and I also then used to go to the station where the wool came in in wet weather, and I had a great deal to do in that way, finding out the condition as it came in. The wool loaded at the side stations where the railway people did not take any responsibility of stowing the wool—they used to leave a hollow in the centre of the covering sheets, and water would lodge there and gradually run through in amongst the wool. I have seen water running right through bales.

254. At wayside or flag stations?—Yes.

255. Right through?—Entirely through the wool-bale.

256. That wool would not be allowed to be shipped?—I would mark it off for reconditioning. You do not require to scour wool that is wetted with fresh water or rain, but with sea-water you must generally scour and get rid of it, but the rain-water will dry in the sun.

257. Well, if wool was subject to some such supervision as before, do you think there would be less danger?—I should think so.

258. *Captain Blackburne.*] There is still no supervision with regard to the tow, I understand?—No Government inspection of the tow that I am aware of, or of wool.

259. *Mr. Foster.*] Do you think there is danger in the tow lying in the shed—is there as much danger with one as with the other?—Equally so, I think. There is perhaps more danger of tow taking fire from sparks or anything of that sort, because it is looser—it is not packed so securely.

260. *The Chairman.*] From external causes?—Yes, from external causes.

261. Do you think it would be possible that although a bale would not take fire inside, yet there might be sufficient heat to ignite the pack?—There is the danger of that if the pack is

stained with foreign grease or anything of that kind. That is another thing I have had to be very careful about. I very often find packs coming in covered with grease and oil, and I cut them adrift, and if I find the grease has not penetrated to the wool I cut that piece out and put an over-all patch on it, but otherwise I do not think there is much danger. Possibly if the bales were damp they would take fire in a mass such as there would be in a ship's hold—that it would generate heat sufficiently to take fire, because the heat cannot escape as it does in these stores. I do not suppose it would take fire in the stores.

262. *The Chairman.*] Do you think it would be advisable or not that the packs themselves should be dipped in a solution of some sort to make them less combustible?—I think it would be a very rare occurrence where this would take place.

263. That is, whether fire would take place from the pack?—I think there are very few cases of that kind to be found.

264. It appears to me that the end of the pack could catch fire, either from friction or any other cause, and being alongside another pack there must be some little room for a current of air?—Oh, yes; but I do not think there is very much danger arising from friction from the bands on wool or flax, by reason of the fact that the bands are buried.

265. *Mr. Foster.*] Some of the bands are fairly flush—in fact, on the sides the bands do not fall in quite flat?—I think in wool or flax the bale would take before the band, in most cases.

266. Take the diagonal band across them—they do not bury except at the ends?—Yes, they are not buried. I dare say they would come in contact there. I do not think there is much chance of friction causing it to fire, because wool is screwed in tight. It is not likely in these large steamers; but, with considerable vibration, where the cargo is continually on the move, then there is a danger of friction that would cause fire.

267. *The Chairman.*] The packages are not always of the same description, but one wool-bale is like another?—Yes.

268. *Mr. Foster.*] Would you think that, with other conditions being favourable to fire—that is to say, a high temperature—that this friction might be the trigger to set it off?—It might do. I cannot conceive that it could be in wool, because there is no moving-about with wool.

269. In regard to the circulation of air in the hold, I take it that when the wool is packed, no doubt tightly screwed in, the ends being rounded off, there are spaces at the ends?—Yes.

270. So that if the pack was to ignite, there would be sufficient air even up through such spaces?—There might be.

271. And, therefore, in these spaces a huge conflagration might result?—Yes.

272. *Captain Blackburne.*] Is the cargo of these steamers screwed in?—Sometimes.

273. Not generally?—When they have plenty of room they do not screw it, but if they want to make room and to take a full cargo it is screwed in.

274. *Mr. Foster.*] It is jacked in?—Yes; they do not screw it in like they do on sailing-ships. I think very few steamers do screw it—they use screw-jacks.

275. *The Chairman.*] Do you consider that skins are more likely to ignite or liable to spontaneous combustion than wool—skins in bales?—Skins in bales, if they are wet—I should say they would.

276. Sooner than wool itself?—Yes, they would putrefy sooner.

277. *Mr. Foster.*] Have you any suggestions to make in the direction of the detection of faulty packing in any stage, either from the country or from the fellmongers, in the stores, or from the stores into the ships—in fact, at any stage?—Well, certainly it ought to undergo supervision, and you would think the owners of the stations would have proper people to look after that.

278. But, assuming a condition of carelessness?—I am afraid a great deal arises from that.

279. But it is detection before getting on to the wool-ships?—I cannot say which would be the best method to adopt for that.

280. As to ascertaining the temperature, at any stage, of the contents of the woolpacks, have you any suggestions as to any possible means which would easily detect it? You use the steel pricker?—Yes, and I could not find anything better.

281. Then, in order to be sure of any test with the pricker, you would have to leave it in the bale some time?—If there was only slight moisture I should try the heat, but if there was considerable moisture and heat you could detect it at once—in a few minutes.

282. But supposing it had barely set up any heating, would it be possible to detect the damp from the instrument you use?—No, you could not detect the damp.

283. So that unless you examined it twice, or a considerable time after it came into the store, you would be liable to oversight?—Yes. That is the reason I recommended some years ago, when we had so much trouble with fellmongered wool, that it should be in the store for at least a fortnight before it was shipped.

284. How long do you think it would be with wool in a wet condition before clearly demonstrating to you that it was in a heated condition?—In a wet condition it will do it in an hour in the summer-time.

285. It will show considerable heat?—Yes. I have seen a bale of wool dropped overboard and picked up immediately, and before night of the same day it has been quite hot, and I have frequently seen it in surf-loading conditions where it has been too wet to put into the hold, and they have left it on the deck, where it would generate heat very soon in the summer-time.

286. *Captain Blackburne.*] Much quicker in the summer-time than in the winter?—Yes.

287. *Mr. Foster.*] We have had it in evidence that wool from a wreck—saturated wool—was days and weeks, I think, and the condition of the wool was not affected?—I can only say that I never saw such a case. The Chatham Island wool was taken on board at the Chathams quite hot from the "Jessie Readman," and they left it on the deck.

288. One witness mentioned the loading at the railway sidings, and, speaking of the conditions of the railway-trucks, he thought at times there might be an inch or two of water in the

bottom of the truck. No careful man would load into that, but do you think it would be possible?—I never knew that to be the case. I never thought they were tight enough to contain water.

289. The construction of the flap doors would be sufficient for that?—I should think so.

290. And the floors of the trucks are all flush—they have no battens on them?—No, all flat.

291. It was mentioned also that the proportion of dirty wool and skins had been greater this year than in previous years—locks and pieces. Can you tell us how we could have that verified?—No, I could not tell you.

292. Where could we get that information?—From the consignees of the wool here, I should think. In my time most of the wool in that condition had to be reconditioned here by instructions from the wool-grower generally.

293. Well, the inference is that this year, owing to the good prices, growers and owners have preferred to send their locks and pieces away in the grease to losing the time that is taken up in scouring?—Of course, that might be so.

294. From your experience of the conduct of the wool-growing business, would you imagine that owners would pretty well adhere to very old methods of dealing with their quality?—Well, you would think so; but I have heard that, this season in particular, buyers have been here purchasing wool from the sheep's back, and taking the responsibility of carting and shipping. Whether that is so or not I do not know.

295. In which case you would think that the interests of the buyers would be to ship it in the condition in which he purchased it?—Yes, that is the inference I draw from that.

296. *Captain Blackburne.*] Do you know anything about the slight fire on the "Indraghiri"?—Yes; I was not present when the fire occurred, but it was kept open for my examination when she came back here.

297. Do you know how the fire was supposed to have originated?—Yes; I formed my opinion that a match or candle had been left at the foot of the ladder down in No. 2 lower hold, and they were cooling down at the time. They came down and left a light or a match there, and then came up and put on the insulated hatches and started to cool down. There was nothing in the hold.

298. In regard to the charcoal for insulation?—It did not originate in the charcoal.

299. *Mr. Foster.*] Do you recollect the case mentioned by Captain Evans this morning in reference to rabbit-skins which were found to be heated in Wellington?—I think that was the case I referred to.

WELLINGTON, FRIDAY, AUGUST 17TH, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

THOMAS FORBES MOFFATT sworn and examined. (No. 15.)

1. *The Chairman.*] You are master of the "Mamari," are you not, Captain Moffatt?—I am.

2. You have had considerable experience of the carrying of wool, flax, and tow from New Zealand and elsewhere?—Yes.

3. The purpose of the Commission you know. Our object in calling you is to learn from your experience and observation what we can as to the probable cause of the fires which have occurred on the wool-ships?—Well, I have been carrying wool for thirty years. I saw one case, particularly, of spontaneous combustion in a bale of wool. In a good many cases we have had wool very hot, and on opening the bales the wool has been so hot that you could not bear your hand on it. On every one of these occasions I think it was very wet. I am speaking now of a very long time ago, when they used to bring the wool down to Otago in bullock-wagons, and be six weeks on the way. Very often, owing to fording the rivers, the lower bales would become saturated with water. No doubt the drivers would not like to arrive with the wool showing wet, and in many cases they would camp outside for a few days and allow the bales to dry on the outside. We should then know nothing about their being wet until they were dumped, when the water would be pressed out of them. At that time we dumped the wool when it came down. In several cases where we opened the bales they were exceedingly hot inside. That was specially the case with wool—locks and pieces, greasy wool—but the locks and pieces especially were mixed up with a good deal of dirt and vegetable matter, and on one occasion one bale did actually take fire. We opened the bale, and it was smouldering in the centre. That was at Port Chalmers, and at the time I was in a sailing-ship. In those days we dumped the wool on board ship; that was about 1870 or 1871.

4. *Mr. Foster.*] You mentioned that the wool was smouldering in the centre. Are we to understand that there was actual fire present, or only dense steam and heat?—Actual fire and red ashes were present.

5. Red hot—in fact you could actually light a match from it?—Yes. That is the only case of actual burning out of the many cases of heat which I have seen. I think perhaps I had better tell you what I saw in the case of the "Gothic" fire, because that puts it beyond all question or doubt as to the possibility of a bale of wool taking fire. I was at Home when the "Gothic" arrived. As you know, I took up her running and took her place coming out this time. Have you had any history of her case at all?

6. *The Chairman.*] No. We should be glad to have it?—Well, the first fire occurred in one of the holds, and when it was first discovered, they got the wool up and threw it overboard.

7. Was it in a state of ignition?—Actually ignited. That was dumped overboard, and they thought the trouble was overcome; but the next day they discovered another fire in another hold. That was the hold which burst into flame eventually, and they had to sink the ship to get it out. Not only that, but in the same hold, or an adjoining hold, there were bales of wool burning in two different places in the hold.

8. Do you know anything about the brands of that wool?—No, I do not know that I could tell you really; I have a lot of hearsay, but that is not the thing. You will have no difficulty in getting the full report of the evidence before the inquiry from Home.

9. Was the inquiry concluded when you left?—No, only beginning. I believe the wool was brought up looking pretty well all right, but when you opened it up it fell to pieces in the centre—it absolutely collapsed. Where the fire occurred that burnt out the cabins—in the same hold, but in a different place—there had been fire going on at the same time, and there was no doubt whatever that it was spontaneous combustion. The fire was put out by water, the holds being completely flooded.

10. Can you tell us if the packings themselves were burnt?—No, not in this case, the packing was not burnt on the outside.

11. *Mr. Foster.*] In the case of the "Gothic" there was nothing to show when the point of ignition had been arrived at. You mentioned that the inside of the bale collapsed in consequence of the burning. Might that not have been due to the intense heat and combustion—not actually fire?—No; I do not think you could get decomposition to set up in that way.

12. Are you very sure of that?—I think not.

13. How do you account for this: that sheep die on the runs; they are left there with the wool on, and in many cases they will gradually disappear until there is nothing left—they have shrunk away?—Well, I think in that case it is very likely that the wool comes off and has been blown away.

14. *The Chairman.*] Perhaps you might answer *Mr. Foster's* question this way: that the period that would be required to decompose would be much longer than would be the case aboard ship on a trip Home?—Yes.

15. *Mr. Foster.*] But the conditions are different?—And the wet wool is compressed very tightly, and it would take a very long time to disappear in the way you suggest. I do not think it is possible for a bale of wool to disappear or collapse in the way a sheep's carcass would. That is a matter I have never heard of before. I have been on a good many stations, and have seen the dead sheep and the wool gone from the carcass in patches.

16. *Mr. Foster.*] We have had it in evidence from men accustomed to deal with wool who say that the wool will not burn. What do you say to that?—Have you any grease in the wool?

17. *The Chairman.*] Natural grease?—Yes, and it will char, and when the air gets to it it will burst into flame.

18. *Mr. Foster.*] I think it must be admitted that wool will, at a certain temperature, burn, and burn very freely?—In the cases I saw myself there must have been fire, because there were ashes, and it had been smouldering because there were ashes in the centre of the bale.

19. You see the intense heat is thus indicated, and it has this effect on wool, that it shrivels up and is like powder—that is intense heat without ignition—but what I wanted to get at was your opinion as to whether it might not have been intense heat without ignition, or actually charred?—Actually charred; there is no doubt about that. Of course, in the case I spoke of they had been very careless, and all sorts of dirt had been put into the bale.

20. *The Chairman.*] That was the case many years ago you spoke of?—Yes.

21. *Mr. Foster.*] Do you consider that greasy wool is liable to spontaneous combustion without damp?—Yes, I should think it would be liable to, but I should not like to express an opinion about it. For a very long time after the first case I held to the theory that spontaneous combustion in wool was impossible. I never believed in it, and did not think it could occur; but since the case of the "Gothic" there cannot be the slightest doubt about it. If you look at the evidence in the "Gothic" inquiry, you will see there is not the slightest room for doubt about that. There must have been some special conditions in the wool of last season that caused that to take place.

22. Do you know whether that evidence is on its way to the colony?—I do not know, but I believe it should be. There is no doubt the insurance people will have sent it.

23. Was the "Gothic" still burning when you were at Home?—No, the fires were out. The circumstances are these: The "Gothic" took fire some time after leaving Teneriffe in No. 3 or No. 4 hold—abaft the engine-room. They found that fire, and were successful in getting the wool up and threw it overboard. That was all right; but a day or two before they got into Plymouth they found another fire in a separate part of the ship altogether from the other fire, forward of the engine-room. There was a water bulkhead between the two places. They got all sorts of assistance to endeavour to put the fire out, and eventually they had to sink her. The object in sinking her was, she was a very crank ship, and from her having so much water poured into her they were afraid she would capsize, so they towed her away to a shallow—about six fathoms—and sank her, and overcame the fire in that way. She was then pumped out and brought alongside for discharging, and during the discharging these bales were brought out, and it was found that they dropped to pieces in the centre. I am not quite certain now whether there was one or two of these that were actually burning—I cannot say that—but it runs in my mind that they were burning when they were brought up, after the ship had been pumped out.

24. *Captain Blackburne.*] Would that hold be insulated?—I am not certain; I do not think so. I should imagine that the whole of the insulated space would be taken up with meat.

25. What kind of insulation would it be?—Mostly charcoal in those boats, I think; but we have silicate of cotton in ours.

26. The older ships would have charcoal?—I think charcoal is the best.

27. Experts do not seem to think so?—Well, I am an expert myself on the question of insulation, and I think that there is no question but that charcoal is better than silicate of cotton; but when experts talk about it in that way, they are simply referring to the danger of fire as compared with silicate of cotton or pumice.

28. Pumice is safe, but it is not such a good non-conductor?—If the questions are directed as to whether it was the insulation that caused the fire, that can be dropped at once, for there is not the slightest question about that matter. The insulation had nothing whatever to do with it.

29. What system of ventilation had she?—Ventilators, two to four generally, about the centre of the holds.

30. Do you think the cargo could get wet through the ventilators in any heavy rain?—No.

31. Do you think the cargo might get wet while being taken in in heavy rain?—I do not think that would cause fire for the amount of wet would never penetrate the bales. I have taken in cargo during rain, but it never got wet except during the very heaviest rain. We would only take it in on a push while it was raining, and then the bales would only be about a quarter of a minute in the rain from the time they left the shed till they were lowered into the hold.

32. The only danger would be while it was in the square of the hatchway?—We never allow it to stand there. First of all we have them most carefully covered. We never have the hatches of the orlop decks off to allow the cargo to be exposed to the rain.

33. But if you were taking it in in rain a good deal would accumulate on the hatches and in the square of the hatch?—Well, if it was so heavy as that we should put them on and stop work.

34. Do they always do it?—Undoubtedly. I think they are very careful. It is a most exceptional thing to take wool in while it is raining. However, I do not think there is any danger of our doing that, because we should be liable to very heavy damages if we had the cargo spoiled. If it were wet and there was a great amount of friction going on it might rub into fire, but there is never sufficient friction from the way it is stowed to cause any heating.

35. *The Chairman.*] You do not screw it up?—No; it is stowed very much looser than it used to be, and the ships are very much steadier than they used to be.

36. *Mr. Foster.*] In any case, there could not be sufficient friction to start a fire?—I do not think so for a moment.

37. I suppose to set up much heat from friction the contact would have to be tremendously heavy?—Yes.

38. And then, I assume, the two bodies in contact would have to be very big in order to retain the heat?

39. *The Chairman.*] And very free draught?—The friction would never be long enough in a ship to do any harm. If a ship got into a gale of wind she might roll a bit for a couple of days, but that would not cause any degree of heat.

40. *Mr. Foster.*] You think we can discard any likelihood of friction?—You may put that away altogether. I am perfectly certain myself as to the cause of the fire, as to how it has arisen, but what was the cause of the fire itself in the first place is what is required to be found out.

41. *The Chairman.*] We can eliminate the question of friction, then the other circumstances must have been such that without the friction they were sufficient to cause ignition: Is that not so?—Yes. I am perfectly certain that if the bales of wool had been in the Harbour Board's shed here they would have taken fire just as well as in that ship's hold.

42. *Mr. Foster.*] Did you see the bales that came out of the "Gothic"?—No.

43. I was wondering whether you could tell us whether they were locks and pieces or fleece wool?—It was not locks and pieces. To a certain extent I know what sort of wool it was, and for several reasons I would far sooner not say. I have my own reasons.

44. *The Chairman.*] Was it bellies?—I do not think it was, as a matter of fact.

45. *Mr. Foster.*] I do not ask you to disclose the ownership?—It is a matter of business. You will get the details from the authorities. That is the best way, and you will be absolutely sure.

46. If you tell us the class of wool it was, and tell us the brands, we can without any delay get to the origin of it?—Yes. Well, I have nothing to say about that phase of the question. Well, to come to the "Rimutaka." Her fire took place whilst discharging after she was in dock. I cannot give you any particulars of the fire, any more than that it broke out on a Saturday night when most of the hands were away ashore, and only an officer in charge. Anyhow, the fire brigade filled up the hold with water, which caused a good deal of damage—

47. *Captain Blackburne.*] They had the Clayton fire-extinguisher there?—I am not sure in the case of the "Rimutaka." In the case of the "Waimate" they had, but they had to put into port to get a supply of sulphur to charge it.

48. *The Chairman.*] What is the use of an appliance if you have to run into port to get supplies?—I understand that you require such a large quantity of sulphur to run it.

49. *Mr. Foster.*] To keep it up?—We use carbonic-acid gas ourselves, and that is the best thing going.

50. That would not suppress the cause of the fire?—No, not the cause of the fire.

51. That is the point: that if wool once gets to the point of incandescence, all those things will not do any good so long as you do not suppress the cause that creates it. If you use a Clayton machine you would have to keep it up all the voyage Home?—You would have to suppose that every bale would be in the condition to take fire. There might only be four bales in a fire. I do not think there would be likely to be any more.

52. *The Chairman.*] The Clayton machine can cool the temperature—that is, apart from putting the fire out? Assuming the fire to be extinguished, you could keep it running at a slow rate?—To cool the temperature? Cooling the temperature will not prevent a fire.

53. If you bring the temperature of the hold down, and then take the Clayton off, you could ascertain if the temperature rose again to a certain fixed extent?—Of course, the temperature of the hold will always regain its normal—that is, it will rise to its former point.

54. Yes, but if it rose in temperature you would know at once that there must be something causing that rise in the temperature?—Yes. Well, I have seen the two machines, and I think there is no doubt about the carbonic-acid gas being the best.

55. *Captain Blackburne.*] I think it was the "Whistler" that was afire, and they were just about to scuttle her. The underwriters asked that they might be allowed to try the carbonic-acid-gas machines, and the fire was put out in three days without any further damage to the ship or cargo?—Yes; that is the one I am speaking about.

56. *Mr. Foster.*] But the fact remains that the carbonic-acid gas or sulphur-fumes merely prevent the fire breaking into flame?—It absolutely extinguishes any fire, even a smouldering fire.

57. But supposing at the time of taking fire, it will only keep it from becoming incandescent?—I understand it would be better to allow it to get into fire and then put it out, and you then destroy the cause at once.

58. Would that be so?—Well——

59. If you let it get into fire and put it out, you have still the temperature to deal with in what you leave. These I know are rather abstruse questions, and although they do not, perhaps, bear on the case, they are interesting?—Until there is absolutely fire the temperature does not rise much. If it should be only smouldering, you might be working alongside it and never know it was there. Supposing the air could not get at it, then there would not be any smoke. The heat itself would not indicate to you any fire—the heat would not be much round about it.

60. *The Chairman.*] If the heat had radiated that would be the best reason why it should ignite.

61. *Mr. Foster.*] It was suggested that a fire-alarm in a ship's hold would be a good thing?—I have never seen any of these patents of much value in a case of fires in a ship's hold. You will remember that there have been four or five fires—the “Perthshire,” “Waimate,” “Rimutaka,” “Gothic,” and I fancy another—one of the Tyser line—I think it was the “Indraghiri.” All these fires have been in the one season.

62. *Captain Blackburne.*] When was the “Perthshire”?—That was on the 26th June that I left Home—she had gone into St. Vincent when the fire broke out. On the way Home the “Gothic” caught fire, the “Rimutaka” in dock on arrival at Home, the “Waimate” on her way Home, and the “Indraghiri”—I think she was on her way Home. The fact that so many ships have taken fire all on the homeward voyage from here points to some common cause.

63. *The Chairman.*] Can you suggest that common cause?—That is what we are trying to find out.

64. We want your opinion: you want safe ships?—Yes, and the feeling at Home is so keen about this that we have to pay nine to ten guineas premium on the “Delphic,” although she was not overdue.

65. That is what we want to get at. We do not want an embargo placed upon the shipping starting from New Zealand, nor do we wish our wool industry—which, I suppose, is the largest export of the colony—crippled. It is from the captains of the ships—the actual men who have to deal with this—that we want any suggestions as to what they consider a danger to their ships; not only a danger to the ships and cargo, and the loss thereby incurred, which must eventually fall upon the colony, but also the great loss of life that may take place upon these ships. In addition to that, the crew of a wool-ship, who are forced by virtue of their calling to be there, even from the captain to the galley-boy, and their lives are just as valuable and as dear to them as any one-else's. Therefore we want to get from the men who are actually engaged in the business some idea as to what they consider—for us to say whether rightly or wrongly—to be the elements of danger that enter into this business. I do not think you need have any hesitation in speaking. captain?—I have no hesitation whatever in speaking: not the least.

66. The shipping people are with us in this?—I do not think it would be any more——. We are trying to find out just what you are trying to find out.

67. We are mere landsmen here?—It is just as much a question for a landsman as for a sailor. It is more a question for the scientists.

68. Oh, God help you if you get the scientists to work: they will give you plenty of science and very little practice?—It is one of three causes, either the damp in the wool, excessive grease in the wool, or the chemicals that may be used in treating the wool.

69. You give us three views of the case?—It is due to one of those three causes

70. Can you say if any one of those three would be sufficient to cause the fires?—Yes; damp in wool on board ship will be liable to cause spontaneous combustion. I do not put this down to the cause of the fires, but generally speaking.

71. *Mr. Foster.*] In using the term “greasy wool,” do you mean any particular sort of greasy wool?—Of course, I do not know the difference between them, except greasy and scoured. As to the degree of grease in any particular wool I do not think I can tell you if it would make the wool more dangerous.

72. We have had it in evidence from a wool expert that fleece wool—body wool—that has not much natural oil in it will not heat when damp?—That is what I think.

73. That goes a step further in regard to greasy fleece wool: if greasy fleece wool is not liable to heat, scoured is less liable?—If greasy wool is not liable to spontaneous combustion, then I think, myself, for the scoured to take fire must be very unlikely. I think the locks and pieces are more likely to take fire than anything else. They used to send the locks and pieces in the unclean state, with much vegetable matter adhering.

74. Do you think the presence of vegetable matter—dung—if thoroughly dried, would be an additional danger?—I think so, even if thoroughly dry; but really I know very little about that.

75. I do not think there would be any danger if the vegetable matter were thoroughly dry, but you know that many times the belly-pieces and pizzle-pieces are naturally more damp from the urine, and these pieces would be thrown into the bales with the rest?—I think from what I know of wool on sheep-stations that there will be a considerable quantity of damp wool—I do not know what you call it, but cut off—well, the after part of the sheep, a little for'ard of the tiller—put into the bales in that wet state. There would be a good deal of chemical action going on just the same as with manure. Practically it is manure.

76. Do you consider that grease—not natural wool-grease—that might get on the wool would lead to conflagration?—I suppose it would be exactly the same thing. I do not see any difference.

You have the substances there, if wool itself will not, surely the addition of substances that will should have that effect; grease itself will burn and thus make the wool burn.

77. That being so, would you consider that sheep-skins dried and packed would be more dangerous than wool in bales?—I do not think so. I saw it in the papers that something of that sort had been contended.

78. You know the conditions under which station-skins are packed?—I cannot say that I do, but as far as we can see them, the outside was always thoroughly dry and simply bound up with wire ties.

79. The portions that would carry fat would be those portions which are folded on the inside, and you would not therefore see them. That being so, do you think any increase in temperature would be likely to rise in the bale and thus make the danger greater?—I can scarcely express an opinion. The only opinion, generally, that I have is that they are not so liable to take fire.

80. *The Chairman.*] You see you have an additional element in it: you have the fat on the skin?—Yes; but it is never packed so close, is it?

81. *Mr. Foster.*] You know that sheep-skins treated for the purpose will make glue—that is, by boiling and evaporation. Glue, I suppose, would be more inflammable than wool?—Yes.

82. So that, generally speaking, would you consider that sheep-skins would be more dangerous to carry than wool?—It might be so, but I have not arrived at that conclusion; I do not know why, but I never thought much about it. It was only when reading over the newspaper wherein it was reported that witnesses had stated that they were more dangerous by reason of the fact of there being flesh and fat adhering that I thought that was not the case.

83. The object of the question is to ascertain if in the opinion of those competent to judge some recommendation should be made as to additional precautions?—We have taken Home lots of skins, and have never had any fire or anything approaching a fire. I have not heard of fires in skins.

84. You took a cargo of this season's wool?—Yes, just at the time the others were loading.

85. What time did you load?—We left here in April, about the 12th or 13th, and arrived Home in May. We left after the "Pitcairn Island," and before the other steamers. I am not sure whether we arrived Home before the "Waimate."

86. From what you saw, have you formed any opinion that a greater proportion of locks and pieces and skins were shipped in the course of this year than in previous years?—I could not give you any information about that, because I might see a bale of wool and nothing more. Of course, the manifest of the ships would give it to you.

87. Strange to say, we have not been able to get the information. I have personally asked one of the leading shipping agents, and they could not give me any information either in support or refutation of that statement. Of course, the manifest would simply show "bales greasy wool," not as "locks and pieces." It comes to this: evidence has been given that there is a great danger through the locks and pieces, and the same witness told us that a far greater quantity of locks and pieces had been shipped during this season than during previous years. The inference, therefore, was that they may have had something to do with it. I wanted to know if that were so?—That is speculation. You will get the full facts and the whole of the evidence of the inquiry now proceeding in London. I can from my own personal observation tell you nothing but hearsay.

88. *Captain Blackburne.*] Do you systematically test the temperature of the holds?—We never take the temperature.

89. We understood from Captain David that they did?—I think it is nonsense. I think he must be referring to the freezing-room.

90. *The Chairman.*] He was asked about that, and he said Yes, very decidedly?—Well, Dr. McArthur, I do not believe it. They do not do it, and I do not think it is necessary.

91. *Captain Blackburne.*] Do you think there would be any chance of water getting down the ventilators?—Not unless you had very bad weather indeed.

92. Rain?—It cannot possibly get down, not unless it were an extreme case of carelessness in turning the ventilators to the wind and rain.

93. The ventilator-cowl is very often turned to the wind?—No; as a rule they are turned away.

94. *Mr. Foster.*] I asked a witness—several, in fact—if there was any likelihood of tallow being stowed on top of wool, and it was regarded somewhat as a useless question, but I still want to hammer away at the question, because I understood that in the case of the "Waimate" fire the tallow got mixed into the wool, and if the tallow is always stowed underneath how could it get into the wool?—She was on fire at Napier.

95. The question I asked was this: "Is tallow in casks ever stowed on top of wool?"—Never, and when I say "Never," you know what I mean—it would be bad management; in fact, so absurd that I cannot conceive any one doing it.

96. One witness was asked if he would put flax alongside, and, if I remember right, he said if he had space in the square of the hatch and nothing else, he would rather put in anything than go without. My wonder was, if nothing was offering but tallow, would that be put there. The question, I fancy, was regarded as being a little bit light, but when I thought of the tallow on the "Waimate" having become mixed through the wool I could only conclude that it was on top, for tallow would scarcely run upwards?—It might have been on top with a deck between.

97. It might have been, but then the deck would require to be burnt through?—It would soon do so if there was a big fire.

98. I do not know the circumstances, but it occurred to me that it must have been on top of it to become mixed with the wool?—I was in Napier at the time, and I know it was questioned as to how it got mixed with the wool, but I think that it has not been properly explained. I know as a matter of fact that all ships are very particular about having the tallow in the bottom of the ship for many reasons; first, there is the weight, then, if you put tallow on top of wool or flax you run the risk of very heavy damages should the cargo become destroyed, and for the reasons stated our instructions are very clear on the point.

99. But you said you take particular care that in taking in wool in wet weather you put something over that which is at the bottom of the hold to prevent it being damaged: might you not do the same thing in the case of protecting wool beneath tallow?—Just so.

100. Another point in regard to stowage: Would it be likely, in receiving tallow on the orlop deck, that you would stow the casks right over the lower-deck hatch?—No; there would be no wool below if we stowed tallow on top. Never.

101. If you had nothing else, would you stow the tallow on the hatch?—Very probably it would be stowed on top of other casks if there were casks below.

102. In the case of stowing flax in the same compartment as wool, we have been told that it is customary to place dunnage-mats between. Is the material from which these dunnage-mats made as inflammable as woolpacks?—They are grass mats. They come from Calcutta—something like sugar-mats, with broader meshes. I have never known a fire to take place from anything like that cause.

103. *The Chairman.*] If you put a match to a woolpack it will burn freely enough?—I think the dunnage-mats will burn freely enough too.

104. So that the putting of the mats between the flax and the wool-bale does not——?—Eliminate the danger of fire. We place them there to prevent the grease from the wool injuring the flax.

105. Would you consider it a danger if the grease from the wool were to get into and saturate the flax-fibre?—It could never get in sufficient to saturate; but I do not think there would be any danger from fire—it would not be sufficiently close. I think the fire under those circumstances only comes through the pressure. I mean that if you lit the flax saturated with grease it would fire quick enough, but if you saturated flax and left it loose it would not fire.

106. *Mr. Foster.*] Would it surprise you to be told that one of your cloth told us that he placed an oilskin coat, rolled up, in a locker, and it fired on the inside?—Not at all. I know that perfectly well.

107. Well, there was no pressure there, but a confinement of air. That is in the nature of fibre or waste with oil on it?—However, I do not think there is any danger whatever in stowing in that way. There is always wood between—dunnage-boards—and I have never yet seen those mats myself saturated with grease from the wool. There is very little chance at all of grease passing from the mat into the flax.

108. These mats have one glossy surface?—Yes, and one rough.

109. That glossy side would not absorb to such an extent as jute-fibre?—No.

110. Would you be surprised to hear it stated that wool dumped in the Harbour Board's sheds has been seen with the grease exuding from it—running out of the bale?—I am not surprised at hearing anything stated after what has been said on this question; but I think they are just a little—well, tough. We have taken a lot of greasy wool Home, and the greatest extent of grease I have ever seen has been the mark of grease on the bale.

111. I know you can take a staple of wool and press the grease out of it, therefore it is only a matter of pressure and the grease will leave it?—Well, if it is going to leave it, it will leave it in the dump. I, personally, have seen thousands of bales dumped, and have never seen anything like that.

112. *Captain Blackburne.*] I am told that water has been squeezed out?—It has to be thoroughly soaked through with water before that would occur. If the bale is dumped it is almost impossible for the rain to penetrate it.

113. Do you think from what you know of the wool in the "Gothic" that there is any need for the Commission to advise about the flax not being put on top of the wool in any case, or in close contact?—I do not think there is any danger from that source, because it is so seldom done—only in very exceptional cases.

ARTHUR WILSON MCKELLAR sworn and examined. (No. 16.)

114. *The Chairman.*] What are you, Captain McKellar?—I am master of the "Kaikoura."

115. You have heard the evidence given by Captain Moffatt, and we should be glad to have from you anything of your experience as regards the subject of the Commission?—I have been about twenty years with wool cargoes. My first experience of heated wool was in 1896, on the "Waikato." We loaded at Queensland with nearly all greasy wool. When we got to sea we noticed considerable vapour rising from the ventilators and a smell of manure or ammonia. We came to the conclusion that the wool was heating. I was second officer at the time. We had a consultation over this, and my idea was to allow no air to get to the wool, by which means I thought it could never fire. When we got to Colombo the captain called a survey and the conclusion of that was to open up the hatches and give the cargo as much air as possible. I should say, after the evidence we have had, that we were really trying to set the ship afire. The heat was so intense that you could not bear to stand over the hatches. However, there was not any evidence of fire. We got Home, and the whole of the wool was more or less damaged, and there was a big law case about it. It went to the Appeal Court, and it was finally proved that this wool was packed damp, and that was the cause of the heating. They tried to prove that it was the want of ventilation. There is not the slightest doubt that wet wool will heat, but I cannot say myself that it will actually ignite. It will smoulder away, but I cannot see that there is going to be any flame to any extent, unless fanned into ignition by great draught.

116. You had ventilators to the hatches? Supposing this process of burning to ashes in the centre taking place and creating considerable heat, would that be more likely to extend all over the hold?—There is no doubt it would rise and expand.

117. But you know, when wool is dumped there is always a certain amount of passage for air, and, in fact, in the wool itself, unless you exclude it most rigorously?—That is true, but there would be no great amount.

118. *Mr. Foster.*] What I understand is this: combustion, if it commences will create a gas and it would soon consume the oxygen. You know in the case of the producer-gas the coke is put in the bottom of the furnace, and the air passes through the coke and it does not reach a stage of incandescence. What I understand you to mean is that although it may be red-hot, it may not actually consume?—I think you have misunderstood me. I think it could be in that state.

119. You mean that it could be in that state and yet cannot flame?—Yes; that is what I understood you to say.

120. My impression is that you are right—that no flame can exist without the necessary oxygen?—That is what I contend.

121. I think there is no doubt about that?—There is a certain amount of oxygen in wool, and if you put moisture in the wool you get more. Professor Lewes, of the Greenwich Naval College, who was the principal witness at the inquiry into the "Waikato" case, said in the course of his evidence that all greasy wool, after coming off the sheep's back, sets up a chemical action, and the more moisture you put in the wool the more chemical action you set up.

122. *The Chairman.*] Who was that? Did you say Professor Lewes?—Yes. At the present time I am waiting to receive a copy of the evidence which a shipmate of mine, who was also a witness in the case, has. That was in 1896, and the case was not over till 1899. Captain Moorhouse, of Auckland, has promised to send me down that evidence of Professor Lewes's.

123. *The Chairman.*] We should be very glad to see that evidence if you can procure it?—I shall be very pleased to let the Commission have it. It was his evidence on that point of chemical action on the wool that won the case, and there is no doubt he appeared to put the matter beyond all doubt. I was very much interested in the case at the time, and the whole case hinged upon the possibility of that chemical action upon the wool. So far as I am aware the only thing the professor did not do in the course of his experiments was to have the wool under pressure. He experimented with it wet, damp, and otherwise, but he never had it in the bale.

124. *Mr. Foster.*] No experiment would be satisfactory that did not embrace all the conditions of a ship's hold. It would have to be in a confined space, under pressure, and also confined as to air—as close as a ship's hold?—And that would be a very difficult thing to do, because you could never have the variations of conditions that would be present in the case of a ship's hold, such as the sudden changes of temperature—externally—which would be caused by change of force and direction of wind. The only other case I have seen of heating of wool in New Zealand was several bales we had sent back, and in that case it was fellmongers' wool.

125. *The Chairman.*] Sent back to be reconditioned?—Yes; there might have been others that have escaped notice; but in this case upon opening the bale you could see what appeared to be lumps of lime in and about the wool. I suppose that was on the side of the skin.

126. *Mr. Foster.*] That would be the chemicals used in fellmongering the wool: it is a mixture of lime and soda?—Those lumps I saw would be the calcium, then.

127. They paint the fleshy side of the skin, and pack them skin to skin for a certain time, and the action of the chemicals frees the wool from the skin and they peel it off. The wool experts seem to think there could be no danger from that cause, as the lime would have been previously slaked?—Yes, I heard the evidence about that; but it is possible that it might not be thoroughly slaked. That stuff I saw looked to me like a lump of unslaked lime.

128. Of course, one expert stated that the lumps of lime, if thrown into the water and not properly granulated, would drown and not slake properly. But this mixture that is used is liquid; the brush is dipped into it and it is painted on, and it is possible that what you saw was an accumulation of the residue as it had trickled down the skin and settled at the corners and dried. Did you notice in those lumps any change of condition?—No, I only remember that I saw the bale and refused to take it, and it was sent back to be reconditioned.

129. I should fancy that that would be due to a collection of the lime-water, otherwise it would have broken out when exposed to the air. It would have crumbled away. Have you noticed if there has been a larger proportion of low-conditioned wool—locks, pieces, &c.—shipped this season as compared with previous years?—I could not say at all. I loaded in March, and we may have had the same class of wool as the other ships, and yet we had no appearance of heat.

130. Do you think you took any special care to notice any heating of wool on your ship?—I do not think so. It is a very difficult thing. If the lighters come alongside in the roadstead and put the wool aboard it would be a very difficult thing to feel every bale carefully. It is generally the stevedores who call our attention to any heating they may find.

131. Do you think you have had a very careful lot of stevedores—more careful than the other vessels—I do not think so, take them as you get them. There must have been something in the wool that went into the other ships that was not in that which I took.

132. And a lot of luck?—Certainly we must have missed the heating bales. I have never heard of any of the consignees growling about heat—that is, except in the case of the "Waikato."

133. *Captain Blackburne.*] Was the whole of the "Waikato" cargo damaged?—Two of the holds. There were two classes of damage: one heating in a certain number of bales, and that set up sufficient heat to seriously damage the fibre of the other bales.

134. It originated in the lower holds?—Yes.

135. Do you know whether that particular hold was warmer than the others?—I do not think so. There were two holds affected, one insulated and the other uninsulated.

136. *Mr. Foster.*] The ships are in the habit of giving clean receipts: you will not give those clean receipts unless the appearance is right?—That is so.

137. Does that only cover the outward appearance?—Do you include any sort of warranty as to the internal condition of the package?

The Chairman: We have settled that in law. It does not.

138. *Mr. Foster.*] In that case would the ship be likely to hear of any cases of heating?—No: I think not unless one comes in contact with the consignees and happen to hear of it in conversation—not officially.

139. *Captain Blackburne.*] How do you keep your ventilators—turned from the wind?—The cowl is turned from the wind. I am speaking of my own experience. Of course, in fine weather we might turn one round to the wind and another away, but every care would be taken that no spray or rain got down below.

140. *Mr. Foster.*] Even supposing that a considerable quantity of water did get down the ventilators, it would run off the bales too quickly to penetrate the woolpack?—That is so. It is dumped so tight that it would run off.

141. I should like to ask Captain McKellar if anything has occurred to him to suggest in the way of precautionary measures being taken to detect wet wool?

142. *The Chairman.*] Yes, at any stage. Is there any method of detection?—Inspection might do it, but that is not so easily done at other ports as at Wellington.

You have not to deal with the difficulty, but what should be done.

143. *Mr. Foster.*] It is very desirable that all masters should express an opinion on this very important point?—The condition in which it reaches them?—

144. In what direction do you think inspection should be made—anything as to the method?—I do not know that anything would be practicable or of value unless you went inside the bale. How to do it I do not know.

145. Have you anything to suggest as to how you are to get inside the bale?—I believe they do at the present time insert a pricker, but that will only tell you up to a point, and will not show moisture.

146. Supposing the interior of a bale of wool to be very hot for a distance from the outside, yet cold and damp near the outside, would not the withdrawing of the pricker through the cold portion tend to cool the pricker and give you no indication of the heat in the interior?—It would lose some of its heat, but steel would hold its heat a little longer than that.

147. It has occurred to me that there must be considerable pressure on the bales while stacked in the sheds, and if there appeared to be any doubt the point might be decided by the means of an instrument?—In the case of the fires in the ships, or most of them, it has always been some time after the ship has loaded.

148. *Captain Blackburne.*] We have the case of the "Strathgryfe," which fired some time after leaving Sydney and before reaching the coast of New Zealand. I think they discovered the fire somewhere down about the Snares, and put into Port Chalmers?—She may have been some time on the voyage.

149. That seemed to be pretty good evidence of spontaneous combustion?—It is a most difficult thing to say. If there is fire you must get a reason for it, and if you cannot find any local influence it is an easy matter to say "spontaneous combustion," and it is a most difficult thing to prove one or the other. I wish to say that I am not referring to the "Gothic" or "Pitcairn Island," but speaking generally.

The Chairman: There is nothing in it but two big words.

150. *Captain Blackburne.*] Do you ever test the holds for temperature?—Occasionally. I do not know that there is any systematic way. The average man will take his heat from the indications at the ventilator now and then, and if there is reason for it he might take it with a thermometer.

EMERY B. CONBY sworn and examined. (No. 17.)

151. *The Chairman.*] What is your name?—Emery B. Conby.

152. And you are master of the s.s. "Tomoana"?—Yes.

153. The Commission understand you have had considerable experience in the carrying of flax, wool, and hemp, and we should like to know if by virtue of your experience you can give us some information on the subject?—I have had considerable experience in regard to nearly all classes of cargo, but not so much in regard to wool—only since I have been in the "Tomoana."

154. How long is that?—Two and a half years. I have been in all other trades with the exception of carrying wool, in India, China, and Japan.

155. And have you not carried wool at all in India, China, and Japan?—No.

156. In the colonies have you carried wool solely from New Zealand?—We have had wool nearly every voyage from New Zealand. There was one occasion when trading on the coast we took wool from Melbourne to London, but that was the only occasion—one voyage.

157. Had you any mishap on that voyage in regard to fire?—No.

158. Since you have been on the New Zealand coast, have you had any reason to have your attention drawn to any wool, flax, or hemp being on fire?—None whatever.

159. It has always been quite safe?—Quite safe, and turned out in excellent condition.

160. You have had no reason whatever to complain of the way in which it has come to you to be shipped?—No, none whatever. There may have been one or two bales stained.

161. Have you any knowledge of any bales that have been declined and reconditioned?—No: I really have not. We have never had very much wool.

162. You must have heard, of course, of the large number of fires which have taken place?—Yes.

163. Have you formed any theory with regard to the cause of those fires?—No. The ships that carry this wool I know are first-class ships, and from casual conversations with my officers since we heard of these fires, we thought the wool must have been shipped in a damp condition and greasy.

164. That is the conclusion you came to?—Yes. I have not conversed about the matter except with any one passing my office when we have heard about the disasters.

165. But you know nothing whatever of the action of wool when it is damp?—I do not. I have always heard before I came here that greasy wool was liable to combustion—not spontaneous, but to smoulder.

166. That is, to generate heat?—Yes.
167. Do you know anything about carrying flax?—I have carried large quantities of hemp from Manila, and flax from New Zealand to London.
168. Have you had any fires in connection with it?—None whatever.
169. Have you had your attention drawn to the stowage of flax in any particular method?—No; we superintend the stowing of flax in Manila ourselves.
170. Have you any rules with reference to stowing flax?—None whatever. It is not even pressed; it is just closed in.
171. Would you put flax alongside wool?—No; you have a partition between—a space.
172. Would you stow flax on top of wool?—I would not if I could avoid it.
173. Supposing your ship was not full, would you rather refuse the flax?—Oh, no, I would not. I would put it on top, with dunnage underneath the flax.
174. Have you had any experience in regard to carrying skins?—Yes; we carry skins from here also.
175. Do you consider that a cargo of skins is more likely to be dangerous than a cargo of wool—wool dumped in the ordinary way?—The skins would not fire, but they might deteriorate and get into a damp and mouldy condition. I have heard of them heating, but never of them firing.
176. Is it not a fact there is a certain amount of animal matter connected with skins, and therefore more likely to heat than wool?—Precisely.
177. Were the skins covered that you carried?—No. I may say I have carried skins from nearly all parts of the world.
178. Do you not think that they would be more likely to cause combustion or ignition?—Heating without combustion.
179. Have you ever had any tow since you have been in New Zealand?—No; I do not remember any tow.

THOMAS HILL EASTERFIELD sworn and examined. (No. 18.)

180. *The Chairman.*] What is your full name?—Thomas Hill Easterfield.
181. What are you?—Professor of Chemistry at Victoria College.
182. You know, of course, the subject of our inquiry, and we wish to know what information you can give us on the matter. I also desire to say this on behalf of my colleagues and myself that if you would suggest during the course of your evidence that you should make experiments which might assist us and give us a lead in the matter, the Commission is quite prepared to arrange for you to do so. What you say now need not be final. You know nothing about the actual shipping?—No. I can also say that I am neither a wool or flax expert; I could not tell the quality of flax on its points, for instance, or anything of that kind. I notice that the scope of the inquiry covers cargoes of inflammable matters generally, that is according to the summons I received. I think that what I have to say can be expressed very shortly. First of all, I would point out that I have been approached in the past, both by wool-shippers and by flax-shippers, each wishing me to make experiments to show that it was always the other people who were at fault, the wool people saying that the wool could not possibly catch fire, and the flax people saying that the flax could not catch fire; and the attitude I have always taken up is this: that if it is a matter of public interest then all experiments must be made at the public expense, and if it is a matter of private interest, where a particular individual wanted to throw the blame on to other articles, then the private individuals must have systematic experiments carried out, and that it would be a matter of expense, and they must pay for it; but that has been sufficient for them in the past and they have gone away. I would point out, however, that a considerable amount of information is already known concerning the firing of vegetable matter generally. I am only speaking generally; my views are more derived from what I have seen in other cases than from anything I have observed actually in connection with wool or flax. In the case of ordinary haymaking, I suppose that no farmer in New Zealand will deny—I have heard it contradicted by farmers—that a haystack will heat if it is put together too wet. That is a matter of very general experience in the Old Country, where we have very wet summers; we expect that if a stack is put together wet it will first of all heat, and steam will be seen coming out. Providing the farmer takes it down sufficiently quickly, the hay may be saved, but the quality will be injured, and if he does not do that the whole stack will probably burst into flame. The cause of this in the first instance is undoubtedly bacteriological, and the action of the bacteria causes the preliminary heating; but when the heating has taken place to a certain extent, it gets so hot that the bacteria are actually killed.
183. *The Chairman.*] That would be in the interior of the stack?—Yes, the interior of the stack. It would get so hot that you could not put your hand inside. The stack is not yet sufficiently hot to catch fire, but at a sufficiently high temperature for the oxygen which gets into the loosely stacked haystack to cause oxidation to take place, and as it takes place the temperature rises with increasing rapidity. Here I might just refer to a well-known law amongst chemists, which is that if a particular chemical action takes place—we will say at a certain rate—and you raise the temperature ten to fifteen degrees, you usually find the rate at which the action is taking place is doubled. Now, supposing you raise it another ten degrees you would double it again. That is to say, as the temperature rises in arithmetical progression the rate of action increases in geometrical progression, and since the output of heat in a given tense is measured by the rate at which oxidation occurs, you can see that after a certain temperature is reached firing will take place with great facility. Supposing we are met with the difficulty of a wet summer in the Old Country, when occasionally we may not have during the whole of the haymaking season a single dry day, then ruin may be averted if, as has been done largely during the last twenty-five years, we turn the crop into ensilage—that is to say, we submit it to a great pressure—the grass is packed together so tightly that the oxygen, of course, cannot get inside. You get preliminary heating, and a large

quantity of liquid runs away from the silo, but after the preliminary heating the action stops and the temperature falls, and cattle which are used to it like ensilage just as much as they like hay. I know farmers in some parts of England who, in wet seasons, convert everything into ensilage, and they get the original condition of heating. The interior of the silo is too hot for you to put your hand inside; but the temperature never rises very much above the temperature at which the bacilli which are causing the original heating are killed. Well, I think, having stated this, my views upon the heating of materials in ships—vegetable matter—must go very largely upon that, for as far as I can make out, no practical experiments have been made, and it would appear certainly probable that if flax were shipped wet, we should have the same kind of conditions holding. I do not say that is the cause, because it may be that flax is an exception to the general rule; but until we have evidence to the contrary, I certainly would not, if I was an insurance agent, insure a cargo of flax which I knew to be wet. Then, as regards the wool, it is, of course, a well-known fact that woollen materials are looked upon with considerable suspicion by insurance companies in the Old Country. From conversations I have had with insurance agents in the Leeds district, there is no doubt about that, and particularly because in the spinning of wool it is treated with some kind of grease, or in making of many kinds of woollen materials some kind of oily matter is put into them; and, of course, in the case of waste, whether wool waste or cotton waste, which has been made greasy, we get the same kind of action occurring, though it is to a more marked extent than that we get in the case of vegetable matter which has been wetted. That is not surprising since some of the oils which are used will absorb, if exposed in a thin layer, as much as 10 per cent. of their own weight of oxygen. Under a process of that kind in which the oxygen is absorbed and a rise in temperature occurs, and the wool is packed together so that the heat cannot escape, but sufficiently loose to enable the oxygen to get in, the phenomenon of firing may be expected. I am only speaking generally here, and probably these facts are well known to you as Commissioners; but at the same time it is well worth while referring to them, because no doubt you could find a large amount of printed evidence in that direction. It certainly would seem therefore if we were shipping wool, that wool which was greasy might be expected to be a far greater source of danger than wool which had been properly cleaned and dried. Just as in the case of flax, I should expect that that which was shipped wet would be more likely to cause trouble than that shipped dry.

184. If the wool is of a low class or condition—that is, such as locks, pieces, and dags?—If it contained dung. Dung is a substance which heats rapidly.

185. Would you consider that a more dangerous class of wool to be heated?—From the fact that dung heats more readily than wool, I should look upon the mixture of dung with wool, if only from one point, that it was certain to be infested with bacteria which would be likely to bring about rapid oxidation I should expect that wool of that description was not as safe a substance as wool which had been properly cleaned and dried.

186. Do you think it is safe to take wool of that description Home at all?—Well, I have got no evidence on that point; but if I were insuring—I speak as having had dealings with insurance companies—if I was going to advise an insurance company, I should say put a higher premium on wool of that kind than on clean wool. I do not wish to speak with any certainty on a point of that kind. Of course, from what I have been saying it would rather appear that I looked upon the bacterial origin as the explanation of cargo-fires, but I do not speak with too much certainty on that point, because we know of other cases, such as coal, in which bacterial action is not probable. The substance will heat also, and I have seen a heap of Westport coal in Wellington catch fire; it was a large heap of slack.

187. It was broken up?—Yes. It was a very large heap, and had remained in stock for some months, and gradually the outside of the heap begun to have a peculiar smell, and people wondered what was the matter, and as a matter of fact it was heating inside. There was a channel underneath, and the air was able to get through and to get to the interior. At the same time the heat could not escape through the thick surrounding coating, and, of course, in the ship's bunkers that is a thing which has constantly to be guarded against; that is one point which induced the Admiralty in favour of briquettes, which can be properly piled up and properly ventilated. There may, of course, be bacterial action there in the first place. We should almost think that the bacteria would find coal an unsatisfactory substance for food, and I think in a case of that kind one would be likely to consider it as ordinary oxidation going on without the necessity of bacteria. In the case again of cotton wool which has been soaked with oil, particularly the drying oils which absorb the oxygen very rapidly from the air, probably bacteria have got nothing to do with it. We have got to get at some cause for the preliminary rising of the temperature; it may be a purely chemical action or a bacterio-chemical action, but given that the temperature is rising owing to oxygen being brought in either by means of the bacteria or by direct chemical action, then we shall expect the temperature will rise and rise in geometrical progression.

188. The object of this Commission is to see, if it be, on the one side, the result of chemical action, what measures can be taken to prevent that chemical action, and on the other hand, if it be a bacteriological action, then what we can do with those little beggars before they cause the fire?—There is no doubt that if it is bacteriological an efficient system of sterilisation would get over the difficulty. Coming back to what I was saying, it is perfectly evident that the matter should be attacked experimentally, so that different series of experiments may be recorded, these should be both on a comparatively small laboratory scale, and also upon a large scale, having whole bales of material submitted to actual conditions as regards moisture, varying conditions of temperature, and so on.

189. Similar to that on board a ship?—Yes. What we want to find out are the conditions under which we shall be certain firing will occur. If we know that we can always insure against those conditions. If we find the conditions in which we are quite certain fire will not occur, we can

also insist upon having those conditions present. For instance, proper drying, or if certain ventilation of the hold may be required—I do not look upon that as the cause—but any conditions which will be found absolutely prohibitive, or to a large extent inhibit the rise of temperature preliminary to the outbreak of fire, those should be found and insisted upon.

190. *Mr. Foster.*] Would you think it would simplify matters if, say, you conducted certain experiments and then gave us your evidence?—I do not know how long the Commission proposes to sit, but it is true that in carrying out experiments of this kind they would have to extend the sittings for several months. You see, as often as not the firing does not occur until the ship is practically in port, the vessel may have been six weeks on the go, and we ought to be able to know the conditions when we are dealing with bales of the material at the time.

191. Your experiments could not extend beyond the time it would take a ship to get Home?—No, not in the case of an individual experiment; but you will understand this, that having first found the conditions which we believe point to the cause of the fire (and it may take us a few weeks to find out those conditions), after that we want to repeat these laboratory experiments on the larger scale with whole bales of material at a time, otherwise it cannot be said that we have hit upon the exact experimental conditions, and we shall not give satisfaction to you or to the public because of that, and you will realise that a large amount of time will be required. If I was asked to conduct experiments of this kind, I am bound to say that during term-time it is practically out of the question, for I am giving two lectures a day on various subjects, and conducting practical classes for another four or five hours during the day. The amount of attention I could give is not that which the subject really deserves, consequently all I could undertake would be to supervise such experiments if such were desired, and I would suggest in that connection that a small committee of experts be picked, and that they be asked to devise a series of experiments, one of them being elected if possible as chairman. I may say this is practically what is done by the House of Lords; they appoint a Committee—

192. *Mr. Foster.*] Just now the evidence which you are giving practically tends to nothing—it is rather supposition. Well, the time of the Commission is to some extent valuable, and it occurred to me that possibly the stage at which your evidence would be applicable would be after you conducted your experiments?—Yes, that is rather what I thought. When I heard the Commission was sitting I did not intend to give any evidence at all, and I am doing so because of the subpoena.

193. Do you think that you would be able to conduct experiments under artificial conditions practically the same as on board ship—could you devise appliances for that?—I think there should be no difficulty in doing that, though, of course, any scientific man is bound to say that he will not speak with absolute certainty until after his experiments are over.

194. *The Chairman.*] We have Professor Kirk here as well as yourself. In talking about a meeting of experts, by that you mean such men as Professor Brown, of Auckland, and yourself, and men occupying corresponding positions at Christchurch?—Yes, Professor Kirk, Dr. Maclaurin, and Mr. Aston are all experts who have had their eyes upon these things.

195. Do you think you could get such a conclave of experts in Wellington here?—I think so. I think that such a committee might be able to devise a series of experiments—a preliminary series which might be of use to you, but, at the same time, they would be obliged to say that the amount of time that they are able to give if you want to settle it offhand is out of the question.

196. I do not think there is any necessity to compel you to settle it offhand?—No?

197. *Mr. Foster.*] I think there is no doubt that the labours of the Commission will not terminate sufficiently soon for any legislative measures this session, and therefore it is a question, to my mind, how soon we shall get it, and possibly we shall have to get it later?—If it is your wish that such work should be undertaken, I have not the least doubt that such a committee could be obtained in Wellington, and that they would be able to give you sufficient evidence for you to have some clear preliminary ideas, and that is what you want to get at in the first instance.

198. *Mr. Foster.*] Would it be possible to in any way get reports from time to time. I do not mean to say as to the experiments, but as to the progress?—Supposing such a committee met, the first thing would be to decide whether they could take any action. There is one thing which appeals to me as a man of the world, and that is that it is possible we should have to engage some assistance for ourselves in order to see this work through, and that cannot be done without expense. The expense would require to be borne by the Commission. I made a suggestion of that kind to the people who approached me before, that probably by the spending of no great amount—probably if they spent £500 or so altogether in their experiments—they could settle very clearly the conditions under which firing was likely to occur.

199. Would you take steps to ascertain whether you could get such a committee together, and if you could give to the Commission an idea of the procedure—I mean in regard to the time and details as to the material required; if we had that before us with the probable cost, I think we might better decide whether to go on with it?—Yes, if you will notify me in writing to call such a committee.

200. *Captain Blackburne.*] Would a haystack fire if grass had already been dried first? Is it not that the cause of fires is principally due to the haystack being stacked with grass still more or less green?—Well, the green grass contains about 80 per cent. of moisture, and the dry grass only contains about 14, and supposing you dried it and then gave it a preliminary wetting—unless you made it absolutely sloppy—it does not take up as much, because the pores have closed up, so that the ordinary thatching is sufficient to prevent enough wet getting soaked in for firing.

201. The flax when sent away and baled up is all dried in fibres—it is a different thing to the green flax, and that we understand will fire pretty quickly?—Yes.

202. *Mr. Foster.*] There is one question you could possibly answer without experimenting. It was given in evidence this morning that certain bales of wool broken out from the "Gothic," after the fire had been put out and she had been scuttled, had heated to such an extent in the centre of the bale, but not outwardly, as to have charred the wool in the centre?—Yes?

203. Can you conceive that possible—that it could have charred? Might there not have been some other process—decomposition—which would show the wool as if it had been charred?—There might be, but I should not like to say the thing did not happen, because the further you go inside the less chance there is for the heat to escape. We never see a small heap of coal heat—it is always in the centre, and when they take a heap apart they find when getting near the centre it is so hot that it may burst into flame.

204. This did not burst into flame. I assume the condition was one of incandescence without flame?—Of course, wool flames with great difficulty.

205. I suppose that is quite a matter of temperature?—Yes.

206. But I asked particularly if the wool was charred. The impression I had was that unless there was an access of air, charring would not go on, would it?—Possibly sufficient air would be able to get through in a case of that kind.

207. I mean a dumped bale of wool—wool that had been subjected to a pressure of 90 tons in the hydraulic press?—It seems surprising that sufficient oxygen should get inside.

208. If sufficient oxygen got inside, would it not extend to the outside?—The outside is cooling away more rapidly. The outside air tends to keep the temperature down, thus preventing it getting up to the point at which actual incandescence can occur.

209. In cases of wool having actually burst into flame, it has been stated that the outside has first of all become ignited?—That is, the first that was seen.

210. But would you not have expected that if it would char inside it would also have flamed up?—No. The only thing that seems against it is the difficulty in getting sufficient oxygen inside, and thus I come back to my coal-heap; it is only in the centre that it gets hot; it gets practically red-hot, and is consuming any small amount of oxygen that manages to find its way there. That bears out the statement you made. Then, of course, it spreads from there until finally the whole thing goes.

211. I have had experience of haystacks, but from what I know the fire has begun about two-thirds of the way up—the first indication of flame?—Yes?

THOMAS CUMMINGS sworn and examined. (No. 19.)

212. *The Chairman.*] What is your name?—Thomas Cummings.

213. What are you?—I am in the employ of the Government.

214. Where?—In Wanganui.

215. As what?—I am Clerk to the Awatea Maori Land Board.

216. I understand that you have some invention by which you think you could enlighten the Commission as to ascertaining the heat of wool or other cargoes on board ship?—That is so.

217. Would you like to explain it to us?—Yes. I will briefly explain what the purpose is, but I would prefer to give a practical demonstration—I would prefer to put my instrument into a dumped bale of wool.

218. What is the nature of the instrument?—It is a small steel tube, very thin, with a very sharp-pointed end. It is so fragile that it would not be possible to force it into a dumped bale of wool; but to get over that difficulty I have put a steel rod down the centre, and the pressure is on the steel rod and on the sharp point. Of course, that carries the steel tube down.

219. Do you mean to say that this rod is inside or outside?—Inside the small tube. [Witness explained his invention by means of a pen.] I might say that the Secretary of the Harbour Board has offered to place a bale of dumped wool and the hydraulic press at my disposal to show how the steel tube is put in and how to take it out, and I would show also how rapidly the thermometer will register by inserting it into, say, a sack of chaff that had been saturated with boiling water; it would show the same as if it got into a hot bale of wool. I could arrange with Superintendent Hugo to explain it to the Commissioners should I not be here.

The Commissioners decided to have the instrument explained and tested by Superintendent Hugo when visiting the wharf the following week.

Extract from lecture by Professor Vivian B. Lewes, at Nottingham, in connection with the British Association, on the subject of spontaneous combustion, put in and marked "Exhibit No. 4."

Extract from "Notes on Stowage," by Charles H. Hillcoat, on the combustion of coal, felt, flax, hemp, jute, and wool, put in, and marked "Exhibit No. 5."

The Commission adjourned till Monday morning, 20th August, at 10.30 a.m.

WELLINGTON, MONDAY, 20TH AUGUST, 1906.

The Commissioners met in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

The Commission, having conferred, proceeded to Ngahauranga, near Wellington, and were there shown over the works of the Wellington Meat Export Company (Limited), and inspected the methods and practice relating to those portions of the works coming within the scope of the investigations of the Commission.

The Commission then proceeded to the fellmongery-works of Mr. A. Tyer, in the vicinity, and were shown over the premises, investigating the various processes through which the skins and wool pass, and the conditions under which they are handled.

On returning to Wellington, the Commission conferred.

Adjourned till 10.30 a.m. to-morrow, Tuesday, 21st August, 1906.

WELLINGTON, TUESDAY, 21ST AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

SAMUEL MORTON ARCUS sworn and examined. (No. 20.)

1. *The Chairman.*] What is your name?—Samuel Morton Arcus.
2. What are you?—A wool clerk, in the employ of the Wellington Harbour Board.
3. We understand, Mr. Arcus, that you can give us some information as to the treatment of the wool after it reaches the Harbour Board, and the manner of shipment?—Yes. I have had the supervision of it this last twelve months—from the beginning of the last season till the end of June. I was in charge of the Harbour Board sheds, and received and delivered all wool *ex* boat and *ex* rail, excepting wool transhipped over side into vessels.
4. Perhaps you could tell us how you deal with it after receiving it?—Well, the wool is consigned to us in the first place by rail; the trucks are run into the sheds and we discharge them. After discharging the trucks we get orders from the merchants to ship certain lines of wool, particular quantities, and we act on those instructions, and the wool is dumped and stacked pending further instructions when to send it down to the ship after her arrival. That is the case with all wool-merchants—it applies to one and applies to all. After it is dumped we get instructions to ship it away, and cart it, as a rule, down to the Glasgow Wharf or Queen's Wharf, whichever wharf the vessel is lying at. If at any time any of the wool, either by rail or boat, is wet, then it is placed on one side for inspection, and also for drying purposes. My attention, as a rule, is called to every bale that enters, say, in a damp or wet condition, and this last season the onus of whether it was fit for shipment or not was placed upon my shoulders, but previously Captain Bendall did the work. If a bale is unfit for shipment we then notify the merchant, and according to the Merchants Shipping Act, I have been held responsible for anything that should go aboard in a wet condition. The Harbour Board had a book printed for this purpose, which sets out that the wool is not in a fit condition for shipment, and the merchant gets a copy.
5. *Mr. Foster.*] You mentioned that if the wool is wet. What are we to understand by that? If it is damp would you ship it, or if it is wet?—If it is really a wet bale and not fit for shipment, then we notify the merchant, and he gets it scoured or dried.
6. I want to understand your expression "wet"?—If it is only slightly wet, through faulty railway sheets or anything like that, we undertake to dry it ourselves, if it is only on the surface; but if it goes in to the body of the wool, then we notify the people that that bale is not fit for shipment, and, as a rule, they send it to the scourers to be dried or treated independently of us, and then it is brought back to us in a dry state for shipment.
7. What steps do you take to ascertain the depth to which the wet has got in?—If it has penetrated an inch or two of the wool we do not bother about it—we consider it is too wet; but if it is on the surface of the pack we dry it ourselves.
8. Practically only the packing?—Yes, simply that. If it penetrates into the wool at all, then we have nothing to do with it. There is a duplicate notice taken in the book, and the original is sent to the merchant. Since Captain Bendall ceased to do the work that book has been printed by the Board for our protection. It has involved extra work, but it has to be done, and it shows the onus of the responsibility is resting on my shoulders.
9. Then, as a matter of fact, there is an inspection as to wool?—Yes, every bale, sir, in a way. For instance, the man who receives the wool—there is a clerk told off for that purpose—he receives the wool from the trucks and tallies it, and if he comes across a damp bale, it is placed on one side, and my attention called to it. If it only wants surface-drying, we place it in a given place and allow sufficient air to get to it for drying, and we have a final inspection to see whether it is fit for shipment. Every bale is inspected.
10. There is a recognised responsibility for the Harbour Board?—It has been forced on to us—we cannot get away from it.
11. You cannot get away from it, but do you recognise it?—Yes. It is not on the receiving of the wool in the first place that the danger arises, it is after it is pressed and put into the stack, and if any moisture remains in the wool after it has been dumped it will then generate heat.
12. But what I understand is this: that the wool when it comes into your hands, I suppose, is examined for the purpose of ascertaining whether it is in a shipping condition?—Yes, that is so. We give a receipt to that effect to the railway or to the vessel or coastal boat. If any particular bale is wet the number of the bale is taken, and receipts given on the manifest of that vessel of so many bales wet. With regard to the slightly wet bales, we dry them ourselves and make a small charge. Formerly Captain Bendall inspected them, and passed them according to whether they were fit for shipment or not; but latterly the work has rested on our shoulders.
13. Would the fact of Captain Bendall passing the work relieve the Harbour Board of the responsibility?—Yes. I have a list of what I call slightly wet bales, which I have picked out. These we make a small charge for drying. This list [produced] gives the marks and quantities of bales which I personally examined. I think there were 635 bales during the season—those have all been very slightly wet.
14. Are these of comparatively recent date?—Last season.
15. *Captain Blackburne.*] On very wet days—sometimes we have had continuous rain for three or four days and fairly heavy, would the work be stopped during that time?—It goes on just the same, because we can put the trucks in the shed and cover them. There are two sheds—one shed will take twenty trucks and another eleven trucks—and when we shut the door they are perfectly rainproof.
16. But if the cargo is worked during heavy rains, these large hatches, I suppose, are kept open all that time?—That would be with regard to loading vessels: but with regard to unloading vessels, we do not take it from them if it is raining.

17. But I mean with regard to loading large vessels?—We have no control over them—they do as they like. They say they want wool and we send it down to them.

18. What is the usual practice—is the work discontinued during continuous heavy rain?—Yes, it is, if it is continuous. It is not on account of the wool only, but on account of the insulation as well—the rain will affect the insulation independent of the wool, and very often the captains of the ships stop the work being done independent of the wool. All round the outsides of the hatches are insulated and all the hold.

19. Not every hold?—Only the meat-holds; but, as far as the wool is concerned, if the rain is too heavy they do stop the work.

20. And the ship would be delayed for two or three days if it was raining continuously?—Yes.

21. *Mr. Foster.*] In regard to shipping wool, do you know if it is ever discharged from your sheds into the steamers in wet weather—I do not mean ordinary drizzle?—Many times. In fact, if it is just slight drizzle when we go to load the vessel with the wool, we place the wool on the lorries, and it is covered up with tarpaulins, taken down to the ship, and then it is for them to decide whether they take it on board or not. If it is too wet they decide whether to do the work or not. Sometimes a slight drizzle is not worth noticing.

22. Have you known a case where the loading has gone on, say, this last season, when the rain was sufficiently heavy to enter beyond the woolpack?—No, I should not like to say that; but it might occur that when the hatches are open and a slight drizzle is going over a number of yards of wool on the floor of the hatch, it might get wet through the pack.

23. Do you happen to see the wool stowed in the ship?—No; I have been in the shed controlling the work from the inside.

24. Have you any impression as to the likelihood of loading being carried on during wet weather? By "wet" I mean sufficiently wet to incur risk?—If it has been raining probably too heavy to work outside, we have a method whereby we can take the wool inside the sheds alongside the ship, and with the hydraulic crane we can take it out of the shed and drop it into the ship, and it is only exposed during the time it is being swung from the shed to the ship.

25. As a matter of fact then, if it is fairly heavy rain it would not do much harm?—No, it would not get through the pack; and even if it got into a heavy shower, it would run off before it got into the ship, because it is packed so hard.

26. Have you ever known of water squeezing out of a bale when being dumped in your shed?—No, I should not like to say that, because wool absorbs a large quantity of water, and there would need to be a large quantity to squeeze out.

27. You mean that if there was a sufficient quantity of water in a bale of wool to have trickled out, you would have noticed it?—It would have been in a sodden state.

28. You would have noticed it?—Yes. When there is the least sign of wet my men have sung out to me.

29. If wool had been seen with water running from it when put in the dumping-press, you would have noticed it?—It has not occurred in my time. I have seen it coming out of flax, but not of late years. I have been eighteen years in the service of the Board, and sixteen years ago I have seen water running out of the flax.

30. Have you known that flax to be shipped?—No, it was stopped at that time.

31. Have you any idea as to whether that may have been in the store before being dumped?—It may have come out of the railway-trucks a few minutes before.

32. And opened and dried afterwards?—The merchants take it away and dry it. We did not do any drying at that time.

33. How long ago was that?—Sixteen years ago.

34. At that time were the merchants not in the habit of opening the bales and separating them in the sheds?—No, they would only pull out a hank here and there for their own examination.

35. Was it then taken away to be dried?—The merchants took it away themselves to dry it.

36. They did not dry it in the sheds?—No, we did not have any then of any magnitude.

37. It was not opened in the shed?—No.

38. So that you would not have the opportunity of ascertaining whether the temperature got up?—No. I have seen the temperature go up in damp flax about that time, but now we do not get damp flax; the Government Graders now give orders for the Harbour Board to send away the flax. We have seen heat generate in flax, but not to the extent it does in wool.

39. Would you imagine that heat would generate in flax to any extent?—Yes, to the extent of rotting it—to the same extent as stable manure.

40. Do you think it would get sufficiently hot to fire?—No, I do not think so. No, I think it would get into a state of smouldering away—not actual fire; ferment away—it gets black and rotten.

41. You do not think flax would fire by itself?—No. Of course, at the present time the way the flax is dealt with it seems impossible for wet flax to get on board a ship. I am speaking personally of Wellington; I cannot speak of other ports. Every bale of flax is inspected by the Government Graders.

42. You open one in ten?—They open one in ten, as a rule.

43. Do they draw a hank from every other bale?—Yes, and every tenth bale they open out and inspect it internally.

44. And since when did that system commence?—Since the Government grading started—about six years ago.

45. We understand that this process of inspecting the flax has existed right through the last season when these fires took place?—Yes, they have been very close; we have been very busy receiving, and we have had as many as eighty or ninety bales from one man stopped by the Graders.

46. Do you know the name of that man?—Yes, but I question whether it would be judicious to publish his name, because, in a way, it is condemning the man's work. You could get that independent of me from the Government Graders. If you want it I will give you the name of the flax.

47. *Captain Blackburne.*] What kind of wool have you the most trouble with?—Dirty wool. It generates heat very quickly. A steamer which came in with a load of wool to the shed had a bale of locks, and the surf-boat had turned over and this bale of locks had been rolled in the surf, and when landed in Wellington the water still poured off it. It was put on one side and the merchants notified, and even before 5 o'clock the same day it had generated heat to that extent that I was afraid to have it in the shed. It had been on the vessel's deck for a few hours. Dirty wool will generate heat very quickly if wet.

48. *Mr. Foster.*] Have you noticed sheep-skins heat at all?—Not much.

49. Never had any trouble with them?—As a rule, sheep-skins will come in and only be in our hands a few hours. If a bale of wool is left in the shed for a fortnight and it generates heat you will see it on the pack, and it leaves a mark on the floor, and then the men will sing out "Here is a hot bale," and it is attended to.

50. Have you formed any opinion as to whether the quantity of locks and pieces shipped this season has been greater than in previous seasons?—I am under the impression that we have shipped more this season than in any other season, but I have no record. I put it down to the good prices, and the people rushing the wool Home to get the good prices.

51. Have you had any pressure from the shipping agents to despatch the wool?—They are always anxious to get the wool away.

52. More so this season than other seasons?—Ever since I have been in the wool business it has always seemed there is a rush. Their object is to get the ship loaded in the shortest time possible. It is not a question of getting the ship away, but a question of saving the labour.

53. I am speaking of the agent, not the shipping companies?—I mean the ships' agents who control the vessels; they give their orders, and we are guided by what the ships' agents or the ships' owners say they will take.

54. The owner of the produce—his agent does not come in contact with you?—No, he goes to the ship's agents or owners. For instance, a vessel may come in here for 4,500 bales booked, and she may have only room for 4,000, and the ships' agents may come down and tell us to put on certain lines, and then they have to contend with the owners of the wool.

55. Have you noticed more pressure on the part of those who are concerned in the buying and selling of wool last season than in previous seasons?—No, I should not like to say that; it does not come within my province.

56. In a previous remark of yours you referred to there being a greater anxiety to get the wool away this season than in previous seasons?—I meant in regard to the wool being rushed into Wellington in a comparatively short space of time. In the month of January we had a larger quantity than ever we had before. We shipped in January a matter of 12,250 more bales of wool this year than last year—that is what we actually shipped. It was a very heavy month, while in the previous years it would be sometimes more spread out.

57. Do you remember whether you got more wool early in October and November?—We have returns kept for that purpose. In November last season we received 23,802 bales; in November this season we received 24,200 bales; in December, 1904, we received 37,718 bales; and in December this season we received 35,285. Now, in January, 1905, we received 35,308 bales, and in January this year we received 47,558 bales, or practically that was shipped.

58. How do your aggregates for the whole season compare?—The season 1904-5—that is, taking the four months November, December, January, and February—we shipped 127,657 bales. This last season for the same period we shipped 132,049, which is about 4,500 more bales in the four months this year. The heaviest rush was in the month of January of this year.

59. In the evidence given by a previous witness, a remark was made which rather indicated that there was a tremendous rush on the wool in the beginning of the season, although none of it caused any trouble in the ships?—Yes, that is so.

60. Well, apparently there had been no such rush in the early part of the season?—We have had no trouble with heated wool in the early part of the season.

61. The evidence I refer to conveyed to me that there was a rush to get the wool in even in the early part of the season. That is not borne out by your figures?—These figures represent the bales of wool shipped during those months. Of course, we had them in the shed.

62. They were not your receipts, but the wool despatched?—Yes.

63. It would not be likely to have accumulated in those months—for November?—Unfortunately, in December we were as long as six or eight days and never had a Home steamer to take a bale from us, and it was being rushed into the sheds all the time. One time we were eight days, another time six days, and twice four days without a steamer to take wool away.

64. And to the same extent would it account for the swelling in January?—Yes. I got a pretty good clearing at the end of December.

65. But it does not show it in your figures?—No, but although the wool accumulated in the early part of December, it went away pretty well at the end of December; a steamer would come along.

66. So that it would not have affected the following month?—No. There was another thing to be taken into account—there were the January wool-sales. We had wool arriving all through December, from perhaps the early part of December, and they went away gradually a few bales at a time, probably two hundred a day to various wool-merchants, and after the wool-sale, which I think took place about the 9th January, the whole of that wool was rushed back to us with the exception of about two thousand bales, and besides dealing with the ordinary work we had to deal with this as well, and get the trucks and keep the boats supplied.

67. In reference to the wool that was returned to you from the sale-rooms, did any of that become heated?—I cannot say that it did. The wool-sales wool would only be in the sheds for a few hours—we should not have time to detect it. Ships coming here for wool come here just in time to catch the sales, and we should have very little time to deal with that wool, and it would be sometimes only in the sheds for a few hours.

68. It has not come under your notice that any of the wool-sales wool heated?—No, I cannot say that.

69. Could you trace it if it had been so?—Yes; I would have had it stopped, and account taken of it.

70. If you could do that, would you do it—I mean if you could trace it?—Trace the account of the wool-sales wool received?

71. Any heating?—There is no heating amongst the town wool that I know of.

72. But it came out in evidence that wool had been offered for sale which was damp, and, in some cases, that damp wool had been packed and sent on?—If that was so that would be done without our knowledge, and, as I say, it would require to remain in the shed probably for a fortnight or so before we should detect it after it was dumped. If it came to us from the wool-sales, we should have to dump it, and it would then generate heat in half the time; but before we could detect it, it would have to remain in the shed for probably a fortnight, so, although it may be damp, it may be dumped into the ship and we would know nothing about it.

73. Would you say this, that the wool that is dumped will heat noticeably much quicker than that which is not dumped?—If it is dumped it will heat much quicker.

74. We have had it in evidence that wool has heated that has only been in the wool-shed for four or five hours?—Yes, I have had that myself. I have had any amount of wool that has come in and heated after it has been in the shed for a day or so. Wool that is only slightly damp, where there is no moisture on the outside of the bales that might generate heat. I have had scoured wool do that, although when it came to us there was no sign of moisture, and yet it generated heat.

75. You can say nothing as to the condition of the wool that came to you from any of the sale-rooms?—No, we do not, practically speaking, take any notice of the internal condition of the bales. We have no means of doing so, and it is not in our province unless our attention is called to it showing heat externally. I have had wool that came to me from the fellmongeries which was supposed to be dry, and it was dumped, and remained, say, for eight or nine days, and then my attention was called to the heated state of it. There were nine bales received at that time, and we examined the bale, and six out of the nine were found to be heated. They were sent back to the wool-scourer in the morning, and they came back the next day supposed to be dry. They were then dumped and left in the shed, and the ship they ought to have gone into refused to take them, and they were left in the shed for a fortnight, and never generated heat afterwards.

76. From your experience, would you say that cases of heating have been more numerous in fellmongered wool than in country wool?—Yes, I should say so.

77. And have you, in respect to fellmongered wool, formed any opinion as to the quality of the wool—that is to say, whether it would be slipe wool, or whether it would be lower quality than you would call second or third quality?—No; as a rule, we do not take any note of that—not of the class of wool; but, in years gone by, probably sixteen years ago, we received wool from the Gear Company and Meat Export Company, and we often had a bale that was heated then, and when we found it was heated it was sent back to them, but after the bands were taken off it remained in a collapsed condition like a concertina—no life in it at all. But of later years, since the new process has been used, that has never occurred. In April of this year I had a bale of wool that belonged to the Gear Company that weighed over 4 cwt., and it was dumped and placed on one side, and five minutes after the bands burst. It is perhaps dangerous the bands breaking. But that bale of wool stood straight up without a wrinkle in it, showing that the internal portion of the wool must be perfectly dry, otherwise it would not have sprung up. But with regard to the fellmongered wool of companies like the Meat Export Company and the Gear Company, we never have any trouble with their wool at the present time.

78. *Captain Blackburne.*] It is the smaller people?—Yes, where they have not the patent appliances, and have to depend on the atmosphere for drying.

79. *Mr. Foster.*] I suppose you see the wool arriving in the trucks in the sheds?—Yes.

80. Have you ever noticed the floors of the trucks in a seriously wet condition?—I have seen the water run through the tarpaulin right through the body of the wool, and lie in the bottom of the truck—go right through the centre of the bale of wool on account of the faulty tarpaulins that they have been covered with.

81. It was stated in evidence that trucks sometimes left at railway sidings where there are no sheds have sometimes considerable quantities of water on the floors, and that a careless carter would drop his wool into it?—Oh, no. As a general rule, in a case of that kind, they drop sawdust or shavings on it, or put tarpaulins down.

82. I should have thought that in heavy rain shavings or sawdust would be rather mischievous?—Yes, if the dampness was of any extent; but, as a general rule, the trucks are not watertight.

83. It would be impossible for any considerable quantity of water to remain in the trucks?—As a general rule. The water would run away, but the surface of the truck may be wet.

84. Then it would not do any harm?—It may wet the outside pack. That is what I dealt with in the book. If there is any bale that looks to be wet, we cut a patch out of it and look at it and pull the wool out, and if it is all right we sew the pack up after a day or so; but if it has gone into the heart of the bale, we send out a notice that we consider the bale unfit for shipment, and it is then sent to the fellmongers to be reconditioned.

85. Have you any reason for supposing that the Railway Department does not make proper provision for securing the wool in the wet weather?—The great fault is, it is not really the trucks, it is where they have got to leave the trucks at wayside stations where they are loaded, that they do not take proper precautions for covering the wool with tarpaulins; and, further, when the engine is drawing the trucks they have the tarpaulins placed so that the wind raises the end up and drives the rain in.

86. You just now referred to the damp from faulty tarpaulins?—Probably nail-holes or something small like that—possibly only a pin-prick in the hollow part of the tarpaulin which you could not see unless you held it up to the light.

87. So that your opinion is that the Railway Department does everything possible to insure the proper carriage?—I would not say that they do otherwise, because the question is that they are very hardly pushed for rolling-stock sometimes. We have had last season as many as 127 trucks in one day, and that shows there is a big demand on the rolling-stock, and the tarpaulins for these are often in the sheds, and the moment they come in they take them and send them up country.

88. As a general rule, you would say that country wool that is wet has not become wet in transit in the railway-trucks so far as they can prevent it?—The railway people themselves very often cannot prevent it. They put the tarpaulins on, and they do not know of any hole. It may only be a pin-hole and yet the water drops through. The greatest trouble, so far as wet wool is concerned, is in the boats working on the coast, where they work with surf-boats. That is salt water, and if the bales were wet with salt water, I was very careful not to allow it to be shipped Home.

89. Are you aware of the condition that the "Waimate" wool arrived at Wellington in—it caught on fire at Napier?—No; that was put on board at Napier, and, of course, we know nothing about it.

90. But it was discharged here for reconditioning?—I believe some of it was discharged for reconditioning.

91. Did you see any of that?—I heard of it, but I did not see any of it.

92. *Captain Blackburne.*] Have you ever seen a bale of wool on fire?—No, never in my life. I have seen it generate heat to such an extent some few months ago that you could not put your hand inside. I think that was the wool I mentioned a moment ago. There are wool-spikes made for Captain Bendall for the purpose, and I put one of them in, and when I took it out it was so hot that you could not take hold of it.

93. Do the bands on the bales of wool that have been dumped often burst?—Yes, very often, especially in the early part of the season with the new wool or new clips coming in. There seems to be more spring and more life in it, and more expansion, and if the man puts the bands on too tight they often burst; but, as a rule, after it has been pressed, there is a little slack to go and come on which leave the bales more secure.

94. *Mr. Foster.*] I suppose its extra springiness is due to there being rather more grease in the wool at that time of the year?—Yes, and not only that, but being the first clip, there would be more life in the wool than at the tail end of the season.

95. *Captain Blackburne.*] Have you seen sparks flying when the bands have burst?—You might. I have seen a spark—it is very rare.

96. You do not think there is any possibility of fire from the bands bursting?—No, I cannot say that. I cannot see how any sparks would occur in a ship by the bands catching one another, because the band is sunk into the bale, and when two bales come together the wool would touch before the bands would touch.

97. *Mr. Foster.*] Have you given any thought to any method for the examination and detection of wool in a bad condition?—No. I have thought the matter over, but I do not know how it could be done. I have thought that there might possibly be inspection of the wool after it has been dumped before it goes on board ship, but when you come to consider that we deal with something like six thousand bales a day, well, a man would have to cut himself into four pieces to attend to one ship, because when working the four hatches it would be impossible for a man to inspect the wool in that way. There was one boat we had two or three years ago and she took in 4,061 bales in seven hours and a half, and to look after that a man would have to be pretty lively. It does not come from one shed, but different sheds. Formerly, when there were any wet bales, Captain Bendall used to come along and we used to put the wet bales aside, and if wet it used to go away if it was not fit for shipment; others he would keep a note of in his book, and come round the next day to look at.

98. Then Captain Bendall's examination was subsequent to the examination by the Harbour Board officials who told him?—He had to be notified by us, and then he took the responsibility as to whether the wool was fit for shipment or not.

99. He made an official inspection?—Yes.

100. But he did not find it out in the first place?—Oh, no. He was always informed by our officers where to find the wool.

101. *Captain Blackburne.*] There would not be room in the sheds to keep the wool for a fortnight after it had been dumped?—You would want a 40-acre paddock for that. In January we shipped 47,558 bales of wool; and to keep them for a fortnight—what are the ships going to do in the meantime.

102. Would it be possible to keep just the particular kind of wool that is looked upon as dangerous, such as locks and pieces?—That could be done, but locks and pieces would not be so much—it is a question of accommodation. It could be done, but it would hamper us a great deal.

103. The wool coming from the Gear Company and the Meat Export Company—the large fellmongers—is looked upon by you as practically safe?—Yes.

104. So that it would be a comparatively small proportion of the wool that there would be danger about?—Yes; I should say, for instance, that locks and pieces contain so much animal matter and manure that with the least moisture they would soon generate heat, but there is not a large amount of it.

105. Would it not be possible to keep such bales for a few days in the shed after they had been dumped to see if they generated heat?—It could be done, but it is a question of accommodation; every merchant and every company would have to have a separate stack—we could not put them into one stack, and that would hamper the present accommodation of the sheds very much.

106. It would appear there is more danger in shipping wool-sales wool because it is shipped away so rapidly—is not that so?—I should not say that is so, because it has been accumulating for weeks before the sale takes place.

107. As soon as it comes back it is shipped away?—Yes, but it is accumulating in the sheds. I do not see that there would be any moisture, because in the stores I should say the people themselves would detect any moisture if there was any. The probability is that they might accumulate for some time before the sale, and after the sale they are rushed down to us at the rate of thousands a day.

108. *Mr. Foster.*] Ruanui brand—where does that come from?—Either boat or rail—that is all we know about it.

109. I see the Ruanui brand occurs pretty frequently in this reconditioning list?—It comes *ex* rail; that is all we know about it. The K-shed wool is all railway wool, and the other shed is mixed wool, and in the U shed, that comes in partly by rail and partly by boat.

110. You would have the consignor's name on your record?—Yes; that would be in the railway-book—that is kept in the shed by the Government. We take the wool out and put it away, and await instructions from the ships' owners or agents as to what ship, and it is then dumped and put into that ship's stack.

111. I notice one brand here, G in a circle, twenty-four bales wet?—I think there were a couple of surf-boats turned over.

112. By the "Kahu"?—Yes, coming from the east coast. They sometimes have a mishap and get the boats rolled over.

FREDERICK STUPPLES sworn and examined. (No. 21.)

113. *The Chairman.*] What is your name?—Frederick Stupples.

114. You are Assistant Wharfinger in the employ of the Wellington Harbour Board?—Yes.

115. We understand that you can give us some information with reference to shipping wool?—Well, I have had a good deal of experience in dealing with wool until about three years ago—I was principally amongst the wool. Of course, Mr. Arcus has given you a pretty fair idea as to how the wool is received at the sheds. I could only reiterate what he has stated in regard to receiving the wool.

116. You have heard all he has said?—Yes.

117. Do you corroborate all he has said?—Yes.

118. Is there anything you wish to say in addition, or anything that has struck you that he has omitted?—There was an instance came before me on one occasion: the "Gothic" shipped fifty or sixty bales of fellmongered wool in Lyttelton, and when she come up here the stevedores discovered in turning it over that a lot of it was very much heated. That wool was landed, it was put into C shed and opened up, and the wool was evidently heating from the inside; it showed some heat right through, but it was much hotter inside than outside.

119. What was the condition of it inside—had it become black?—It was much darker.

120. Was there any sign of cinders?—Oh, no; only extreme heat—no sign of it turning into cinders or anything of that kind.

121. What was done with it?—That was sent away up to the fellmongery to be reconditioned, and after that it was brought back and shipped. That was the process we used to go through with all wet wool, as Mr. Arcus has said. When Captain Bendall was looking after it, if anything like that came about we used to ring him up and ask him to come along and inspect it. There was another instance with flax. We shipped a lot of flax. At the time the Rangitikei Fibre Company was in full swing we used to get a great quantity of flax down, and some of the men were not very scrupulous in dealing with it. And in mentioning the way the water was running out of the flax in the dumping-shed, we were told afterwards that that was the fault of the balers in the flax-mills. They went in for the practice of making it wet as they were paid so much per ton, and they would throw a bucket or two of water into the bale, and when we got that down here and put the pressure on to it, we squeezed the water out of it. Of course, sometimes we would get some of the flax-mill hands working in the sheds here, and they would know something about it.

122. The water-can had been used there?—Yes, the water-can to make it wet. I remember we used to reject the flax that was wet, and have nothing to do with it.

123. *Mr. Foster.*] In your position, would you have an opportunity of seeing how the wool and other stuff is stowed in the ship?—Well, occasionally it is necessary to go on board the ship. For instance, a wrong dump may get on board the vessel, and then it is necessary to go on board and get it out.

124. Did it ever come under your notice that any other class of stuff is stowed with wool on board ship?—No, they do not usually do that.

125. Have you ever seen flax stowed with wool in the same hold?—I have seen flax stowed in the same hold, but they do not stow it with the wool. For instance, if going to stow the flax they would put it in with dunnage between it, and then the wool against the dunnage.

126. Do they use anything else besides wood dunnage?—They have mats, as a rule, and dunnage to keep it separated.

127. Have you ever seen any of these mats on fire?—No.

128. Do you think they would burn?—I suppose they would burn, but I have never seen any on fire.

129. Do you think they would burn as readily as the woolpack would?—I should not think so—it is a different nature. In regard to your question about the Ruanui wool, I think that comes from somewhere up Hunterville or Taihape way. It comes down usually with Studholme's wool. It sometimes comes down *via* Wanganui and sometimes by rail.

The Commission proceeded to the wharves and sheds of the Wellington Harbour Board, and, under the direction of the Secretary of the Board, was shown the system of receiving, handling, stowing, and checking the wool, and flax, and tow passing through the Board's sheds. The system of testing bales of wool for temperature was demonstrated, and also the system of grading flax.

The Commission conferred.

The depositions taken before the Collector of Customs at Dunedin on the 15th April, 1901, at an inquiry into the fire which occurred in the wool cargo of the barque "Strathgryfe," while on a voyage from Sydney to London, and which put into Port Chalmers on fire, was put in, and marked "Exhibit No. 6."

A statement of shipments of hemp and tow shipped by G. H. Scales from Wellington was put in, and marked "Exhibit No. 7."

Report by the colony's Produce Commissioner in London to the High Commissioner, London, dated the 26th June, 1906, relative to fires on vessels carrying New Zealand produce to Great Britain was put in, and marked "Exhibit No. 9."

The Commission adjourned till to-morrow, Wednesday, 22nd August, 1906, at 10.30 a.m.

WELLINGTON, WEDNESDAY, 22ND AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

CHARLES WADLEY sworn and examined. (No. 22.)

1. *The Chairman.*] What is your name?—Charles Wadley.
2. You are a stevedore?—Yes.
3. For what company?—For G. H. Scales, and Huddart, Parker, and Co.
4. We understand that you have had a large experience as a stevedore, and, of course, in regard to shipping wool and flax, and the Commission is of opinion that you may be able to give some useful information as to the manner in which these commodities are stowed from the time you get them. Do you know anything about them before they reach the Harbour Board?—Only that they come down in the trucks undumped, and they go into the sheds and are there dumped. Sometimes the wool comes down wet, the tarpaulins have been taken off, and the drippings of the water have been running into the wool; but most of that wool has been opened outside the Harbour Board shed and dried.
5. It does not reach you in that state?—No, it does not.
6. Would you exercise any discretionary power in refusing to take that wool, supposing it should get to you in that condition?—Oh, yes, refuse it; we would not take it aboard the ship.
7. *Mr. Foster.*] Have you ever examined any wool that has been dried in that way in the Harbour Board sheds?—Oh, yes.
8. Of course, they stitch it up after having exposed it to the air?—Yes, they stitch it up.
9. Have you ever tested any of those parts in the wool-bales to see if they have sufficiently dried?—We have tested them with Captain Bendall's mild steels. There have been occasions when we have put the steels in that they have come out a bit warm.
10. After the Harbour Board had tried to dry it?—Yes, but not to that extent. The steel is cold when it goes in, and the wool would bring it up to whatever the temperature of the wool is.
11. Would you expect that if it was not thoroughly dry?—When the rain gets on to it it does not go far into the pack—not more than about an inch or two inches; it would never go into the body of the wool.
12. Of course, you say it never goes deep enough, but a witness we had stated that on occasions the drippings from tarpaulins have been known to go right through the bale?—I do not think so. The outside of the bale would take up the water first before the wool would. I have never know a bale to get wet right through unless it has been dumped over the side.
13. That has been stated, but, at any rate, you have never seen such a case?—No. The only case I know of was when the "Jessie Osborne" caught fire; I loaded her after she was fixed up with scoured wool, and there were occasions I think when the wool was sent back on account of it not being properly dried—it got heated a bit.
14. You say you think—do you know that there was?—Yes; of course, that was rejected—it had to be dried.
15. Do you know the brand of that wool?—I could not tell you. I do not think they could get the brands of many of the bales, because they were so burned. Of course, they put brands on them and the insurance company had to take them over; but there is the wool that comes from Wanganui which has been put into the surf-boats, and it is likely to get wet with salt water, and the salt in the water does not allow it to dry properly, and then the ships' agents take it and dry it themselves.
16. You, of course, have nothing to do with the wool until after it is passed out to you by the Harbour Board?—As soon as it is down by the ship's side I take charge of it.
17. So that your knowledge of the condition of the wool commences with its arrival at the ship's side?—Yes.
18. Supposing that the wool comes by boat, do the steamers take it direct over the ship's side?—Yes, at the ship's side.
19. And the Harbour Board does not handle it?—No.
20. Have you ever found any damaged?—Yes.
21. What do you do with it?—Reject it. It is sent away to be dried. The agents for the small boats have to take charge of that wool which we reject, and they have to get it dried at their own expense.
22. Have you had much flax?—Yes.
23. Have you ever found any wet bales of flax?—No.
24. Never found any wet at all?—Not in the sailing-ships. I have seen flax damp, but it has always turned out dry afterwards.
25. How long is it since you commenced the business you are now at?—Thirteen years.

26. And the whole time in Wellington?—Yes.
27. And you have been dealing with flax throughout the whole of that time?—Flax, wool, and tow.
28. We have been told that, prior to the starting of this grading, flax was occasionally shipped wet?—Yes, wet and green.
29. You said just now that no flax was shipped wet?—Not now.
30. But it has been prior to the grading?—Yes.
31. Do you consider the grading now is a thorough preventive to shipping wet flax?—Oh, yes.
32. When wet flax was shipped prior to the grading, did you ever find any heating?—No, sir.
33. It did not heat at all?—No.
34. Did you ever see any of those flax-bales opened?—Never seen them opened.
35. When wet they were simply dealt with?—Rejected flax is generally stowed by itself.
36. You have never seen a bale opened?—No.
37. So that you would not know what condition it was in?—No. I have seen them discharged in the Old Country.
38. But you would not know what the condition was inside—you would not know whether they were hot or warm?—No. I have seen tow wet inside, and I have seen it all go mouldy after it has been opened.
39. And was there any increase in the temperature at all inside?—No, it was just mouldy—rotting away.
40. Was it still damp or had it got dry?—It had got dry.
41. So that if it had got dry the heat would have gone out of it?—Yes, absorbed from it.
42. Was there anything to lead you to suppose that that part which was mouldy was not mouldy when it was packed?—I should think so.
43. You understand what I mean?—Yes, was put in in good condition.
44. Was that mouldy condition there prior to its being put into the bale?—I do not think so; I think it was in good condition when it was put in.
45. Except that it was wet?—Yes.
46. What led you to think that?—It was through the fire it got wet—that was the “Jessie Osborne.”
47. It was saturated owing to the fire?—Yes, with water.
48. And subsequently, owing to the heating as one would expect, it got mouldy?—Yes, started to get rotten. Most of our ropes we get made in New Zealand of flax, and they are wound up pretty tight, and if you look at the heart, which is wet with fresh and salt water, although it starts to go rotten, there does not seem to be any heat at all, because I have had flax in ships for three weeks and then broke it out, and it has come out all right after having been screwed down tight.
49. Do you mean going in wet?—No, gone in dry. After I have taken it out after being screwed down for three weeks, I have found the same temperature as when I put it in.
50. We have had no evidence as to whether flax which is in good condition and thoroughly dry would heat. What is the condition of wet flax when dumped?—That it will rot—it will never fire.
51. Have you ever known of any loading of flax or wool in wet weather?—If it rains at all we knock off loading.
52. But you work in a sort of Scotch mist?—No; if it is going to wet the woolpacks we do not work, and if we see the least sign of rain coming over the wool, we have it rushed into the ship's hold and cover the hold over.
53. Do you stow the flax and wool in the same hold?—Yes.
54. And if the flax is stowed in the same hold, is it ever in contact with the wool?—There are generally partitions of either mats or wood.
55. If there were no mats used and you were putting tow in, would not some of that tow be likely to come in contact with the woolpack?—It is very likely to come in contact with the wool-bale.
56. In between the wood?—Yes. The partition of wool is only a thin partition, and it is screwed up in the sailing-ships, but in the steamboats it is just stowed in, and there is more likelihood of friction than in the ships.
57. What do you mean by a “partition”?—A sort of bulkhead.
58. Closed bulkhead?—Yes.
59. I thought you meant dunnage?—No, the dunnage is underneath.
60. Supposing in a hold you had a certain quantity of wool, and you had to put flax in, would you put it on top of the wool?—Yes.
61. But what would you have between them?—Dunnage—close-boarded wood. The dunnage goes first on the lower part of the ship, and then if the ship has 'tween-decks we put the dunnage underneath, so as to allow a certain amount of ventilation to go between the bales.
62. That is close-boarded?—Yes.
63. So that there would be no possibility of the tow getting down and coming in contact with the wool?—Oh, no, unless when it is being squeezed in. There is a tremendous pressure on the screws when squeezing it in. In steamboats they simply place it in without screwing it.
64. Have you ever found any wool heat after it is stowed?—No.
65. Not on any occasion?—No.
66. Did you stow the “Pitcairn Island”?—I partly stowed her. She took three thousand bales in Dunedin.
67. Did you take any notice as to whether there was a large quantity of locks and pieces?—I could not tell you that.
68. You do not take any notice of that?—No, no notice at all. Of course, you can generally tell when it is heavy wool—when you know there are locks and pieces in it.
69. Did you notice whether there were any heavy bales?—There were a lot of heavy bales in the “Pitcairn Island.”

70. Would you say there was a larger proportion of those heavy bales than in the previous season?—I do not think so. She was pretty light, and not down to plimsoll.

71. Was there any tallow on board?—No.

72. Have you ever noticed tallow placed on the top of either wool or hemp?—Not on top of hemp, but on top of wool. There may be one or two casks come down at the last minute and gone on board the ship, but there would be some sawdust or tarpaulins and wood put in to prevent the tallow going on top of the wool. That refers to the New Zealand Shipping Company's boats, and not to Mr. Scales's ships.

73. What is the object of that?—It is on account of the grease, I think.

74. Lest it stains the bales?—Yes. Then, after the sawdust is down or the tarpaulins underneath, the timber is laid on it so as to keep it off the bales of wool.

75. By "timber" you mean any dunnage?—Yes.

76. It would not be close-boarded?—Not along the bottom tier—you would have it right down on the bilge. You put the dunnage on the two ends to save it from crushing.

77. And between that and the wool is there any close-boarding?—Yes, we generally put a lot of dunnage down there, and then put two pieces on top of it. You might have nine inches of dunnage underneath that.

78. What I mean is this: you put your close-boarding on top of the wool?—Yes, and then put cross-pieces on top of that.

79. Supposing the cask leaked, could the grease get through the close-boarding?—No, because there is generally sawdust or tarpaulins underneath that. The grease could not possibly get on the bales.

80. Not if the tallow melted?—I do not think so.

81. Have you ever noticed anything as to the quality of the tallow that is occasionally shipped—for instance, butchers' tallow?—I have seen it go aboard in a liquid state.

82. In the case of a faulty cask, you are sure that there has been no chance of the grease getting down to the wool?—No, I do not think so—not if it is taken proper care of in the first place. Of course, if a man is careless and stows it down anyhow, it is liable to get down on top of the wool.

83. There is a space between the bilge and the close-boarded dunnage?—Yes, a free space.

84. On that would be the sawdust?—Yes, sawdust or tarpaulins.

85. Would not the rolling of the ship be liable to shift that sawdust from one side to the other?—It might.

86. And in that case if a cask was leaking, the grease would possibly get through the close-boarding?—It would in that case, yes.

87. Supposing the cask was so faulty that it all ran out, the sawdust would be nowhere—it would run over the edge?—Yes, but any faulty cask going aboard a ship they generally reject it.

88. But have you ever known of a fault developing after it has been shipped?—After it has been in the lower hold—not in the 'tween-decks.

89. Would you think it possible for a fault that was not noticeable before being shipped to develop after the ship was away?—It might do.

90. Do you consider it unwise or unsafe to stow tallow in such a position?—No.

91. You think it would be all right?—Yes.

92. Were you here when the "Waimate" came from Napier?—I was in Wellington.

93. Did you take any interest in it and have a look at her?—No.

94. *Captain Blackburne.*] You have never seen a bale of wool on fire?—No, not on fire. I have seen it warm.

95. Did you see any of the stuff that came out of the "Waimate," or other ships?—Yes, out of the "Jessie Osborne."

96. But you saw none on fire?—No, the ship was under water.

97. Did you see the bales opened out?—No, they were not opened on the wharf; they were sent away straight from the wharf.

98. In regard to the casks you have seen stowed in the centre of a hatch, how many do you say there would be?—There might only be a couple—they might come down the last minute; never any more. If there is a big line of tallow to go away on a ship, that is always put on the bottom and covered up with ballast.

99. What depth of sawdust would you have underneath that?—Just ordinary red-pine sawdust, and tarpaulins as well. The tarpaulin is put underneath.

100. Would the sawdust be on the tarpaulin?—On top of the tarpaulin. Mr. Scales, who charters boats, always comes down and supervises the finishing-off of a boat himself.

101. You have particularly stowed sailing-ships?—Yes.

102. I suppose the Huddart, Parker, and Co.'s boats do not often take wool?—No, mostly flax.

103. Just across to Australia?—Yes, Australia and Auckland.

104. *Mr. Foster.*] Do you ever have any of your tow scrimmed?—No.

105. You do not require that?—No.

106. Have you ever shipped sheep-skins?—Yes.

107. In the bale or dumped?—Dumped and in the bale.

108. Have you ever found any sheep-skins heated?—No.

109. Or damp?—No. Wool goes through our hands much slower than on a steamboat. With five men handling wool on a sailing-vessel, ninety to a hundred bales a day is considered a good average, so that you would have a better chance of finding out if the wool was warm in a sailing-ship than in a steamer.

110. *The Chairman.*] And you are more likely to be careful?—Yes, more careful, very likely, to look after it.

111. *Captain Blackburne.*] Are the bales generally stowed up to the deck?—Yes, right up to the deck; but if there is any iron by the deck there is dunnage covered over it, to prevent it coming in contact with the iron on account of the sweating.

Copy of judgment of Mr. Justice Bigham, Q.B. Div., Commercial Court, High Court of Justice, *In re Owners of Wool Cargo ex "Waikato" v. the New Zealand Shipping Company (Limited)*, was produced by Captain Arthur Willson McKellar, put in, and marked "Exhibit No. 10."

Copy extract from the log of s.s. "Waikato," voyage 6, Home, 1889, was produced by Captain Arthur Willson McKellar, put in, and marked "Exhibit No. 11."

Copy report of Captain Croucher, master s.s. "Waikato," relative to voyage 6, Home, was produced by Captain Arthur Willson McKellar, put in, and marked "Exhibit No. 12."

Copy of the evidence of Professor Vivian B. Lewes *in re* Exhibit No. 10 was produced by Captain Arthur Willson McKellar, put in, and marked "Exhibit No. 13."

The Commission adjourned till to-morrow, Thursday, 23rd August, 1906, at 10.30 a.m.

WELLINGTON, THURSDAY, 23RD AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

ALFRED HENRY MILES sworn and examined. (No. 23.)

1. *The Chairman.*] What is your full name?—Alfred Henry Miles.

2. What are you?—I am resident partner in the firm of Murray, Roberts, and Co.

3. The Commission understands that you can give us some information concerning the subject-matter before the Commission?—I shall be very pleased to answer any questions. Perhaps if I gave you one or two points it might enable you to put your questions in whichever direction you considered suitable. Briefly, during the many years I have been engaged in this trade I have seen many bales of wool withheld from shipment owing to same being in a damp and more or less heated condition. We have had sheep-skins put out of the "Arawa"—sheep-skins which we were shipping on behalf of a client, and which we were not able to examine—it is difficult for a shipper to examine every bale that goes through his hands—we had a number of bales put on shore in a heated state. They were placed in the Harbour Board shed; I was called by the captain and superintendent of the line to explain how we were shipping stuff in such a condition, and you could scarcely put your hand on the bales in parts. We promptly sent for the shipper, but he could say nothing except that the skins were shipped in a damp condition without his knowledge by his men and without proper supervision; but when the bales were opened on the wharf steam was emitted, and you could not put your hand on them in parts. I have had cases of greasy locks and pieces in which I consider there is very great danger, because these pieces and locks are largely mixed up with manure, which always contains a certain amount of moisture. I remember one particular instance of a couple of bales of pieces that came down from the coast and got heated in course of shipment in the surf-boats, and was so warm at all events that the Harbour Board people stopped shipping, and sent them to my store to be dealt with. They arrived at my store too late to be dealt with and sent to the fellmongers, which is the usual course adopted by shippers, and so they were put into my store. I went in with one of my men that evening, being anxious about the bales of warm wool. We went on to the top floor, and directly we got there we smelt ammonia, and we got a lantern and there was a slight mist over these bales from evaporation. We opened the bales up, and away went the fumes of ammonia which had been generated in these bales. I say "ammonia" because it smelt like ammonia. Well, it occurred to me very often in thinking over this question in which we are all so largely interested, that if that danger could happen from salt water being on these bales coming down the coast, the same thing might happen on board ship. The bales might be shipped in a perfectly dry condition here, and owing to a leakage in the ship, or sweat, or anything of that sort, the same thing may be developed in the chamber of a vessel even after the vessel had left port with the wool in a dry condition. I mention that point, gentlemen, because I would suggest it is worth while bringing it out from your nautical men—men like Captain Bendall and Captain Blackburne, who may be able to give you a lead in the matter. I have never during all my experience of handling wool seen wool alight, and I do not believe a bale of wool will light. If you had some samples of wool here and tried to burn them you could not do so, but if you mixed a little hemp with it away would go the whole thing.

4. The wool as well?—The wool and hemp goes together. I have tried that quite recently to show people when discussing it.

5. *Mr. Foster.*] Would you say that, supposing wool will spontaneously heat to a certain temperature, it will not then flame?—I say I have never seen it.

6. You said you do not think it would flame?—I do not think it would—at all events, greasy wool would not.

7. *Captain Blackburne.*] There is a good deal of evidence to show that wool will blaze when coming in contact with the air after it has very much heated—almost to incandescence?—I should not like to say it would not, but all I can say is that I have never seen it, and I do not think that greasy wool would flame. Of course, you have to put one man's opinion against another, and I suppose you will take the opinions of scientific experts as to whether it will.

8. *Mr. Foster.*] It could be easily demonstrated?—Very easily. It has always been a very-much-debated question in London among underwriters as to whether there is the danger of wool actually fring, but that it will fire if in contact with other articles, such as vegetable-fibre and hemp, goes without saying.

9. Have you ever noticed whether sheep-skins will heat to the same degree of temperature that wool will?—I have never really taken the temperatures, but I should say from what I have seen that those sheep-skins I mentioned were undoubtedly as hot as any wool I have seen heated. You might be able to get that information from the Harbour Board officials who saw the sheep-skins with me.

10. Do you consider that sheep-skins are or are not a greater danger from heating than wool, assuming that either would burn?—I should say they are not a greater danger than some of the greasy locks and pieces that are shipped. Most shippers who are interested in the wool trade endeavour to dissuade their friends from shipping heavy belly-pieces and locks; and while on that point I might refer to a letter I received from the Commission this morning inquiring whether the tendency has been to ship more locks and pieces this last season than in previous seasons; but that is absolutely opposed to my opinion. This last season we certainly shipped on behalf of our clients fewer locks and pieces than we did before, and we are not singular in that respect.

11. It has been stated in evidence by several witnesses, but I do not know whether they have access to the figures to enable them to form an opinion, that the quantity of locks and pieces shipped has been greater this last season than in previous years?—That is not my experience. The only way you could get at that would be through the export returns; but the tendency last year was to dispose of the locks and pieces in the local market owing to the high prices ruling, more so than has been usually the case.

12. It has also been stated that large quantities of locks and pieces bought at sales were packed and so shipped, not having been scoured?—I think any one buying them would scour them. You see, locks lose 50 to 60 per cent., sometimes more, in weight, and a man would in ordinary course undoubtedly prefer to scour them if shipping them Home for a speculation. Of course, there are locks and locks, and pieces and pieces.

13. We find it difficult to get any proof from either the Customs, shipping companies, or Harbour Boards, and we thought that in all probability the shipping agents would be able, from their records and by turning up a number of their old clips, to say whether there is or is not any foundation in the statement that a greater proportion of locks and pieces had been shipped?—I am afraid you will only get that in a general way, because, although I might come to you and say that, so far as my experience goes, we shipped less than we are in the habit of doing, still those locks might have been bought in the local sales and shipped. It is exceedingly difficult to trace.

14. You held wool-sales last season?—Yes.

15. Did you notice whether a large proportion of low-quality wool came into your stores wet?—No; I think we only had one or two cases of damp wool which we detected, and we have that every season.

16. Did you regard last season as having been a particularly wet season—abnormally wet?—Not abnormally wet. It was wetter in some districts than other seasons perhaps, but I should think on the whole there is not very much in that. A number of my friends I find conducted their shearing through the wet weather, and others had a good time; but it happens nearly every year that people who shear early get a wet time, and those who shear late get a drier time, or *vice versa*.

17. *Captain Blackburne.*] One witness stated that it was notorious among shearers that a great many sheep had been shorn wet?—Shearers will not shear wet sheep as a rule, and the growers do not want to shear the wool when it is wet.

18. *Mr. Foster.*] I have here a letter addressed to me, which is unsigned, from a former owner of a station called Akitio. Do you know that station?—Yes.

19. Have you any idea who could have been the former owner?—There are two Akitios—one on the north of the river owned by Armstrong Bros., and Akitio on the south. [Letter handed to witness.] No wonder he is not the owner of the property to-day according to that letter.

20. Can you form any idea as to who it is?—I should not care to say—it would not be fair.

21. Do you think there is anything in it?—No. That letter raises one point which I might refer to. There may not be anything in it, but I suppose you gentlemen will be glad to get hold of as many points as you can, and then form your own opinion as to whether there is anything in them. I have seen several cases, particularly on the east coast, of small shipping-sheds where wool has been waiting shipment—sheds build on the sand, and these bales of wool have been lying there virtually on the sand above high-water mark on dry sand, but ten or fifteen bales stacked there awaiting shipment. The bottom of the bales has been lying right on the sand, and that is one of the risks the underwriters have to face—no greater risk, probably, than men having wool stacked in a shed with a leaky roof.

22. You referred to two bales sent from your store to the Harbour Board—they would be undumped bales?—Yes.

23. Do you think the temperature would have been forced up much higher had they been dumped?—I do not see why it should—they are packed so tight.

24. *Captain Blackburne.*] You gave evidence in a former inquiry, and collected some evidence about the s.s. "Bungaree" in which the bales were found heated in the centre, and were discharged into a lighter. The bales fired next morning apparently?—Fired the woolpack, I think.

25. The lighterage people gave a bad receipt as being wet and stained, and it is stated that the next morning those bales fired. I suppose that meant that it blazed?—The pack probably blazed.

26. And you quoted a letter from the average-adjusters which states, "If we are right in this conclusion (and we cannot help thinking we are), then there is no claim for particular average on wool damaged in this manner"?—That was the case in point.

27. Do you know what conclusion they eventually came to about that case?—Nothing more was heard of it so far as I know. I could not, without reference to my books, say whether the claim was ultimately paid. That was a ship from Melbourne.

28. You might be able to find out?—Yes.

29. You also said, "It is difficult to fire wool by itself. If there was a mixture of cotton and wool there might be danger"?—I am still of that opinion.

30. Could you give us the records?—The trouble is to get you the records. You see, the bulk of the information one gets is without legal authority—at all events, a good deal is hearsay. The information that my London firm gives to me is mainly the impressions that they have gained from such experts as have supervised the discharge of the vessel.

31. You could not lay your hand on many records at the present time?—I am afraid I could not. If possible I will do so. The record in regard to the “Gothic,” which I understand you have deemed it advisable to have, would be very interesting even if you only traced what was in the same chamber with the wool.

32. *Mr. Foster.*] Have any of your shippers recovered damage in respect to any of the fires on ships this last season?—I think in the case of the “Pitcairn Island” the claims were paid. I understand in regard to the “Gothic” the bulk of the claims on account of damaged wool are being paid in full, and the insurance companies are taking over the wool.

33. Have you had any particulars of those claims?—I have some particulars of the damaged wool, but I have no settlement of claims; it would take some little time, as they have gone before the average-adjusters.

34. Have you yet received any particulars as to the marks, numbers, and descriptions of the wool?—Yes, of some wool that was damaged. That is on record in the brokers’ catalogue; but some thirty or forty bales were damaged beyond recognition, the brands could not be traced, and they were sold on behalf of whom they concerned.

35. Can you let us have the brands, and numbers, and specifications?—I will get you a copy of the catalogue, which speaks for itself. You are now referring to the “Gothic”?

36. Yes, and any others?—Yes, I shall certainly do that.

37. *Captain Blackburne.*] Captain Moffatt told us that in the case of the “Gothic” some of the bales were found in a state of incandescence right in the centre of the bale after the ship had been flooded.

38. *Mr. Foster.*] It was stated that a bale or bales—I am not sure whether it referred to more than one—was found to be somewhat charred in the inside; the bale had collapsed, but the outside covering, the woolpack, and the outside edges of the wool inside the woolpack had not been burnt?—Yes, the wool had evidently put its own fire out.

39. The ship was scuttled?—Yes, I believe so.

40. What I asked Captain Moffatt was this: If the outside covering and outside edge of the wool was not consumed, was it possible that the inside could be charred, my opinion being that it was incandescent at one stage. My impression was that if the outside did not burn at all the inside would not be burnt, but it might reach the condition that we all know wool does reach when it gets intensely hot?—Yes.

41. It looks almost as if it had been charred?—But might not have been charred.

42. What is your opinion?—I think that bale would have been a very exceptional bale. It is so difficult to know what is going on inside a bale unless you are there. You have got a very difficult problem to solve; they have been hammering away at it in London. I go there now and again and I ask our underwriters, “Can you give me any information? Here is a thing I have not been able to get at the bottom of,” and the invariable reply is, “Oh, give us something easier; we have been at it ourselves.” I remember being asked by the chairman of an inquiry, “What advice would you give us as an individual shipper?” and I said, “The only advice I can give you is, Don’t ship wet wool.” You might have noticed some reference to sheep-dips in the Australian papers.

43. That will be for the experts to determine—what will be the result of dips in wool in any quantity?—The wool is dipped so long before shipment—about six months.

44. Of course, the question has been raised as to whether sheep-dips have an effect. We can only come to a conclusion by getting samples of every dip, and ascertaining what effect they have under certain conditions?—Yes. Has your attention been called to the several instances—two or three at least—where slipe wools have been put on shore again from the steamers here through being too heated and not being in a fit condition for shipment? If not, that evidence would be forthcoming from the marine superintendents of the various shipping lines here. I have myself seen on more than one occasion slipe wool being landed to be reconditioned.

45. Yes, we have had it in evidence that all descriptions of wool have at times been discovered heated in the Harbour Board sheds and ships?—There are one or two cases of slipe wool having been sent to this port and landed here, and then sent back owing to the heated condition it was in.

46. You represent a marine insurance company?—Yes, British and Foreign Marine.

47. And, as representing an insurance company, you would have to recondition some of this wool?—Yes; the insurance company we represent has to recondition all wools insured under its policy which arrive here in a bad condition.

48. Can you give us a list of all the wools you had to recondition last year?—There were very few for last year. I can certainly give you the list, I think.

49. If we had a list such as that from all the insurance people it would probably enable us to come to some conclusion as to the description of wool which was most liable?—Yes, I think I may be able to do that.

50. We have already had one or two similar lists, and, as you know, we have invited the insurance companies’ representatives to meet the Commissioners in conference in order to see in which direction it is best to get evidence, and that is one direction in which I think it would very likely be useful to us?—Well, the insurance company I represent have many claims to pass in that direction on account of wool which gets wet on the railway—wool loaded at flag stations and not properly covered by tarpaulins. The railways disclaim any responsibility when it is at flag stations.

51. But would you imagine that to be a serious danger?—Oh, no, so long as it is discovered before the wool is shipped, because then you can rectify it. It is only a question of drying the wool and repacking it.

52. The Harbour Board does that?—But they cannot examine every bale.

53. But the wet goes in such a little way that they are generally able to dry it in the sun?—They do their best. I think the interest is fully protected by the Harbour Board in that respect, and also by the insurance companies if they only know the danger is there, because it is naturally to their interests to recondition a parcel of wool here in preference to having a heavier loss to pay at the other end when the stuff reaches its destination if it is damaged.

54. Do you know anything as to the stowing of wool and hemp on board the ships?—No.

55. And no reports have ever reached you as to stowing tow or hemp in contact with wool-bales?—No.

56. Would you imagine that, if a greasy bale of wool and tow were in contact, and the bale had been dumped and there was a certain amount of heat, there would be greater danger?—I should think there would be far greater danger of fire with hemp and wool stowed in the same chamber than if the wool was alone in that part of the vessel. I should say the danger would undoubtedly be increased by stowing wool and hemp in the same chamber.

57. *Captain Blackburne.*] I think in all probability that will be shown to be the case in regard to the "Gothic," as I understand they had both wool and flax in the same hold?—Yes, I think the danger would be increased.

58. I gathered from Captain Evans that in No. 3 hold, where the fire was very severe, they had not sufficient wool to fill up the hold, and consequently filled it up with flax?—

59. *Mr. Foster.*] We were told, Mr. Miles, that at the wool-sales here one buyer found—I think it was a parcel of locks, heated very much, so much so in fact that when it was opened he noticed a flash of fire which did not continue burning. Do you think that is of frequent occurrence?—I should say he had exceptional eyesight.

60. Can you suggest any methods of improvement in regard to the inspection and examination of wool? You know the system that obtains at present in the Harbour Board's sheds, that they take every care?—Yes. You have got to face this fact: that you cannot examine every bale of wool.

61. *The Chairman.*] But until you have every bale of wool handled, and if, as we understand, the men who handle the wool do give instructions to mark any bales by reason of their being in a bad condition, then would it not be a wise thing to have somebody whose *ipse dixit* would be sufficient to prevent that wool being shipped?—Very advisable, I think. Of course, the officer of the ship has that power now; he would not take a bale of wool on board if he knows it to be wet. That is the general experience we have had of all these ships—the ships will not knowingly take a bale of wet wool on board.

62. But would it not be better to have a man like Captain Bendall to continue as he was doing before? The Harbour Board witness pointed out to us that it relieved them of great responsibility when his attention was drawn to it?—I think the appointment of a man like Captain Bendall would certainly be a move in the right direction. The work at the port at this time of the year is more than one man could undertake, but I think the supervision by inspectors of the type of men like Captain Bendall, and Captain Willis, and others at different ports is certainly in the right direction.

63. *Mr. Foster.*] You say the officers on a vessel would not take wool in a wet condition, but on account of the amount of wool an officer would not be able to inspect it?—That is so. The system of loading a sailing-ship is not the same as loading a steamer with five hatches going.

64. *Captain Blackburne.*] Do you think anything should be done in the way of compelling shippers who ship dangerous kinds of wool, such as locks and pieces, &c.—that such wool should always be marked conspicuously "Dangerous," or something of that sort?—It is very well in theory but difficult to apply in practice. A man would not, of course, send a bale of wool containing stuff which he considered dangerous.

65. If a man does not mark wool "Dangerous" when it is dangerous, do you think he should be liable?—Well, who is to say it is dangerous.

66. *Mr. Foster.*] In that connection, would you not consider that locks, no matter how dirty, providing they were thoroughly dry, were dangerous?—Certainly more liable to danger than fleece wool or clean dried pieces.

67. As long as they continued dry?—I think there is a certain amount of danger owing to the dung that is left in the wool.

68. The danger would be in the event of damp getting to it?—Yes.

69. But as long as it continued dry?—It is perfectly safe to ship it then—as long as it remained dry; but if it got damp by any sweat or anything on board, I think the locks would be the most dangerous of any wool cargo.

70. Would your opinion lead you to suggest that the shipment of greasy locks should be prohibited?—I should not like to go so far as that, because, as I said before, there are locks and locks. There are some locks we see passing through the sale-rooms that none of us would ship.

71. Do you think the shipping people should be cautioned against stowing that class of wool in parts of ships with other wool?—I do not think you could do it in practice. You could compel every man who ships locks and pieces to mark them locks and pieces, and you could give a surveyor power to say that a particular bale of locks is not in a fit state to be shipped with other cargo.

72. But, assuming there is danger in locks, would it not be possible perhaps by some increased rate of freight to separate it from other cargo?—I do not think so.

73. Well, in the Harbour Board sheds clips, of course, are put pretty well together?—Yes.

74. So that they could be shipped when the owner or agent required it. Would it not be possible to classify the wool by the marks on the outside and put locks and pieces in one stack, and so deliver them to the ship that they would not be put together?—The Harbour Board men would be the best people to answer that. I fancy from their point of view it would not be possible in the busy season.

75. I suppose it would be practicable by an additional cost?—By additional expense.

76. Would you not consider it right that, if one cargo is more dangerous than another, it should bear that expense?—My answer to that is, Don't ship the locks.

77. That would be in the way of a prohibition?—That has been my advice to shippers we represent, not to ship any dirty stuff—either scour it or sell it here.

78. Would it not be in the power of the ships to put on a freight to prevent it?—It would be in their power, but you would have to look somewhere else than to the ships to do anything of that sort. The system of inspection at this end by competent men would, in my opinion, tend to lessen the danger. I think it would be far more to the point to have men of some experience as inspectors, either a man like Captain Bendall or a man with Captain Bendall's knowledge—men with the best experience, if it be deemed advisable by the Commission that greater supervision should be introduced. It comes back to what I said just now, that the great thing is not to ship wet wool.

79. Captain Bendall was the representative of the Underwriters' Association?—Yes, for many years.

80. And the underwriters bore the expense?—A certain number of the underwriters had to bear the whole expense of inspection of the wool at this end, while other underwriters who took large risks were not represented, and when the local underwriters discovered that they were paying all the expense of this inspection, and that the others were reaping the benefit of it, they declined to continue it, and you cannot blame them.

81. Do you think the discontinuance of it has been more costly?—This season it has, but I would not take it by one season. I was sorry to see the thing go, because I considered this inspection was a move in the right direction, and I submitted a scheme years ago whereby the underwriters who were not represented in the colony could be caught for their share of the expense.

82. Would you, as a stockowner, a wool-grower, shipping agent, and representative of a fire insurance company, recommend that a rate should be imposed on all wool shipped to pay for such an inspection as that—a rate per bale?—The rate per bale would be so small that I think you would have to introduce a new fraction to calculate it, but I do not think there would be any objection on the part of the owner. I am not one of those who advocate putting any charge on the exports of the colony which are not absolutely imperative, but I do not think the owner of wool, be he buyer, speculator, or grower of the wool could object to the very small charge which would be necessary to cover a proper inspection of the article. I think, as years go on, if these fires continue, the owner of the interest, let him be the buyer of the stuff or the speculator, will eventually have to face a higher rate of premium, and it is better for him to face an infinitesimal rate on the wool than a higher rate in the premium, which might be considerable.

83. In referring to the charge per bale for the purpose of inspection, I mean that legislation could provide it so that there could be no escape from it no matter who the shipper is?—There would be no difficulty in working that through the Harbour Board. The Harbour Board make a certain charge for wharfage.

84. If the Government did it, I suppose they would do it through the Customs?—Well, that would be very costly. I suppose it would cost as much to collect it as the surveyors' salaries would run into. My own opinion is that our wharfage charges are sufficiently high at present to pay for the inspection. There is no reason why the Harbour Board should not appoint surveyors; they have men who are practically acting as surveyors now—members of their staff.

85. *Captain Blackburne.*] The wool is not always shipped at a port; sometimes it is taken from lighters in places like Waitara?—That is so. That is one of the difficulties you have to face in recommending any scheme of that sort.

86. *Mr. Foster.*] You know the procedure in the Harbour Board—they make as careful an inspection as they can, and report any cases?—Yes.

87. So far as the Wellington Harbour Board is concerned, I believe it is a fairly good inspection?—I think so. Then, of course, most of the shipping firms have their shipping clerks about, and these men are generally instructed to keep an eye on any stuff that is not fit to ship. Of course, you know the trouble that exists with this surf-loaded wool in the places referred to. These wools are always specially watched by the Harbour Board, and coastal steamers report pretty regularly.

88. Do you do anything with flax?—Yes.

89. Have you ever had your attention drawn to damp bales which have heated?—Yes, in past years—not during the last few years.

90. Have you ever known flax to heat?—No, never had flax of our own heat.

91. And tow?—No, we do not handle it.

92. Do you imagine that flax would heat when dumped under pressure?—I should not like to express an opinion upon that. It is easily tested.

93. Have you not had any experience in the matter?—I have never seen heated flax. I have seen flax opened up absolutely rotten at the London end, evidently through the heat.

94. That must have been damp flax?—Yes.

95. From that would you infer that there is no spontaneous combustion in flax?—I would not go so far as that. I would not care to express an opinion upon that; that is so easily tested here by putting a whole bale under the dump and putting it into the shed for a month.

96. Would you consider that a sufficient experiment?—No.

97. Unless you could put it under the same conditions as exist in a ship's hold?—It would not be of very much value. That is the difficulty you have: in any tests you may make here you cannot get the same conditions that the risk is exposed to on its voyage.

98. As representing an insurance company, has your attention ever been drawn to the stowage on board ships—any reports in regard to stowing any flax in contact with wool?—No. I have endeavoured to get something from the other end, but I have not been able to get anything.

99. Do you think that, the risks being measured at Home, the companies pay there without very much inquiry or very much bother?—That is my experience. They pay the claim and endeavour to assess the rates on the risks they run, and undoubtedly if these fires go on they will have to assess their risks on a higher scale. Take the case of the "Sardhana": they were so scared after the case of the "Gothic" and "Pitcairn Island" that when the "Sardhana" was only fifty days out they were offering twenty guineas premium owing to their dread of what might happen; but eventually the vessel arrived Home safely.

FREDERIC BARKAS sworn and examined. (No. 24.)

100. *The Chairman.*] What is your name?—Frederic Barkas.

101. You are manager of the local branch of the New Zealand Loan and Mercantile Agency Company (Limited)?—Yes.

102. The Commission would be pleased to get from you any information you can give?—I have a letter from the Commission in regard to shipping locks and pieces. I have just been through the specifications of shipments for last year and this year, and there is practically no difference. The few persons—very few indeed—who shipped locks and pieces last year shipped them again this season. The bigger men who have larger quantities of locks and pieces have sold locally exactly the same as in the previous season. The amount of locks and pieces shipped by the shippers—not the growers—is practically infinitesimal—only a few bales—and those in nearly every case are clean pieces. I have not been able to find any heavy bales shipped by any shipper, so that there is no practical difference so far as I can see. So far as the general custom is concerned, with the growth of the local sales the tendency has been more and more to dispose of the heavy locks and pieces locally, and then for them to be handled by the fellmongers. Very much the largest portion is dealt with in that way. The Bradford people handle pieces, but they are in almost every case dry pieces, which are just as good for shipping as wool.

103. *Mr. Foster.*] Did you notice whether the wool that came into your sales was in a wetter condition as compared with previous years?—My difficulty is this: that my experience in regard to Wellington only concerns last year.

104. Have you any one in your service here who could give us that information?—I am afraid not. You see my predecessor was responsible chiefly for the examination before. I can only compare the condition of the wool with what I saw during my previous fifteen years in Canterbury; and that there was wet wool I have not the slightest doubt—wool damper than we were accustomed to have it in Canterbury. I noticed going through my examination-book the word “Cold” several times. You know when wool is damp it is not in its ordinary natural feeling. There are certain wools which are damp enough to be “cold,” and there were some wools last year which were damp enough to have heated in the sales. There is one point which may be of interest to you, and that is, that the wool-shippers’ general experience is that the weight shipped as compared with the weight at Home usually shows over a series of years a slight increase during transit. I have just been through the specifications of wool shipped by us during February and March of this year, and in every case except one consignment, the London weights for the May sales are less than the Wellington shipping weights, which to me is very clear evidence that the season was an unusual one. The reason why my attention was drawn to that was on account of the dispute as to the short weights arriving this season, and I feel perfectly certain it is due to natural shrinkage, probably due to the unusual condition of the wool, and probably due to the unusual condition of the season.

105. To what extent did you find there was a difference?—There was a difference of from one or two pounds a bale up to as much as 10 lb. a bale.

106. And have you any means of detecting the class of wool in which the shrinkage is greatest?—Nearly all greasy fleece wools. Our shipments of locks and pieces are so small; they do not amount to practically anything.

107. What about slipe wool—fellmongers’ wool?—We have not shipped any fellmongered wool. I have no experience to say. We have only shipped fleece wool and growers’ wool. I do not know what the experience of other houses is as compared with this season and last season. I did take the trouble to ask a large shipper what his loss was, and he said his loss for the May weights, as compared with other months, was 9 lb. a bale, which corroborates, of course, our own specifications.

108. You heard, I think, the question asked Mr. Miles as to a bale of locks that was seen by a buyer to be intensely hot, and when opened he seemed to see a flash. Would that be likely to have been in the Loan and Mercantile Company’s stores?—No. I have seen locks and pieces and discoloured wool, and I have opened them myself, and in my fifteen years’ experience I have seen no flash. I have never seen wool fire. I have seen it coloured from a light straw-colour up to a dark colour by reason of the temperature, and I have seen scoured wools which have the appearance of having been charred, but I have never seen flame, fire, or smoke. Of course, one has seen steam.

109. I think I am right in saying that you had an analytical training?—That was what my training was.

110. Well, it has occurred to me in regard to the temperature in bales of wool having reached a certain point, that the danger of bursting into flame is in the saturated woolpack—grease in the woolpack. What do you think?—I have really had no personal experience of the matter. The only thing I have is a report from London in regard to a parcel of scoured wool which was charred, and that scoured wool was only blackened inside; there was no evidence on the pack at all. Another case was the unloading of a ship at Lyttelton—practically the same thing, with the seat of dehydration, not ignition—by chemical action and bacteriological action.

111. That is an answer to the question I put to Captain Moffatt, that the pack or shell of the wool was intact, but the inside was charred?—You cannot say it was charred. It is the fibre which, by some chemical process—you can do it with artificial acids—has all the appearance of being charred, but it is dehydration, and there is no proof that any ignition or incandescence has ever taken place. I can make you scoured wool which would look absolutely charred, but which had never risen above 80° Fahr. by dehydration; but these are things which no reports have gone into carefully, and the only way is to establish a set of experiments with a normal clip over a normal period of a normal voyage, and see if the slight dehydration there does increase so much as to cause charring and what temperature has taken place. I think it is a matter for experiments alone.

112. You heard Mr. Miles say that in his opinion wool will not burn?—I have never seen it burn.

113. Would you not consider that was merely a matter of temperature?—I should expect it to be very largely a matter of temperature and air.

114. That is, supposing that the temperature of wool by the natural process of heating reached a certain point, it would turn into flame?—The chemical constituents of greasy wool are inflammable substances, but whether there is some physical condition which retards it I do not know. I do not know whether any one has tested it. There is a rough-and-ready way of testing it by putting a lighted candle into a bale of wool, and it will not burn it.

115. But you cannot go on the assumption that the wool will not burn?—You cannot go on the assumption at all.

116. Do you consider it would take very long to make a series of experiments to determine what we want to get at?—You cannot begin till you have the normal clip available. The wool you would get at the present time is winter clippings—clipped crutchings. That is quite different in character from the ordinary fleeces; it is shorn in the winter, when possibly the bacteria proper to wool is not there, because bacteria we know are always more active in the damper period, or just in the spring, and I think if you had any oddments—that is, wool that had been kicking about for months—that these experiments would be valueless to you. I have never known of crutchings being damaged. The reports are chiefly for scoured wools, sheep-skins, slipes occasionally, and the ordinary reports simply cover ordinary fleece wools.

117. From what you know of the dips in use, would you consider that the use of the dips in the ordinary dipping-times would have any dangerous effect on the wool?—None whatever. I think it is scientifically impossible. The dips consist of three things—carbolic acid, arsenic, with carbonate (or caustic) of soda, and glycerine.

118. There is glycerine?—Yes, and that is used in dipping. It is far more soluble than arsenite of soda, and I think you would not find a trace of it when you examined it.

119. The question was raised in regard to the process of slipping—the chemicals used—as to the likelihood of any after-effect. Of course, you know that in the process of slipping the edges of the skins get coated with chemicals?—They use sulphide of sodium, but pick off the edgings to make the lower sorts, such as No. 3 or No. 4.

120. Do you think any of the lime could possibly remain unslaked?—No; but some of that sulphide could remain unoxidized.

121. And the effect would be, what?—To raise the temperature if not absolutely dry.

122. Would moist air have that effect upon it?—The moist air helps it to oxidize undoubtedly. The basis, of course, is sulphide of calcium, and the tendency of moist air is to promote oxidation, and if that was rapid enough the temperature would be raised; but if slow the rise in temperature would be hardly appreciable.

123. And moisture would bring that about?—Yes; but if it is dry it does not occur at all.

124. Do you know the process in regard to the preparation of this mixture?—Yes.

125. It is mixed in one tub and it is then thoroughly stirred and put in another, so that there is a sediment in the first tub. Would not that be through the thorough saturation of the chemical?—The chemical when it is painted on the skin is for all practical purposes a sulphide of lime, which is a non-oxidized form of a compound. All these sulphides have a tendency to absorb oxygen—that is combustion, but it is so slow under ordinary circumstances that the rise in temperature requires the very finest observation to notice it. Whether there is enough unoxidized soda-sulphide left in the No. 3 and No. 4 slipe wool I think is one of those experiments which will have to be tried, and it is well worth trying.

126. But when dry it would require damp to start it off?—Yes. There is practically no chemical action worth mentioning if it is well dried.

127. Then would you imagine that the presence of such a small amount as you would understand would be in the skins or fellmongered wool could possibly cause any fire?—I do not think it would be of sufficient quantity; but I think Mr. Miles gave you the cue when he said, “Don’t ship damp wool.” The whole story lies there. The question is how much moisture is dangerous and how much is not.

128. Would you corroborate all that Mr. Miles has said?—My experience has been practically the same as his.

129. *Captain Blackburne.*] The difficulty is to find out whether it is damp or wet?—That is the difficulty. We find the same difficulty in the wool-sales. A bale may look perfect in the pack—you never know whether it is slightly damp or wet until you have examined it. There, I think, is really the difficult problem you have to face. As you know, when you have to ship as we have here, working from 4 o’clock in the morning with all the gangs of men we can get on the place, there is no possibility of getting it all examined; there is such a rush that it is almost impossible. The only way is for every bale to be examined inside—open the bale of wool. You cannot tell from the outside whether you have damp fleeces inside, and in order to do that you would open an enormous question. When a bale is wet on the railway-truck, or has been wet in the surf-boat, it is palpable to the eye; there is no difficulty, the bales are put aside to give them a chance to dry. The danger is in the perfectly well-ordered bales which are wet inside sufficiently to be dangerous.

130. *Mr. Foster.*] Supposing means were found of inserting something down a tube into the centre of a bale—is there any method which would detect moisture?—No sure way; but the method of inserting a fine thermometer would certainly be of great value in examinations, because if the wool is sufficiently damp to be dangerous, by the time it has come down to the Harbour Board’s shed it must have been baled for three or four days or a week or two, and the temperature would have risen perceptibly, and you could have one of those probers, with a fine registering thermometer, which you could insert into any portion of the bale you like before dumping.

131. How long would it be necessary to leave the thermometer in?—With a fine thermometer it would take a minute or a minute and a half.

132. Then there would be no advantage in leaving it in for two or three hours?—None at all, because if the temperature has not risen in transit down to the shed, it would not show much rise in an hour or two in the shed.

133. The trouble is that there is some difficulty in getting into a dumped bale by that method?—It is difficult.

134. In a pressed bale they drive it in with an axe-head?—It is very difficult with the way the wool is pressed at the station now. It is pressed so hard before dumping down at all that it is exceedingly difficult to drive a wedge in or a steel tube.

135. Supposing it was possible when pressing to leave an iron tube in and press it with the wool, would that be of any advantage?—That would be very difficult. I do not think you will find that a very practical matter.

136. They have already had hollow tubes with a thermometer attached in use by the Harbour Board, but they found the tubes would not stand it—they bent?—The pressure is very great. The method they have with them is to open up a certain number of bales to examine, and I should say a fair thing would be to open two out of ten bales at random, and that would minimise the risk very largely.

137. The tendency of that would be to break up the fleeces in repacking?—An expert would not break them up much. Thousands of bales go through the local sales without depreciation. It would minimise the risks very much. If an unscrupulous wool-grower, to save a day or two, did not get his fleeces as dry as they ought to be, he would know the risk he runs of having charges thrown upon him if a wet bale were detected.

138. Would you recommend, as representing the shippers, the levying of a rate per bale for the purpose of examinations?—No; I should not like to go so far as that. I think that very much the simplest plan is to include that examination along with your insurance risk, as it was done previous to this trouble with Lloyd's. I think it would be a much more satisfactory way. The insurance company is quite as much interested as the shipper, and it is easier to pay the premium on the insurance and cover the cost with the insurance. The machinery is much easier than adding another special item for collection.

139. And in any case the purchaser has to pay?—Yes.

140. And if the insurance people included the cost in the insurance premium, the purchaser would have to pay all the same?—Yes, but it is a very small amount. If the insurance companies combined in this work, the amount per bale would be so infinitesimally small that it would hardly be noticed, whereas if a separate charge had to be collected they would have to make it a farthing or one-eighth, and it then becomes perceptible.

141. Unless you make a charge per bale?—As a portion of the wharfage, branding, &c.?

142. Yes?—That could be done if it was a statutory charge at the port; but my own impression is that it is best for the insurance companies, who are distinctly interested in safeguarding the wool in transit, to consider the matter.

143. If legislation is brought to bear to make an examination compulsory, how are you going to make the insurance companies pay unless you levy it on the bale: how could you make a foreign company come in?—Of course, and then there are others who ship without insurance. It would have to be on the bale as part of the port charge.

144. And you would consider it quite a proper thing that this class of cargo, if found to be liable to fire owing to circumstances, should bear its own cost of inspection?—I think so—services rendered for the good of society. It would have to be paid, whether through the shipper or not.

145. If it is compelled by law to levy a charge, it is distinguishing it from any other class of cargo?—Yes. That depends on what the finding of your Commission is—whether it is a specially dangerous article or not, and whether there are some other circumstances or conditions which we have not yet found out.

146. *Captain Blackburne.* [Have you ever heard of wool heating apart from damp?—Never heard of it. Of course, one knows that slipes and scoured wool are quite as liable to heat when damp as fleeces.

147. Have any of your shipments been affected by these fires?—In the "Pitcairn Island" losses were paid and settled for, and one other lot was smoke-stained on the "Waimate"—very small damage.

148. Did you have any wool in the "Gothic"?—None. We apparently had some in the "Rimutaka," but I have not got any reports yet.

D'ARCY CHAYTOR sworn and examined. (No. 25.)

149. *The Chairman.*] What is your name?—D'Arcy Chaytor.

150. You are a flax and wool expert?—I am interested in both businesses.

151. And you reside in Marlborough?—Yes.

152. The Commission thought that you would be able to give some information specially with regard to wool and flax firing?—Of course, I do not see, either with wool or flax, so much as many people do—only what I see till its gets off the place; although, of course, we hear in what condition it arrives at the other end, where we are shipping ourselves, which we often do.

153. It is a particularly excellent brand?—It is one of the best brands. We have never had a complaint yet from any consumers that we have been consigning to direct, either of dampness, discoloration, or heat, and, of course, we always take good care that it is in good order before it is sent away. We have not shipped anything direct ourselves further away than to Australia; but, of course, if it was inclined to heat in that time it would arrive there in a heated condition, a condition that would be complained of by the people who get it, but as we have never had any complaint whatever we assume that nothing has ever occurred.

154. Either heating or rotting?—No. Through a season, in a bundle of fibre, a few stacks that probably got the wet into them, and big heaps of refuse that lie about flax-mills very often, you would never see any signs of heating to any extent at all, and they rot down to nothing; but there are signs of heating that you find immediately in dirty wool.

155. *Mr. Foster.*] But, of course, the flax that you referred to—the refuse—is not under pressure?—Except, of course, that you sometimes get it eight or ten feet deep, which has its own weight on top of that, and it has got a good depth of stuff to get hot in if it did heat.

156. That would be practically fibre—not very much vegetable matter?—Well, a good deal of fibre and vegetable matter as well—not vegetation that has been put out green, but vegetation that comes out of the fibre, and scutchings—that is, the refuse fibre. Before tow got up to such a price great quantities of this used to be chucked away, and remain in a heap until it rotted away.

157. Would you say, for instance, that in a ship's hold wet flax would not ignite?—I should think not.

158. It would not ignite spontaneously?—No. My own opinion is that it decidedly would not.

159. That instead of heating it would rot?—Yes; it would rot.

160. *Captain Blackburne.*] What is your experience in regard to green flax heating?—I think green flax will heat, but I do not know how far it will heat. It will heat enough to discolour it.

161. You have never found fibre heat?—No, never. We had in a shed one year our clip of wool for three or four months—stacked in the shed—and we were using this same shed for stowing fibre in during the whole time the wool was in there. Of course, it was not actually confined like it would be in the hold of a ship; but when you get a tier as high as this room packed up, the centre bales would not have much draught through them, and we never found anything wrong, but, of course, the wool and fibre was in proper order.

162. *The Chairman.*] The flax would be absolutely dry?—Oh, yes, absolutely dry—that is, what one calls absolutely dry, although all millers prefer to try and get it in not quite as dry as it can be got in. In the summer-time especially you will see all millers get it out of the paddock with dew on it in the morning; but you will never feel that an hour or two afterwards. Otherwise the flax is so brittle and too dry.

163. *Mr. Foster.*] And it enhances the value for inspection?—Yes; and it is better for working than when the flax is brittle and less pliable, and it keeps the strength in it; but when it is baled you will never feel any dampness in it—it is not enough to feel.

164. Do you conduct your own shearing?—Yes.

165. Have you ever shorn your own sheep wet?—No, never wet enough that you could really feel the dampness in the wool. Of course, you dry the sheep when you have had rain on them, and if stopped through the rain, you dry them until you come to the conclusion that they are dry enough to shear, but possibly there may be one or two sheep a little wet under the bellies. Of course, when you go in and feel a mob one sheep may have got a little wetter than another, and therefore you would not feel it; but almost always when a sheep is found like that it is put on one side, and ninety-nine out of a hundred may be perfectly dry for the purpose of shearing.

166. It has been stated that sheds in Marlborough are rather prone to shear wet. You would hardly think that would be correct?—I know that a good many sheds which have very long shearing would probably try and get on with it at the earliest possible moment, but both the shearers and men in charge of the shed dislike it very much indeed, and at least the owner for his own purpose does not shear too soon.

167. Have any cases of heated wool ever come under your notice?—None whatever.

168. Have you a wool-scouring branch?—No, not ourselves; but we have always shipped our own wool, or at least we have always consigned it to be sold in London, and I think only once have we had an insurance claim, and that was sea-damaged on the way Home.

Copy of report on the fire on the barque "Beltana," which put into Lyttelton on the 15th December, 1889, put in and marked "Exhibit No. 14."

JOHN WILLIAM MARDON sworn and examined. (No. 26.)

169. *The Chairman.*] What is your name?—John William Mardon.

170. What are you?—Expert flax-dresser and expert in flax. My experience dates back as far as 1875 in flax, and I have been on and off in the flax trade ever since that time. I have always scouted the idea of spontaneous combustion so far as flax is concerned, because my experience from that time up to now is that it is quite contrary to flax. As Mr. Chaytor said, in the event of flax being packed in a wet condition—thoroughly wet, with wet hanks inside the bales, and even if you pack dry flax round it—it would rise to a certain temperature—too hot to put one's hand in—but when it comes to that temperature it causes fermentation and causes the fibre to rot. My opinion is that it would not burn.

171. Even although it may be warm?—Yes, so warm that you could not put your hand in. I remember, when I was a lad, when I started in the flax line, we did not have our vegetation washed as the mills do now; we had to cart the vegetation out in a wheel-barrow and stack it up in heaps. In the winter mornings we used to have very cold feet, and we used to take the stuff from inside one of these stacks and tie it round our feet—which shows that the fibre and vegetation gets very hot, but never to ignition-point. It starts to decay. One time we had a whole lot of tow, quite a hundred bales, and the price became so low that we would not sell it, so we stacked it in the yard and put a tarpaulin over it. This tarpaulin became faulty after some time and started to leak so that the water got into the tow, and in course of time, instead of the tow igniting or anything of the sort, we could see the stack gradually sinking until there was none left, showing that if there was any chance of spontaneous combustion it would have fired.

172. *Mr. Foster.*] Do you think it would have been the same if under great pressure?—That is my opinion also if it had been in a ship's hold. I also remember an occasion when I was flax-milling. I used to sell my flax to Paterson and Co., and I came down once to do business with Mr. Harris. He told me they were loading a barque at the wharf with flax, and he asked me to go to the wharf with him. I saw the sailing-vessel at the wharf loaded to the hatches with flax, and she was nearly ready to go to sea. I told him it was very dangerous to have the hatches off and the fibre exposed so close to the cook's galley—in fact, the galley was immediately at the end of the hatchway. The cook was firing up, and I told him a spark might get amongst the fibre. He considered it was highly dangerous. I think it was two days after that there was a fire discovered in the ship's hold, and a considerable quantity of this fibre was burned. There was an inquiry into the matter, and it was attributed to spontaneous combustion. My opinion was that it was a spark from the cook's galley that had fallen into this fibre, and that it had started smouldering and smouldering until it burst into flame. I was not asked to give any evidence at the inquiry.

173. Do you say an inquiry was held?—Yes.

174. And what was the finding of the inquiry?—Spontaneous combustion.

175. Can you give us the name of that ship?—No. I have been trying to remember the name of it. It happened somewhere about five or six years ago. Paterson and Co. loaded the ship, and they may be able to give you all information.

176. Was it a schooner?—No, I think a barque loaded for America.

177. *Captain Blackburne.*] You supposed that it was caused by a spark?—Yes; and in speaking to Mr. Harris some little time after he said he did not believe it was spontaneous combustion any more than I did.

178. Was there much damage?—Yes, a lot of damage. Mr. Harris told me that in his capacity as manager for Paterson and Co., who were large buyers and shippers of flax, he had tested bales in all degrees of dampness to see if there was any spontaneous combustion in them, and in their reports asking for information as to the state these bales arrived in at Home, there was not one in which there was any sign of fire. One or two of them were wet, and the only thing was that the texture of the fibre was very much deteriorated and had become rotten.

179. *Mr. Foster.*] Did Mr. Harris personally make those experiments?—Yes, so he told me.

180. Have you had anything to do with the shipping of tow?—Yes.

181. There is a practice of covering it now with scrim?—Yes.

182. Do you think that is good?—The only practical advantage of scrimming bales of flax is that the cost of the freight is 1s. or 8d. a ton less. I think the object was to get it in a neater bale, because in handling tow there is a lot of loose tow about the bales, and in wheeling it along the wharf and sheds it becomes entangled in the wheels of the trucks. That is the real reason, I think, of it being done.

183. That is the only reason?—Yes, I think so; but the scrim would catch fire equally as quick as the fibre.

184. *The Chairman.*] Have you anything else you wish to say?—In speaking of the wool and spontaneous combustion, it has occurred to me that the phosphorus poison for rabbits might have something to do with the fires. As you might know, phosphorus poison is mixed up with pollard and scattered about on the land for rabbits, and it has occurred to me that sheep might lie down on the phosphorus and then the consequence is that it goes in with the bales, and when the bales start to heat that may have some influence on the phosphorus and ignite it.

185. This pollard mixture is carried about, a small sod is turned and then it is laid down?—Yes.

186. I think that is a very remote probability?—If there was only one piece put down; but where the country is very much infested with rabbits it is laid down pretty thick. I have seen them putting it down every two or three chains.

187. I should think that, if sheep got so close to phosphorus as that, they would probably eat it and die?—It has been suggested that some have died through the same thing. It is only an idea of my own as to what I thought might possibly tend to cause the fires.

WILLIAM WALTER WAKELEY SWORN and examined. (No. 27.)

188. *The Chairman.*] What are you?—A flax-miller, residing at Featherston.

189. We understand you are in a position to give us some information as to the probability of heating in flax?—I have never seen any cases of heating in flax since I have been connected with the business.

190. How long have you been in business as a flax-miller?—About seventeen or eighteen years, and I have never known of a case of heating in flax. We always contrive to stack the flax in a damp condition, in order to bring it out at a uniform toughness when it comes to go through the scutchers. If we stack it up dry, when it comes to go through the scutchers it all breaks up, and a large quantity of tow is the result. In the summer-time, on account of its being so dry, we find it necessary to leave it out at night, and, after a heavy dew, we stack it in that damp condition so as to sweat it. I have never seen a stack steam, let alone get heated.

191. *Mr. Foster.*] The expression "to sweat it" conveys an impression that you heat it to some extent, or expect it to?—That may be, but it is just like a stack of corn or hay.

192. Yes, but they fire?—I know for a positive fact that the flax will not heat. We have broken out a good number of bales, and I have never seen a sign of it. I have had thirty bales in the shed since June, not being able to get it out on account of the floods. It is sold, too, but I cannot get it away, yet there is not the slightest sign of heat about it.

193. Have you had any down during the last two or three days?—No.

194. *Captain Blackburne.*] I understand you have made some experiments?—Yes. I have tried with wet bales of tow. I have baled up the tow in a wet state, and when we broke it out it was in a state of dry rot, with all the fibre exhausted but not hot.

195. Nor even steaming?—You have perhaps seen vegetation steaming, but that is not heat. That is the vegetation which would steam, not the fibre proper.

196. *Mr. Foster.*] Is there not a heavy premium on flax-mills for insurance?—I think so.

197. Do you know the reason for that?—I think every one is running away with the idea that a flax-mill is something like a gunpowder-mill, or something like that. We have had fires certainly at the mill, but we have known the cause of them. In no case has it been due to the flax. In one case a match dropped into the scutcher, and when it passed through up it went. In another case a spark from the engine set the tow going. Whatever fires we have had have always been accounted for—but never by spontaneous combustion.

198. It is your opinion that the high premium would not be owing to the possibility of spontaneous combustion, but on account of the probability of outside causes?—I think so. I have thirty bales at the mill now, and there is no insurance upon them. The flax is dry, and I can see no reason to fear anything from heat or sweating, and I see no reason to insure it.

199. *The Chairman.*] You think there is no danger?—No; I have had sixty bales in the shed at a time which I could not get out, and there has never been any sign of heat.

200. Where is your mill?—Down the lower valley, at Kahautara, near Featherston.

201. *Captain Blackburne.*] You have never had any experience of wool heating?—No.

202. Has any of your flax been shipped Home?—Of course.

203. Have you never had any complaints?—No, never. I think several bales got wet in transit; they could only get wet on the outside—a little damp. I do not think it would go through to the centre, and any damp that there may be in one part of the bale will be absorbed by the dry fibre.

204. *Mr. Foster.*] In the case of a faulty tarpaulin on the trucks and the water dripping through, do you think that would not saturate the contents of the bale?—Undoubtedly a lot of it would soak in. It must do.

205. If that happened would there be any danger?—No.

206. It would not, you think, be likely to heat?—No. The Graders draw the hanks out of the bales, and, seeing that we have to pay 5s. per bale for grading, we are not likely to allow any damp flax to come forward if we can avoid it. Of course, if it gets wet in transit we cannot help that. For instance, I had two bales sent back for wet a short time ago, and I am certain that it was not damp when it was put into the truck, for there had not been a drop of rain from the time the flax was put into the stack until after it got into the railway-truck. We made no claim, but the charge for drying was made against us all the same.

207. Do you insure your hemp from the mill?—No, we never insure.

208. You press your bales very lightly as compared with the pressure that is applied to a bale of wool?—Yes.

209. Would you think that the additional pressure would be likely to alter the conditions as to heating?—No, I do not think so. I have broken out stacks as flat as though it had been dumped. It had been in the stack for four months at a time.

210. Have you ever had it under such a pressure as 90 tons?—No; but you understand if the fibre is stacked away damp in a stack 12 ft. to 15 ft. high, and as broad as this room; it settles down and flattens out the fibre, and if the hanks were not tight when pressed they would be when they came out of that heap.

211. But the pressure applied by the dump is 90 tons, it would not be so great as that?—No; that would be greater, of course.

GEORGE COLEY sworn and examined. (No. 28.)

212. *The Chairman.*] What are you?—I am a flax-miller, residing and carrying on business at Foxton.

213. We understand you are able to give us some information from your experience as to the probability of flax or tow heating sufficiently to cause danger from spontaneous combustion. Have you had any experience in that direction?—I have had about nineteen years' experience in the business myself without a break, and I had some experience before going into business for myself, and in all my experience I have never seen a bale of flax take fire through heating. I have seen it hot, but my experience is that it will go to a certain degree of heat, and that heat then dies down, and the result of it will be that the flax goes mouldy and rots away.

214. Does the temperature increase at any stage?—No. It will go to a certain degree and then die away.

215. *Mr. Foster.*] Have you ever known of flax to be so heated that you could not bear your hand in it?—Only on one occasion, when the "Alice" was on fire.

216. That heat was caused through the fire?—Yes; that was the only time I have ever known of any great heat. I think that was owing to the salt water on it at the time.

217. Do you think salt water applied to flax will make it heat to a higher temperature than fresh water would?—Yes.

218. That was a case of the ship being on fire?—Yes. The water had been poured down her hold and the flax was sent up to Foxton to be dried, and it was a fortnight or three weeks before we could get to work on it. That was the fire on the barque "Alice," which caught fire some seven or eight years ago. She was burnt at the Railway Wharf. She was loaded by Paterson and Co. It may be six years ago, but I know it was the barque "Alice," of New York.

219. *Mr. Foster.*] You heard the questions asked of the previous witness. Is there anything you can add to the evidence which he gave?—Nothing that I know of. You asked him why the insurance premiums were so high on flax-mill risks. There is no doubt that the flax will take fire when the chaps are not careful enough, such as through smoking, sparks, or something of the sort. If they are burning wood in the furnace, there is a likelihood of sparks from the wood; but,

in many cases of fire in flax, it is due to cigarettes. I had over a thousand bales of flax in Foxton for over eighteen months, and none of that ever took fire. I had to store it there on account of Paterson and Co., and it was in a stack, and there was never any sign of heating.

220. *Captain Blackburne.*] Was it exposed to the weather?—No, stacked inside.

221. Was it damp?—It was not supposed to be. It was prepared ready for shipment.

222. *Mr. Foster.* You know the method they have of grading. They open one bale in ten, and draw hanks from one bale in three: do you think that is sufficient to test the condition of the bales for damp?—I think so.

223. From your experience you say that flax, in itself, is absolutely safe, even if wet?—That is my opinion. I do not think there is any danger. I think it will go to a certain degree of heat, and it will cool down again, and will go to rot like a bale of straw.

224. Do you think the temperature would also fall in the same way if it were stowed in a ship's hold?—I could not say, it may be different in a ship's hold; but I suppose a certain amount of air could pass round it.

GEORGE SEIFERT sworn and examined. (No. 29.)

225. *The Chairman.*] What are you, Mr. Seifert?—I am a flax-miller, residing at and carrying on business at Tokomaru.

226. What experience have you had in the business?—I have had about ten years' working on my own account, and prior to that I was for about six or seven years working in mills. I have had about fifteen or sixteen years' experience.

227. Perhaps you can assist the Commission in forming some definite idea as to the possibility or otherwise of heating in flax?—Well, what I do know of the flax is that since the grading system has been inaugurated, the flax which is sent forward is fully 40 per cent. drier than it was before the grading system was brought in. When you consider that it costs us about £1 10s. per ton to dry it, and we have to pay the same amount to dry it in the paddocks, we do not like to lose the additional amount of £1 10s. which would be charged to us if we sent our flax forward in a damp condition, or in the event of its getting wet between the mills and the grading-sheds. Of course, as to tow I cannot say, for it is not graded; but I believe there is a lot of tow sent forward in a damp condition. We have been agitating for the Government grading of tow as well as the flax.

228. *Mr. Foster.*] You heard the evidence of the previous witnesses to-day: is there anything you can add to that given by Mr. Coley or Mr. Wakeley?—No more than that the flax will not fire of its own accord. I have stacked it damp, and if it is left in that condition for long we should find when we bring it in to the scutcher that it was rotten in the middle.

229. So far as your process of packing and treatment is concerned, you do not think it will heat sufficient to burn?—No, I do not. Another point is that it is much drier than it used to be shipped, and if there was any danger how is it that we never had any fires when it was damper than it is now?

230. *The Chairman.*] Did they not blame the flax as well as the wool? It would appear that any stick was sufficient to beat a flax-miller with?—What I mean is that they never discovered any fire in the fibre. I reckon that the system of grading as carried out now could not be improved upon for giving you a good test as to the presence of damp.

231. You think the system affords excellent protection?—The millers know that their flax must be dry, and they do it to protect the trade. If any fibre was shipped damp we know it would be bad for the manufacturer. We all endeavour to raise the standard of the fibre, and, if there is any danger as to the tow being damp, the grading of tow, if that could also be inaugurated by the Government, would afford an ample amount of protection.

232. *Captain Blackburne.*] But you do not think there is any danger through its being shipped damp?—I could not say as to its being in the boat.

233. *The Chairman.*] By grading you think there is a better chance of your getting a better price?—Yes, that is what we are working for. We are willing to pay the cost of the grading of the tow at the same ratio as we are charged for the grading of the flax at the present time. You see the Government loses nothing by the grading, and we are willing to pay for the grading of the tow on the same scale.

234. *Mr. Foster.*] Are you forwarding any tow to the port just now?—I think some of mine was in a few days ago.

235. Did you send some away that was very full of dust?—I do not think so.

236. One bale of a quantity consigned to Mr. Scales was so full of dirt that it had evidently been through a flood?—I believe some of mine was in the flood.

237. Do you imagine there would be any danger through that?—I do not think there would be any danger; it was probably the silt in it. There were three or four tons that was mixed with the other, and the fibre was best fair grade, and the tow went through with the other fibre. I do not think the silt in it would make any difference.

238. *Captain Blackburne.*] Have you ever found flax so heated that you could not bear your hand in it?—Yes, I saw that at Blenheim in some tow. It was stacked up outside the shed, and it became so heated that the miller became frightened, and he had it shifted away from the shed. It never fired, although it became very heated.

239. *Mr. Foster.*] Did you break it down to cool it?—No, we merely carted it away. At that time there was no sale for the tow, and it was simply stacked outside the shed in a heap year after year.

240. You say the miller was frightened it might fire?—He did not know, but he did not like it being so near the shed. It heated just like manure would.

241. He relieved it from pressure?—There was no special pressure, it was stacked in a heap; but it may not have been tight.

242. *Captain Blackburne.*] Was it green?—No, dry, just as it had been thrown out from time to time.

243. *Mr. Foster.*] Are you aware of any practice of damping down the flax with water while it is being baled?—No, that is never done.

244. If that has been given in evidence you would say it is not correct?—I have never seen it done and I have been in dozens of mills, and I know they are very particular.

245. *The Chairman.*] But sometimes the paddockers may bring it in damp?—In that case we might not know of it.

246. *Mr. Foster.*] Has any of your flax ever been wet by salt water?—Not that I know of.

247. You have no impression as to the effect salt water would have upon it?—No.

EVERARD HENRY AUGUSTIN LAMBERT sworn and examined. (No. 30.)

248. *The Chairman.*] What are you?—I am a clerk.

249. In the employ of the Government?—No, in a private firm.

250. We understand you have some device which you would like to show us, and which you propose inserting in bales of wool in order to establish the presence of moisture or heat?—[Witness produced two galvanised-iron tubes 2 ft. 2 in. long, and about 1 in. diameter.] These tubes are to be placed in the bales during the process of filling, and they thus insure the presence of any undue heat or moisture existing in the wool-bales being instantly detected from the time of pressing. Moreover, the dumping would force through the holes in the tubes any moisture not otherwise apparent, and the increased heat, if any, resulting from such extra pressure would be immediately ascertainable, so that any bales showing an abnormal state of moisture or heat could be easily retained for further test before shipment. This method also affords an easy, effective, and expeditious method of testing all bales of wool that after being dumped may be waiting in the sheds for shipment; it being merely a matter of inspection to ascertain the temperature or moisture present at any time by examining the condition of the tube. The tube also acts as a ventilator. The tube acts not only as a safeguard, but also as a warranty almost as to the condition of the contents of the bale. Its mere presence should not form a matter for consideration in assessing the value of the quantity of wool in the bale.

251. *Mr. Foster.*] Once that is in the bale, how are you going to locate it?—There is a line down the centre of each bale, woven in the jute.

252. Vertical?—Yes, and the tube must be somewhere about that line?—Mr. Ferguson, the Secretary of the Harbour Board, has kindly offered to dump a few bales for me in order to test it, and I should be pleased if the Commissioners would come down and see it when it has been done.

253. What is the length of the tubes?—The bales are 2 ft. 3 in. across, and the tubes will be 2 ft. 2 in. Of course, the cost of these tubes would be very little—somewhere between 6d. and 9d. each, and I have no doubt I could have them turned out much cheaper than that for quantities.

254. Do you know anything about wool?—Very little from a business point of view.

255. From a practical point of view?—No; I do not know much about wool.

256. *The Chairman.*] You will let us know when the bales are ready for inspection?—Yes.

The Commission adjourned until to-morrow, Friday, 24th August, 1906, at 2.15 p.m.

WELLINGTON, FRIDAY, 24TH AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 2.15 p.m.

JOHN DILNE MOWAT sworn and examined. (No. 31.)

1. *The Chairman.*] What are you?—I was in business as a fellmonger for about fourteen years, and have been mixed up with wool for the last ten years.

2. We believe you wish to give us some information relative to the subject of this inquiry?—I think that a good deal of the cause of the fires at the present time has been through the wool speculators who go round and buy the wool from the farmers at, say, 8d. per pound.

3. Buy it on the sheep's back?—Practically on the sheep's back. As you know, the farmers sell their wool by weight, and those who have sold in this manner are not over-scrupulous as to the condition it is in so long as it weighs heavily, and I have known, of my own experience, of inferior wool being put into the bales, such as crutchings, stained pieces, and dags.

4. They would put that in although the wool would be marked and sold as "fleece"?—Yes. No speculator should trust any small farmer, but he should go through the wool and reclassify it. I know I would not trust them. I always go through it, and I know many local men who do the same thing. I know one case in point last year where a certain man offered his wool. It was examined and found to be damp, and it was not purchased, but to the best of my knowledge it was shipped. The owner said, "Well, I will ship it myself as it is."

5. *Mr. Foster.*] Before you leave that subject, can you give us the name of that individual, so that the wool may be traced?—I do not care to do that.

6. *The Chairman.*] Not necessarily for publication. It will not be published?—Well, it places me in a peculiar position—

7. *Mr. Foster.*] But you place the Commission in a very peculiar position if we are given a statement without any particulars to back it up. Half-information is very little use to us. Unless we get the full particulars it is useless. We should have the full particulars of the wool—the marks, numbers, and particulars of the wool—so that it may be traced upon the vessel which carried it?—Well, will it be withheld from publication if I give the information?

8. *The Chairman.*] It will not be published. (The witness gave to the Commission the name of the owner of the wool in question, and undertook to supply the full particulars as to brand, numbers, and date of shipment, and vessel by which the wool was shipped.)

9. *Mr. Foster.*] Can you say as to the date?—Last season. The wool was certainly damp.

10. *The Chairman.*] You think you can trace it?—I will find out the full particulars and supply it to the Commission. I say that the speculators are a good deal to blame for this state of things, and it should be their duty to reclassify the wool and give a warranty for every bale shipped, because what will happen with one will happen with another. They buy the wool, put their brand upon it, and ship it. They buy at, say, 8d. per pound, insure it for 10d. per pound, and it is of very little interest to them what becomes of it. Of course, you have heard so much about low-quality wools that it is useless my going into the matter. Of course, what I have said hardly applies to the larger sheds, for they, in the majority of cases, scour their low-condition wools, which reduces the risk. I know one instance, however, where I was classing on a station. The fleeces were dry, but the stained pieces were thrown back for a day, and I know that in this instance probably as much as a couple of bales accumulated, and when the men started to remove it to be scoured a volume of steam started up. That wool was immediately sent to the scour, but if any unscrupulous hands had dealt with that wool it might just as well have been baled and shipped. One thing about low-grade wools, the heat will be detected within a few hours, whereas damp fleece wools will not show the heat perhaps for some three or four weeks.

11. After dumping?—The tighter it is compressed the more readily will it show heat. In the season of 1894 or 1895 there was a big flood in Blenheim, and some five hundred bales were wet. I handled that wool, and in the case of the stained pieces they were so hot within twenty-four hours you could not bear your hand in it. I had not space in the sheds to open it up, and it started to heat.

12. Have you made any special observations as to the heating of wool—for instance, have you ever taken notice whether greasy wool—especially merino wool, which has a larger proportion of animal fat in it, will heat if perfectly dry?—No. In my experience it will not.

13. To bring about heat you must have damp?—You must have dampness. You know stained pieces which are left in a bale—more especially those from wethers—will generate heat although the sheep may be bone-dry to all appearance. Of course, in the larger sheds this wool is carefully picked out; but there is no question about it but that the urine and ammonia in it will set up heat very rapidly—quicker than anything.

14. Do you mean pieces separated from the fleece?—I mean where they are all packed together. In many instances where there is carelessness on the part of the owner it is all packed together.

15. I am referring to the better-class sheds?—In the better-class sheds they take the stained pieces and bale them separately, unless they are going to scour immediately.

16. Do I understand you to refer to the negligent or criminal farmer?—I refer to the negligent farmer.

17. Where he puts bellies and everything in?—Yes.

18. Would you consider that the pizzle-pieces, which, after all, are not a big proportion, would create sufficient heat to be dangerous?—They would be sufficient to materially assist—materially aggravate it. While the wool without the pizzle-pieces may be safe for shipment, the inclusion of them would be sufficient to set up heat.

19. There would require to be other dampness before the pizzle-pieces could themselves cause much heat?—Yes, if the other wool was dry it would absorb the moisture.

20. Is it your opinion that the scoured wool will heat if damp?—Yes; but no fellmonger would be fool enough to let it go away wet or in a doubtful condition. It would jeopardize his business.

21. Would it surprise you to hear that a very large proportion of the cases of heating discovered in the Harbour Board's sheds have been fellmongers' wool?—Yes, it does, because scourers as a rule are most particular, and I know that the wool is held for a time—about twelve hours after being pressed—and any heat is likely to be detected.

22. What is your opinion if you heard it stated that fleece wool, even if damp, will scarcely heat to a point of firing?—I know a case in point where it had the appearance of dampness and the clip went Home, and there was not even a comment upon it, and those who were interested in putting it up—the shearers and those who handled it—expected to hear of disastrous results.

23. That case came under your notice?—Yes, at Molesworth, some fifteen years ago.

24. Have you done any skin-work?—Yes, I did it for about fourteen years.

25. Have you ever noticed in applying the sulphide of sodium that the lime is always thoroughly slaked?—You must slake it.

26. It has been stated that there is a possibility of portions of the lime when put into the water being drowned. By that we come to understand that it would not be slaked?—I cannot hold with that. No man with experience would make such a statement.

27. I think the gentleman who mentioned it had had thirty years' experience?—Had he practical experience?

28. He had to pay for it?—That is a different matter.

29. I think he had practical experience. That is where the diversity of experience comes in?—In my experience the only instance where the chemical touched wool would be either cold-water washed or scoured, and that process would remove the greater portion, if not all, of the chemical.

30. You have had some experience of sheep-raising? Would you think anything of the suggestion that possibly a case of fire on ships could be traced to the poison laid for rabbits becoming attached to the wool?—Surely not.

31. That the method of laying the poison would permit of the sheep carrying it in the fleece and it ultimately getting into the bales?—No, never.

32. Supposing such a thing did happen, would the phosphorus not have exhausted itself?—No, it would not be exhausted, because baits will remain good for eight or nine months. I do not

say if open and exposed, but it would be good if kept in a shed, for instance. A manager of a station told me that he laid baits after six months, and they were more effective than if freshly made.

33. Is it the opinion of managers that it should be laid green?—Yes. It depends upon the weather. Of course, if there is much dry weather it will lose little of its virtue, but if the weather is wet it will absorb the moisture.

34. And yet they keep phosphorus in water, and it does not lose any of its strength?—A stick is different from a bit of pollard saturated with it.

35. No, but it is the action of the air on phosphorus that makes it dangerous—water would prevent that?—But it dissolves the bait in a day or so, and it will disappear.

36. Is it your opinion that the danger from rabbit-poison is not worth considering?—Not worth considering.

37. *Captain Blackburne.*] Can you suggest to the Commission any means of guarding against having to take such wool as you have been speaking about?—My idea is that speculators should handle the wool after it comes in, as it used to be done some years ago. It is only since wool has gone up so high that they have been so careless.

38. *Mr. Foster.* What methods would you suggest to compel them to examine it?—Make them give you a warranty that it has been thoroughly examined.

39. Give whom?—Whoever is constituted the authority—the Harbour Board or whoever may be in charge before it goes into the ships for Home.

40. What would you consider a thorough examination?—To have it handled and thoroughly classified. That is a fair-enough test to satisfy myself.

41. And if a speculator purchased a clip he would have to classify it?—But it depends upon who he buys it from: if from a man of some standing the seller will be prepared to warrant the wool.

42. But the warranty you propose should be also a warranty as to his standing?—Yes, in the case of the smaller men—that is where the trouble emanates from. Of course, in years gone by the prices were not so high. The standard of price is, say, 8d. per pound, and by the time the wool is delivered to the purchaser it has gone up to 10d. per pound, and those people who had accepted the small price would be inclined to make up the weight.

43. You practically mean that the higher the price the more he wants?—That is my experience.

44. In the case of the large sheds, of course, you know the troubles with the shearers?—Yes; they object to any damp sheep.

45. Have you any case within your knowledge of last season that could be traced to damp wool?—Only the one I have mentioned. Of course, as you know, merino wool is particularly deceptive. For instance, I know of a fleece that was the subject of argument as to whether it was wet or dry. It was as dry as could be, but a close muggy day with moisture in the atmosphere would make it seem quite damp. Shearers will swear it is wet, but it is really only the moisture in the grease.

46. *Captain Blackburne.*] Possibly you have seen statements that have been made about shearers shearing wet sheep. Is there anything in that?—My own experience of late years is that if there is anything wet at all they will not touch them, and therefore I maintain, in the case of the small men who usually shear their half-dozen sheep—they might send in their wool wet.

47. *The Chairman.*] This might occur in a district like Cheviot, where the neighbours go from one to the other and shear for each other—they would not perhaps be so particular?—No. More particularly the man who shears his own sheep—probably himself and his sons. Of course, my own theory is this—and it might be ridiculous, but still I maintain it—what I attribute the cause to be is through this fleece wool that is shipped under the conditions I named getting hot; that wool might be packed perfectly tight, and through the ship rolling and the bales working with the motion there is no doubt there will be a certain amount of friction, and that causes heat—

48. *The Chairman.*] Do you mean the bands or the bales themselves?—The rolling and the working of the bales would cause friction, and that makes a fine dust from the bales, and when there has become an enormous heat inside, I think that tends to cause ignition as quick as anything.

49. A large number of those fires we have had evidence of—not necessarily here—we found a great many of the fires were in the interior of the bales—right in the centre?—That is so; but I do not know if you have had experience of wet wool—the heat is something enormous. If you allow a bale of wool to heat and stand it in the middle of this room it will never take fire.

50. Have you seen wool on fire?—Yes, but in a shed. I had a shed burned down, and when it has fire to set it going it takes more to put it out than it does to start it.

51. It will burn?—Yes, it will.

52. It is only a question of the surroundings?—Yes. Give it a thorough start, and you could never imagine anything like it. I had a shed burned down, and there was a lot of greasy wool in it, and it burned rapidly enough.

53. *Captain Blackburne.*] Have you ever made any experiments?—We were practically making experiments every day. This line of theory I cannot hold with at all. I know I have shipped hundreds of bales of skins. The pelts are dry, and if you apply a lighted match to the pelt it will be more inflammable than wool.

54. *Mr. Foster.*] Do you consider a bale of skins to be more inflammable than wool?—Yes, I do.

55. Given the same temperature?—Yes.

56. *The Chairman.*] And if the pelt had attached to it any portions of fat, do you consider it would be more inflammable?—Take an ordinary pelt and dry it: if shipped in any sort of condition it will be safe enough. I remember a case of doubtful wool. There was a bale about

the dryness of which I was not perfectly sure. We let it stand in the shed for a day or two, and the first thing I detected was a light dew all round the outside of the bale like an early morning dew. Now, if that bale had been put into the sun for a few minutes it might have passed and have gone away; but directly we opened that bale it was so hot that we could scarcely bear to touch it.

57. Can you suggest any method of testing bales before shipment, to be effective?—No, I cannot; the only thing I can suggest is what I have already suggested, that those who wish to ship wool should be prepared to give a warranty that the wool is dry and in a fit condition to be shipped, and that there is no reason why it should not go.

58. Take the case of purchasing clips up-country and their coming forward for shipment. It is consigned to an agent here. Would you propose that the purchaser should have the opportunity of examining it here?—If he is dealing with a reliable man he does not require to examine it. In that case let the original vendor take the responsibility.

59. But if a certificate is given that wool is in a proper condition for shipment, should the speculator go on his own opinion or the man's integrity?—He has that man to fall back upon if he gets a warranty from that man.

60. He is to take the warranty of the seller?—There are some men whom I might describe that I would not take all the warranties in the world from.

SAMUEL MUNSON NEVILL SWORN and examined. (No. 32.)

61. *The Chairman.*] We know you have had considerable experience of wool, and think you can throw some light upon the subject which we have before us?—I think that is rather difficult. For my own part I believe that a great deal of the cause of the wool heating is due to the small farmers and settlers who sell their wool to the dealers. You know there has been great competition during the past two seasons among dealers to buy the wool off the sheep's back. I know that, for I could have sold my own wool last year before I shored it. They offered a price, and there is no doubt a good many have taken advantage of the offer made by the dealers. I have been sending my wool Home for the past thirty years, and I have never had any fire.

62. No complaints?—No complaints at all. Some forty years ago I had experience of fellmongering, and I know the way in which the wool is scoured and the skins fellmongered. After treating the skins for taking the wool off, the skins are placed in heaps and they are probably covered with a few bucketfuls of water in order that the moisture might cause the temperature to rise sufficient to sweat the skins. Of course, if the water is hot it will the more readily cause the grease to leave the wool, and I have seen wool treated in that way discoloured by heating too much, so by that experience of the trade I am quite certain that wool will heat, and very considerably if damp.

63. Do you think the pieces and dag-locks would be more liable to heat?—Of course. Dags from the shearing are thrown into bags or bales, and if left any length of time they will heat readily enough.

64. Do you think there would be any hardship if the law prevented these dags and pieces from being exported without being scoured?—I do not think it would; I think it would be a benefit. I myself would never think of sending them away. I do not send bellies or stained pieces; I have it all scoured on the place.

65. And probably the return would be greater, as you would not have to pay the cost of carrying dirt Home?—It would mean a saving to that extent. I let my scouring by contract; I get it done for ¾d. per pound, and I find the firewood, cloths, and all appliances.

66. *Mr. Foster.*] Provided the locks and stained pieces are thoroughly dry, do you think there would be any danger in shipping them?—Not if thoroughly dry and honestly picked over; they would be just as safe as any other wool.

67. *Captain Blackburne.*] They might be dangerous if wet on the voyage. You would never know what moisture they would take?—Not any more than any other wool. You are speaking of wether and ewe pizzle-pieces.

68. *Mr. Foster.*] The breech-pieces, particularly the wether pizzle-pieces, which are frequently more wet with urine than is the case with ewe pieces?—Yes.

69. *The Chairman.*] You heard the suggestion made by Mr. Mowat as to warranty, whereby he thinks these fires might be avoided?—I think that might be some check upon them. You have a check upon the flax, and I do not see why you should not have a similar check on the wool. I know if wool is put into a bale damp there is never the same spring in the wool as when perfectly dry. An experienced man will be able to tell by the feel and taking the weight of the bale and the feel of the bale at the same time. For instance, if you see a three-quarter bale weighing 4 cwt., you may make up your mind there is something wrong with it. All should be pressed to the same weight—say, not to exceed 3½ cwt.—3 cwt. is quite enough.

70. *Mr. Foster.*] That would depend upon the description of the wool—for instance, you will get a greater weight into the same space of merino wool than you will of crossbreds?—Yes, I agree with you; we know merino wool will more closely pack than crossbred.

71. In that case how would the ordinary hand on the wharf be able to distinguish?—I do not think the ordinary wharf hand would, but—I look upon this as most serious—we should have experienced men for the purpose. I consider that an experienced man when he sees the size and weight of a bale would be able to judge as to whether the wool might be expected to be damp or that there was anything wrong with it.

72. Do you think it would be a step in the right direction for shippers to have to produce specifications and the weights of all wool for shipment?—We always do—the sheep-farmers all keep a wool-book.

73. You send that information to your agents: do you think it would be a step in the right direction were it compulsory for your agents to send specifications and statement of condition to

the Harbour Boards before shipment?—I think it would be a very good thing, provided there were reasonable precautions taken in that respect. For instance, the ewes' new wool is heavier in weight than the wool of wethers or crossbreds, unless you shear them later than the wethers. You would require to allow a certain amount of latitude, for crossbred wool will not weigh so heavily as merino. You will not get much more than 2½ cwt. to the bale of crossbred.

ROBERT JOHN BELL sworn and examined. (No. 33.)

74. *The Chairman.*] You know, Mr. Bell, what we are searching for, and you have heard what has been said by the other witnesses: Have you anything to add to that?—One thing I would like to have proved, and that is whether wool will take fire in the bale through being damp.

75. You mean, get into a state of ignition?—Yes.

76. That seems to be a moot point at present?—I think it is the point to find out.

77. What is your opinion?—I think the wool would require to be wetter than any reasonable man would dare to ship it before it would fire.

78. *Mr. Foster.*] What about the unreasonable man or the criminal man?—I think there is a check kept on that. The Harbour Board people would soon prevent that. They would soon find out if it was damp.

79. They have power to stop it if it is damp, so far as they can see it externally?—Yes.

80. *The Chairman.*] Do you think it would be a good idea if the Harbour Board were to levy a small amount per bale so that they will take the responsibility and say whether the wool is in a fit state for shipment?—The Harbour Board has the right to do that.

81. They exercise that right whether they have it or not. However, at one time an official—Captain Bendall—did inspect doubtful wool, but since June last year he has not been so employed. Would it not be a good thing if some officer of the Harbour Board, provided the wool-owners bore the expense, was deputed to inspect every shipment?—I believe the Board have the right to do that now. They have the right to levy tolls.

82. Do you think a small amount per bale being charged by the Harbour Board for this inspection would be objected to by the reasonable farmer: of course, the unreasonable one would object to anything?—That is so.

83. *Mr. Foster.*] The Harbour Boards at the present time do make an examination as far as they can from outward appearance as to anything that will indicate heat; but they do it for their own protection, there being a penalty for wilfully neglecting precautions as to shipping dangerous goods. Of course, the sheepowner and shipper of the wool are equally liable under statute for wilfully shipping dangerous goods?—But very often I think the trouble may not be with the owner. I know, myself, from my own experience of the different stations on the Wairarapa that they are very careful of the way in which they handle their bales. I have followed my wool down to the port, and when I came to the stores I have hardly been able to recognise the bales; they were all covered with dirt. I do not see the shipments often, but I suppose the wool is left on the wharves and gets a certain amount of damp.

84. *The Chairman.*] They tell us they do not, and that they are very careful?—I know of my own knowledge that the bales of my own wool were scarcely recognisable.

85. *Mr. Foster.*] You probably mean a careless wagoner, or perhaps a faulty tarpaulin?—Perhaps carelessness in the stores or the railway-trucks.

86. Of course, that might be an element, but it would require to be fairly heavy rain to go through the bale to any distance?—A certain amount of wet would get in. However, I should like it proved if the wool will get such heat as will make it burn.

87. You may make your mind easy: that is going to be proved?—Yes, I should say it is. I know it will take a fortnight to show heat to any extent at all.

88. *Captain Blackburne.*] We have had the cases of one or two ships having left Australia and put into New Zealand with the wool heated to such an extent that the ships were set on fire, and it has been found that, although the woolpacks outside were intact, the wool in the centre of the bales was in a state of smouldering ash, which is sufficient evidence of spontaneous combustion. I understand from Captain Moffatt that the same thing was the case in the "Gothic"?—But is it possible also that matches may have got into the centre of the bales.

89. How would you account for a fire originating in two distinct parts of the same ship?—There might be matches in the different bales.

90. But they could not strike in the centre of the bales?—No.

91. *Mr. Foster.*] We have had, at times, some rather wild suggestions, and perhaps I might venture a wild question. You usually allow "smoke-ho" in the shed during shearing: it is possible that a live match might get dropped into a fleece and by that means eventually get into the centre of a bale of wool?—There is a possibility.

92. You regard that as likely?—It is quite possible. We know this is possible. One question you asked Mr. Nevill as to allowing locks and stained pieces to be shipped unscoured: I think it would be a most unwise thing to attempt to prohibit it in a free country. A man should be allowed to please himself, and if any man wished to send it to London in the grease he should be allowed to do so.

93. *Captain Blackburne.*] Even at the risk of lives and ships?—I do not think there is any risk if it is dry.

94. How are you to be sure of that?—You have to find that out in the same way as fleece wool.

95. *Mr. Foster.*] Of course, I understand you to mean that it will be logical that if you prohibit the export of locks and pieces in the grease so you will have to go on until you arrive at a class of wool that will not fire?—You will have to discover it.

96. I think it would be difficult to enforce it?—So do I.

97. You have heard Mr. Mowat say that the speculator or purchaser should take into consideration the standing of the vendor when accepting his warranty. Supposing you, as an up-county settler, sell your wool to Mr. Mowat and send it to the ship in good condition and give your warranty as to its condition, but the wool gets wet on the road, who would be responsible for that condition as between the two guarantors?—I cannot see the value of the warranty, unless you have some penalty. I still hold that the port of shipment is the place to do that.

98. *The Chairman.*] The people who handle it last, immediately before going on board ship, those would be the people to give the warranty?—I think so.

99. *Mr. Foster.*] You have heard the question about phosphorus: do you see anything in that?—Not the slightest. It is a most ridiculous proposition.

100. Is it your practice to leave the sheep in the same paddock as you are laying phosphorus in?—Sometimes.

101. And the possibility of its getting into a bale of wool is not worth thinking about?—No, it is not.

The Commission adjourned till Tuesday, 28th August, 1906, at 2.30 p.m.

WELLINGTON, TUESDAY, 28TH AUGUST, 1906.

The Commission met in the Upper Court, Magistrate's Courthouse, Wellington, at 2.15 p.m.

COLLIN FRANCIS POST sworn and examined. (No. 34.)

1. *The Chairman.*] What is your name?—Collin Francis Post.
2. And what is your position?—I am commander of the Government cable-steamer "Tutanekai."
3. The Commission understand that the "Tutanekai" was berthed alongside the "Pitcairn Island," and that you know something as to the conditions in which the wool was stowed in the "Pitcairn Island"?—At the time the "Pitcairn Island" was loading I was on sick-leave, and only came down to the "Tutanekai" on one occasion; but a portion of the present crew were on the "Tutanekai" at the time.
4. What was the date when the "Tutanekai" was at the wharf on that occasion?—I could not give the exact dates without referring to my log-book. It was about somewhere in the month of March.
5. And how long were you lying there?—I presume about a week.
6. Was the "Pitcairn Island" lying alongside?—At that time, yes.
7. Do you know anything about the state of the weather at that time?—I know the weather was disagreeable at that time.
8. What do you mean by "disagreeable"?—Wet and disagreeable. There was a considerable amount of wet weather.
9. Can you say whether the weather was wet at that time?—For some days during that time—I could not supply specific dates.
10. You saw the "Pitcairn Island" being loaded?—I saw her loading myself, yes.
11. And you know she was loaded with wool?—I knew she was loading with wool—yes.
12. Can you say anything about the conditions under which she was loading—the weather conditions?—Not from my own knowledge, but from what members of my crew told me.
13. You did not observe the conditions yourself?—No, not particularly.
14. Were you not in command of your steamer?—I was on sick-leave at that time.
15. What have you been told as to the conditions of the weather?—I was told by the boatswain of the "Tutanekai" that the weather at the time was disagreeable.
16. What is the name of the boatswain?—Henry Winter.
17. Is he still boatswain?—He is caretaker of the ship now.
18. She is out of commission?—Yes.
19. And were you told anything else at that time?—Shortly afterwards.
20. Was that before the "Pitcairn Island" went away?—No, sir, when the first news came that she had been in trouble.
21. I understand, Captain Post, that some communications were made to you while the vessel was loading?—The boatswain and the chief engineer, who were on the vessel, had some conversation about it.
22. Were you present?—No, I was not present. I only heard of this conversation afterwards.
23. Is the boatswain of the ship and the engineer still on board your steamer?—Yes.
24. What was told you?—Only the remarks that were passed at the time.
25. Who told you first?—The engineer and the boatswain both.
26. They were both present?—Yes.
27. What did they say?—They remarked that—
28. Who remarked?—I could not say which of the two it was.
29. Either the boatswain or the engineer?—Yes. They remarked that they were not surprised, on account of the vessel loading in such weather as she did, that the fire originated.
30. Now, Captain Post, was not that put another way? Before that vessel went away, did they not say to you that they would not be surprised if she caught fire?—No, they did not say it to me. They had mentioned it among themselves before she went away.
31. Did they tell you what they said amongst themselves?—I did not pay particular attention to it.

32. Is it not a fact that these men told you before the vessel sailed that it would be a strange thing if that vessel did not take fire?—They did not tell me that before she sailed. It was only after she took fire that it came out that they had had a conversation.

33. It was only after the fire that they told you they had had a conversation amongst themselves, and that it would be a strange thing if that vessel did not take fire?—Yes; that is so. I may say that perhaps there would not have been so much interest attaching to it only for the fact that young McKenzie, who was formerly a boy with us on the ship, was lost in one of the boats.

34. Did the whole of this conversation take place after it was known that the ship had been lost?—All that I know of the conversation took place then, when they said they had mentioned it among themselves at the time she was loading.

35. All that you know about the conversation took place after it was known that the ship had taken fire?—That is all I know.

36. But they said they had conversed about this matter at the time she was loading?—Yes, at the time she was loading.

37. Do you know her loading-dates?—No, I do not.

38. Your ship was lying alongside when she was loading?—But I was not attached to the ship.

39. But you had been at the ship to and fro?—No; I was only down on one occasion during the time I was ill.

40. And when did you hear of this conversation?—After the news came that the ship had caught fire.

41. Do you mean to say that you heard no conversation or any talk of any conversation before word came to you that the ship had been burned?—No, sir, only after we got word that young McKenzie was lost, and speaking of the ship having taken fire, the chief engineer, the boatswain, and I were together, and they remarked that seeing the conditions the ship was loading under, it would be a strange thing if the wool did not get heated.

42. This whole conversation arose after they knew the ship was burned?—Yes.

43. Is it not a strange thing that these men should not have mentioned it to you or to one another before the ship went away?—They may have done so—I was not in the ship.

44. We have had the stevedore who loaded that ship, and he has told us on oath that they were in no hurry in regard to the loading or sailing of the vessel, and that they took their time and did not load during wet weather, and yet your men seem to have conversed about the matter and say the wool was taken in under conditions that it should not have been so taken in?—Yes; that is so—all I know about it. Had I known I was coming here I should have brought the ship's log-book.

45. Who has got the ship's log-book?—It is on the ship.

46. Who is in charge?—I am.

47. You could produce that?—Yes.

48. Can you produce it to-morrow morning?—Yes.

49. Are the two men you were speaking of, the boatswain and the chief engineer, still on your ship?—Yes.

50. And there is nothing to prevent them coming here to-morrow?—No, nothing I know of.

51. Are the rest of the crew that were on board on this occasion still on the ship?—No; they are all scattered.

52. *Mr. Foster.*] Do you remember the dates of your sick-leave?—I came ashore in February, and did not rejoin the ship till she was laid up in May.

53. We have had it in evidence that there was a certain amount of tow on board from the middle of January till March, so that she was loading all that time apparently?—Yes, in February and March.

54. Would the officer in charge of the "Tutanekai" at the time of your absence record every day in his log the state of the weather?—He should do so. I have not looked at the log since.

55. *The Chairman.*] Who would be responsible for that?—Well, the acting-master would be, but as he was only acting *pro tem* he might not.

56. The chief engineer and boatswain are still on board the ship?—Yes.

57. Do you know any one else who was present?—No. You will understand that we come into the wharf, another ship comes here and another there, and we do not take notice of them.

58. Did you not take notice of where you were?—Yes, when we were there ourselves—not other ships.

59. *Mr. Foster.*] The "Tutanekai" was in commission while the "Pitcairn Island" was loading?—Yes.

60. The crew would be on board?—Yes.

61. And, of course, you would have their names on board?—Yes.

62. Would the men on the boat now be able to tell whether the other men are available?—They would be able to tell better than I.

63. *The Chairman.*] Amongst other vessels, such as the "Gothic," we are going to follow this "Pitcairn Island" case straight out, and if we do not get the whole of the evidence tendered to us we are going to call for it?—That is the correct thing to do.

64. *Captain Blackburne.*] Have you any suggestions to make as to the possible origin of fires in wool-ships—any opinion?—I think the majority of fires take place on wool-ships through wet wool. I know myself from my experience of taking wool off the coastal ports we frequently get a bale wet.

65. You do not often bring wool up here?—I sometimes take wool from Bruce Bay.

66. Half a dozen bales at a time?—Yes, and sometimes more.

67. And get it wet in the boat occasionally?—Yes.

68. *The Chairman.*] In the surf-boats?—Yes.

69. You do not bother your heads again afterwards?—We stack it up by the funnel afterwards.

70. Do you take any responsibility about drying it?—None whatever.

71. You do that to oblige the shippers?—Yes.

72. Have you known many cases of that?—When I was in the Union Company's service on the east coast it was a frequent occurrence to get a bale of wool wet. The outside of the bale would certainly be dry by the time we reached port, and that would probably be dumped and stowed away on board ship.

73. You mean it had fallen into the tide?—Yes, fallen into the sea.

74. And then you brought it aboard and stacked it alongside the funnel to dry it?—Yes.

75. That is, the pack would get dry?—Yes.

76. Did you form any opinion as to what the wool was like inside?—No; it did not concern me.

77. Did you come to any conclusion?—No; but I often thought the wool must have been wet inside.

78. But the outside drying did not concern you?—No.

79. *Captain Blackburne.*] You simply dried it the best you could in the sun or alongside the funnel?—Yes, and they would probably be pressed if they were not opened by the buyers or wool-brokers.

80. *The Chairman.*] Did that concern you—did you look?—No, it did not concern me.

81. *Captain Blackburne.*] Can you suggest any other possible means by which the fires may originate?—I have thought often friction might do it—two hard woolpacks rubbing together for a long voyage Home.

82. *The Chairman.*] What about a long voyage: have you been on a long voyage here with it?—I have only had wool one voyage Home, in the "Rotokino."

83. Did anything take place on that occasion?—No, nothing.

84. That was a steamer?—Yes.

85. And the wool was closely packed?—Yes.

86. But there was no screwing-in of the wool?—No.

87. And should there be a little friction it would not be very close?—It was not very close, and there was room for it to work.

88. That is not so on board a ship?—No. I noticed when they came out that some bales had been rubbing against the timbers and against each other, and had worn down.

89. Had you seen any increase of heat by reason of that?—No.

90. *Captain Blackburne.*] You noticed a bale actually worn?—Yes, the edges chafed.

91. *The Chairman.*] Did you notice any sign of incandescence?—No, none whatever.

92. *Mr. Foster.*] The chafing would simply be ordinary chafing—no discoloration?—No, just ordinary chafing. I should say that under ordinary conditions it might—

93. *The Chairman.*] Can you give us any facts about it?—No.

94. Have you known anything about bales heating in the interior or not?—No, no experience in that way at all.

95. Of course, the major part of your experience has been up and down the coast—a few days at a time?—Yes.

96. After taking the wool and then landing it, have you had any complaints about the heating of the wool?—No, no complaints. We have taken it out of the bullock-wagon into the boat, and from the boat on to the wharf.

97. What is the longest period you have had wool?—Three days on the coast.

98. *Captain Blackburne.*] Your vessel is very often lying at the wharf, Captain Post? Do you notice what the ships do in the way of taking in cargo in rainy weather: do they generally close up the hatches?—I have seen them take the wool in a great quantity outside on the wharf for the ships to take in, and it frequently comes on to rain, and they have to take the wool back into the shed as fast as they can, and then, of course, they close up the hatches. A certain quantity of the wool gets wet, of course, and when the weather gets dry again they bring the wool out and dump it on the wharf again.

99. And when it is raining for two or three days?—It would be detained then; but if they had carted the wool out, it would get wet before they could get it back.

100. *The Chairman.*] Supposing you were master of that ship, and you could say whether the wool was to be taken on board or not: have you seen wool taken on board during misty weather when you would have forbidden it to be taken on board, and if your word was the *ipse dixit*, would you say it was not to be taken on board?—I cannot say I have seen it so bad as that, because I have not taken the trouble to examine as to what condition the wool was in.

101. Supposing you were on the wharf and you saw a vessel taking wool on board, have you ever been in this position: that you would say, "If I was master of that ship I would not like that wool to be taken on board under those conditions," and yet the wool has been taken on board?—No, I do not know that I ever have. I have certainly seen wool picked up and rushed into the shed again as quick as they could when a shower came on.

102. But if a man said it was not to go on board the ship, you would have it stopped?—I should consider it was only superficially wet on the outside, and that it would dry in a few hours.

103. Would you stop it?—I might.

104. Have you ever seen it in such a condition that you considered it should not have gone on board, and yet you have seen it go on board?—No, I do not know that I have. Sailors trust a lot to Providence.

The Commission adjourned until to-morrow, Wednesday, 29th August, 1900, at 10.30 a.m.

WELLINGTON, WEDNESDAY, 29TH AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

COLLIN FRANCIS POST, previously sworn, was recalled and further examined. (No. 35.)

1. *The Chairman.*] Have you looked up your log-books?—Yes. I have them here. What dates do you want?

2. *Captain Blackburne.*] The dates on which the "Pitcairn Island" was loading were between the 26th February and the 18th March last. She left here on the 19th March?—On the 26th February the "Tutanekai" left Wellington. On that day it was dull and overcast, moderate wind, with heavy rain. The ship left on that day for the north. She was absent from the 25th February to the 2nd March, when she arrived again in Wellington. The log-book does not say much about the weather except that there were light airs, fine, taking in lighthouse stores. Left again on the 3rd March, and went across to the Sounds. The book does not state the weather, except "strong breeze and moderate sea." Then she went away north with the Premier, and was away north until the 13th March. She arrived back in Wellington on Wednesday, the 14th—wet and windy until noon, when it cleared up and the rain ceased. Thursday, 15th, weather fine with sky overcast. Friday, 16th, dull and overcast; there may have been a drizzling rain. Saturday, the weather was fine and clear throughout. Monday, 19th, fine and clear throughout.

3. The "Pitcairn Island" left on the 19th March?—Probably the day which was referred to was Wednesday, the 14th, "wet and windy up to noon," or one of the other days on which it was overcast.

4. There does not appear to have been much wet weather?—That is the few days we were alongside the wharf. The boat came in and went away again. There were practically three rainy days. Of course, the log-book only deals with the state of the weather between 8 a.m. and 5 p.m. What the weather was like between the time the ship left the wharf and returned I could not say.

THOMAS BELL JONES SINCLAIR sworn and examined. (No. 36.)

5. *The Chairman.*] What are you?—I am chief engineer on the Government steamer "Tutanekai."

6. Some time during the months of February and March you were lying alongside the wharf at Wellington?—Yes, as near as I can recollect.

7. Close to where the "Pitcairn Island" was loading wool?—Yes; on the opposite side of the wharf.

8. Do you know anything of the state of the weather at that time?—I remember it was wet weather—misty weather at the time.

9. Did you observe the loading of wool going on while the weather was wet?—Yes.

10. Did you notice if any precautions were taken to protect the woolpacks from getting wet?—I remember it coming on to rain, and they took some of the wool back into the shed.

11. Do you know of any damp getting on to the wool during the period at which it was raining?—I did not take particular notice of the wool, and could not say; but I have noticed pools of water on the wharf after the rain, and the wool-bales dumped down on to the wharf where it has been wet.

12. Have you taken any notice of the effect that had on the wool?—No.

13. But you have seen wool put on to the wharf while the wharf itself was wet. Was there nothing under the wool when it was put on the wharf—anything in the nature of timber?—I saw nothing.

14. Was your attention, or anybody else's, drawn to the fact that the wharf was wet?—The boatswain and myself had a conversation about it—just a passing conversation about it.

15. What was the gist of that conversation?—As near as I can remember, "It is no wonder some of these ships take fire when they let wool get in that condition." That is as near as I can remember.

16. What did you mean by "that condition"?—It was raining at the time.

17. While loading was going on?—Yes.

18. And the wharf was wet?—Yes.

19. *Mr. Foster.*] When you say the wharf was wet, you mean there were pools of water on it. Do you mean that they brought wool out while it was raining, or was it the wool which was lying on the wharf when it came on to rain?—I am not very sure about it. I was standing on deck, and took a look at it, but I could not say anything about it.

20. You said you saw the wool on the wharf when it came on to rain, and it was taken back?—Yes.

21. Did you notice at that time any pools of water on the wharf?—As near as I can remember, the wharf has hollows in it, and after rain a little water lies there. That is about all I remember.

22. You see the point is this: If the wool was taken in when the shower came on it would not be likely to absorb much moisture—they would be practically dry. Did you notice whether it was dumped or undumped wool?—I am almost sure it was dumped.

23. And do you think dumped wool will take up moisture as readily as undumped?—I could not say.

24. As a matter of fact, you did not take much notice of the conditions?—No, I did not. Wool is not in my line at all, but it was only a passing remark.

25. Still, it must have impressed you to some extent to induce you to say "No wonder these ships take fire." There must have been a strong impression?—Yes. I do not know much about wool, but I thought it would be likely that the wet would be the cause of the heating, and seeing the way the wool was brought out that day induced the remark.

26. You did not form any idea of the amount of damp necessary to cause spontaneous combustion?—No.

27. Would you think the amount of rain which fell upon those bales would have been sufficient to make them dangerous?—I should not like to say.

28. At the time you formed no opinion?—I was just thinking what I had read about spontaneous combustion. As a matter of fact, I think it was a remark made to me first.

29. But apparently you must have formed some opinion when you said, "No wonder these ships take fire"?—The impression I gathered was from what I had read. I had no experience of loading wool.

30. It is not a matter of how the impression was arrived at: I want to ascertain from you if you had any theory to go upon?—No, I cannot say that I have.

HENRY WINTER SWORN and examined. (No. 37.)

31. *The Chairman.*] What are you?—I am boatswain on the "Tutanekai."

32. We understand that while the "Pitcairn Island" was lying at the wharf loading wool, the "Tutanekai" was also lying alongside the same wharf. Did you observe the state of the weather while certain portions of the cargo were being shipped?—Yes. The remark I made was that it seemed people wondered that wool-ships caught fire; that goes to help them take fire.

33. You made that remark to the chief engineer?—Yes.

34. Was it actually raining at the time?—It was showery.

35. Was the wharf itself wet?—Oh, yes.

36. In the depressions in the wharf there were pools of water?—Yes.

37. And were these bales just placed down in the pools or otherwise?—Roughly, anywhere.

38. And subsequently lifted in slings and taken aboard?—Some were taken aboard, and some were taken back to the sheds.

39. *Mr. Foster.*] Would you say if any bales were out on the wharf after the rain commenced?—No, not after the rain commenced.

40. Well, then, would you still say that they were dumped down in the water, anywhere?—Yes.

41. Still you say there were no more brought out after the rain commenced?—The wool was on the wharf when the rain commenced. There was a heavy shower, and they could not take it in fast enough, so they started to take it back to the shed. After the shower was over I saw them trundling it back—immediately the shower was over.

42. And in the meantime it was covered up?—No.

43. Have you had anything to do with handling wool?—No.

44. Have you formed any idea of how far rain such as you saw would penetrate the bales of wool?—No, I should not like to say. It certainly would not improve it.

45. Have you any idea of the quantity of rain which would have fallen during the showers you spoke of?—I do not know any more than that there was a very heavy shower while the wool was on the wharf.

46. Supposing that water could not run away, to what depth do you think it would lie?—I could not say. The remark I passed was merely owing to seeing the wool in the rain.

47. You see the statements which have been made are of a very serious nature—that is, the statement that you expressed surprise that a vessel should get Home after loading in such conditions—and the Commission is anxious to ascertain the weight of evidence to support that statement. Can you give us any idea of the quantity of water which might have fallen on the surface of the bales? By that means we might form an idea of the possibility of that water penetrating to bales to any and what extent?—Hard-pressed wool will not take in much water even if it rains heavily. Nevertheless it does not improve its condition when it has to be hard-pressed into a ship's hold.

48. Would it surprise you to hear that after a bale of dumped wool has been under water for days it might not be wet in the centre?—It is quite possible; it is so hardly pressed.

49. I suppose, when the rain commenced the men stopped running the bales out of the shed?—I never took any notice.

50. In the evidence, both of the shipping people interested and by the Harbour Board officials, it has been stated they continue loading when there is a light Scotch mist. Do you consider that the rain on the occasion of which you speak was any heavier than that?—Oh, yes, I do. It came on a heavy shower.

51. Did the shower last very long?—It came on several heavy showers, one after another, with sun in between.

52. Do you know if the wool was out on the wharf any length of time?—They took all they could in, and ran it into the shed till it cleared.

53. How long do you think any one bale might have been out in the showers—minutes or hours?—Not hours; minutes. It would not go into a quarter of an hour. Only a few minutes. At the time it happened I passed that remark.

54. Have you any idea of how many bales were out in the showers—would it be a hundred?—I should not like to say.

55. Did the ship's or the Harbour Board's people use haste to get it into the ship or shed?—Yes.

56. Did they try to save it?—There is no doubt about that.

57. *Captain Blackburne.*] You have often taken in wool at Jackson's Bay and other places?—Yes.

58. You get it wet occasionally?—Not as a rule, no. We are very careful in handling the wool.

59. It has been wet occasionally?—We are very careful. I remember taking in wool on the "Hinemoa," and that is the only time I remember taking in wool in the Sounds, and we are very careful not to get it wet.

60. Have you never taken it in from the surf-boats?—No, not from the surf-boats.

61. Captain Post told us of his experience of getting wool wet occasionally, and drying it. Do you know how far the wet goes into the bales under such circumstances?—No, I have no idea. I believe that in the small vessels they have to dry it. You must open it up and dry the wool. I have heard of them doing it.

62. You have never carried wool?—No, not wool. I have been with jute cargoes, but not with wool.

63. Have you noticed when lying alongside the wharves that it is customary to take in cargo while it is raining?—No, I have never noticed particularly; only on the occasion when we were lying alongside the "Pitcairn Island" on the occasion of which I spoke.

64. Have you noticed it in the case of steamers?—No, we seldom have time to look round; but this was a special occasion, when she was beside us, and I could not help seeing it.

65. *The Chairman.*] Do you know if the hatches were closed while the rain was falling?—They were taking in the wool when the rain commenced.

66. Do you know if they closed the hatches while the rain was on?—I could not say.

HARRY FRENCH ASHCROFT sworn and examined. (No. 38).

67. *The Chairman.*] What are you?—I am engine-room storekeeper on the "Tutanekai."

68. You were aboard while she was alongside the wharf where the "Pitcairn Island" was loading wool?—Yes.

69. What did you observe of the weather-conditions while the wool was being loaded?—I passed a remark about the wool lying there while there was a heavy shower on.

70. Was it raining heavily?—A heavy shower.

71. What did they do with the wool?—It was lying on the wharf. I could not say how long, or the time it took them to take it back into the shed.

72. When the rain came on, did they take it back?—Yes, when the rain came on there were a few bales lying there. They got them back in a few minutes.

73. What was the condition of the wharf then?—Whenever there is a heavy shower on the Wool Wharf the rain lies about in pools.

74. When the showers were over did they resume the loading again?—Yes.

75. Where was the wool put?—Just tipped on to the wharf off the trucks.

76. Until such times as it was taken aboard?—Yes.

77. *Mr. Foster.*] Have you any idea of how long the bales lay there?—I could not say.

78. Can you make a rough shot as to how many bales were there during the shower?—There might have been forty, or sometimes twenty.

79. Do you understand the principle of the rain-gauge?—No.

80. Supposing a large flat dish to have been on the wharf, to what depth do you think the rain would have filled it?—I could not say. I have never taken sufficient notice.

81. Would it have wet you through had you been travelling between your ship and town—say, a ten-minutes walk?—You would have got pretty wet without a coat on.

82. Would you have imagined that the dumped wool would take up much of the water?—I could not say. I have never had anything to do with wool.

83. Did you form any opinion as to the probable danger which might arise from the wool becoming wet?—That is the only thing. I drew attention to it, and said it was no wonder ships took fire.

84. So you think there was a big risk attaching to it?—No, only I had seen in the papers that they were talking about damp wool, and then I passed the remark that it was no wonder when they took it in in the rain.

85. So, although you did not take any special notice of the condition of it you were apprehensive of the danger likely to accrue from the fact of its being taken in while it was raining?—I could not say.

86. *Captain Blackburne.*] Did you notice if the hatches were put on while the rain was falling?—No. I did not notice.

COLLIN FRANCIS POST, already sworn, was recalled and further examined. (No. 39.)

87. *Mr. Foster.*] From what you have heard in respect of this wool—you did not see it—but from what you have heard from the witnesses, would you, as master of a ship, receive such wool into your ship for carriage from here to London?—No, from what I have heard, I would not.

88. You think it would be dangerous?—Well, I should want to see to what extent the damp had penetrated.

89. From what you have heard, do you think it would have reached such a point as to become dangerous?—I should not like to say. It might have; but I know the majority of the wool-shippers would not ship wool without seeing that it was dry.

90. You see, if the captain of that vessel had been a careful man, he would have looked for those conditions to be present. That would be expected?—You must remember, too, that he might not have been there. The custom is when lying at the Wool Wharf for the wool to be brought down sometimes on lorries, sometimes it is brought out of the shed in trucks, and it accumulates there on the wharf in quantities: Then at the same time the wool is going in they may be filling in with scrap-iron for ballast, so they are not able to take it in as quickly as it is offered.

91. *Captain Blackburne.*] Have you noticed whether the steamers close up their hatches when it commences to rain?—If they do not they have an awning over them.

92. Or a tarpaulin over the—?—That is the same thing.
93. If you stretch a tarpaulin over a big stick across the hatch is it not possible there might be leakage through the collection of water in one spot?—In that case we should have the ends fast. I know I have taken in fine flour at Timaru and Oamaru when it has been raining like Old Harry, and have not got any of it wet.
94. *Mr. Foster.*] In regard to the "Pitcairn Island," they did not close the hatches when they stopped taking in wool, they went on stowing; but in the steamers they do not screw in the wool as they do in the sailing-ships?—I could not say what took place. I was away ill at the time she was loading, and therefore do not know anything about the ship, but I know what has taken place with other ships. Frequently when a shower comes on they would cover the well up as rapidly as possible.

RUSSELL JAGGARD SWORN and examined. (No. 40.)

95. *The Chairman.*] What is your name?—Russell Jaggard.
96. What are you?—Master of the s.s. "Ruapehu."
97. The Commission understands that you have had some experience with reference to fires on ships, and also that you can give some information with reference to the means of extinguishing fires?—I can only say that I have had one case of hot wool on board a ship about three years ago. That is the only case that has come under my personal supervision, and it was in regard to some wool on board the "Paparoa" in Auckland. In that instance we were rushing to get away on the tide, and the wool was all spread down below with the exception of two or three bales that I put on the inward cargo, and for the time nothing was known of the wool. We called in at Gisborne and Napier on the way down, and the wool we got there was put on top of the other. On arrival here, after taking out six or seven bales that had been put in temporarily, Captain Bendall found the bands round the dumps were so hot that you could not touch them, and the consequence was we had to turn to and take out the whole of it. I am speaking to a great extent from memory, but out of a shipment of about ninety bales that were tested, over seventy were found hot, and were kept back for reconditioning.
98. Do you know anything about the marks of those bales?—No, I do not. I had a record at the time, but I have been changing about and have not got it now. Those bales kept us three days longer in the colony: we did not sail until the Sunday, and we should have got away on the Thursday. We had to take out the whole of the cargo to get the ninety bales out.
99. *Mr. Foster.*] Do you know where those bales came from?—No. I had no record. They were from Auckland, that is all I can say.
100. Was your record in the log?—No, it was a private record I had made.
101. There was no record on the ship?—No, except that Captain Bendall would be most likely to have a record, as he discovered the fire. Lloyd's agents in Lyttelton had to say whether they were in a fit condition to go into the ship or not; they took them out, and I should say they may have a record.
102. Who was the agent?—Mr. Barnes. They had to take them out, and to certify whether they had to go on the ship or not. When they found there were seventy out of the ninety bales, they decided to have the whole lot out and recondition them; but some of those were so hot in that time that you could not put your hand on them.
103. Do you know whose clip they were?—No. I should think Captain Bendall would have a record.
104. That was in the "Paparoa"?—Yes; and it is about three or four years ago.
105. You were not on the "Waimate" when she was on fire in Napier?—No. I had been out of the "Waimate" eight years. I have brought some books in regard to the Clayton fire-extinguisher that we have had fitted to our ships now. We run it once a week, not with sulphur, but with the pump part going with the air, and about three weeks ago, in the presence of some underwriters' representatives in Christchurch, we worked it with some sulphur and connected it with our galley to get rid of the cockroaches, and in about two hours everything was dead, and a man could not possibly go in. I am perfectly sure that when I saw the "Waimate" arrive in London if her insulation had been sufficiently completed it would have put the fire out. It is a thing you cannot complete in one voyage, as the pipes have to be laid down, and the company has not been putting it in complete in one voyage. In the case of the "Waimate," they had no pipes in the hold in which the fire was, and therefore the carpenter had to provide a wooden shoot to convey the sulphur through, and the captain said he did not get above 20 per cent. of his gas into the hold, and he had to call into Plymouth for more sulphur. I would not hesitate to go to sea with a ship on fire if the holds were properly fitted with the pipes.
106. *The Chairman.*] Did you see the "Waimate" when she arrived in London?—Yes.
107. Did you see any of the wool opened?—I did not belong to the ship, but I went aboard and saw one or two bales when they got into the barge—I saw them putting them out.
108. We have been told that it is impossible for them to burn—what do you say?—I saw them burning. I was on board and had nothing to do with the ship, but knowing the captain, I went to see how he had arranged it, because my insulation in the "Paparoa" was not finished, and I went on board with him to see what arrangements he had made to get it into the hold. He said he would not have had to go into Plymouth for sulphur, only for the fact that he considered that out of 100 ft. of gas generating he was only getting about 20 ft. After discharging some of the wool into the lighter some of it ignited. It did not ignite till the bands were broken. When the dumps came on board the men broke the bands, and it seemed that by breaking these the air got in and they were actually alight.
109. *Captain Blackburne.*] Were the packs all right on the outsides?—There was smoke. It looked to me as if the packs where they were pressed together had let the air in and ignited the packs. I could not swear to anything of that sort, as I only looked over the side and saw them.

110. In some instances the packs have been all right while the wool inside was burning?—Yes; I have heard of that. But this I am speaking of broke out into actual red fire.

111. *Mr. Foster.*] You have expressed a very strong opinion in regard to this Clayton fire-extinguisher?—Yes; I would go straight to sea with a ship on fire if it was properly fitted.

112. Is that likely to cause any neglect in regard to watching the cargo—the confidence in the appliance?—I should not think so. I have such confidence in it that if a hold is properly fitted you have command of it. It was about three weeks ago that I saw the galley filled up, and I do not believe any fires could burn.

113. Would you think that the effect of a complete installation of this appliance would absolutely remove any risk in going to sea?—Yes, sir. I think that that appliance ought to be run once a week into the hold for the simple expense it would be. I think you could run the machine into every hold in the ship for the cost of half a cask of sulphur, and my opinion is that with a full load of wool it ought to be run into the holds once a week—every Saturday. There is one thing I should want to know, and that is that the sulphur-fumes did not damage the iron on the ship, which I do not think it does. I think a man could make a ship perfectly safe by running it once a week.

114. Do you think the sulphur-fumes would keep the temperature down although the wool might be wet?—No, I think the same process would go on; but the fire cannot start where the air cannot get to it. If you put fire into a vacuum you cannot burn it; but if the smallest amount of oxygen can get in, then I say that that gas will penetrate quite as far as the oxygen will.

115. It is contended that the wool will under certain temperatures contribute a certain amount of oxygen to put it into a state of incandescence, although it will not flame?—Without the exterior oxygen ever getting there?

116. Yes?—That would alter the case. I cannot say it would not; but wherever the air would penetrate this gas would penetrate.

117. Would you say that air would not penetrate to the centre of the bale?—Impossible.

118. It has been given in evidence that a bale from the “Gothic,” after she had been scuttled, was found actually ignited—that is to say, the whole of the inside was charred and the outside of the bale was intact?—It must form oxygen itself in some way to do it.

119. *Captain Blackburne.*] Through dampness?—Yes; but where the exterior air will get the gas will get; but, then, of course, it cannot penetrate into a bale. If you play a hose on to a bale for a quarter of an hour and then feel 3 in. inside that bale, you will not find any water—it is dumped so hard. If it forms any oxygen itself you are certain to stop the feeding of it to a great extent by this machine.

120. *Mr. Foster.*] Of course, you noticed the process of loading ships here?—Yes.

121. It was given in evidence this morning that loading has been going on during rain here to such an extent as to constitute considerable danger. Would you imagine that supposing a dumped bale was in a fairly heavy rain for, say, a quarter of an hour, it would suffer very much?—No, sir.

122. You would not hesitate to take it aboard your ship?—I should try not to; but if I was forced to I should say that was not going to affect it; it would not get into the centre of the bale.

123. *Captain Blackburne.*] Not more than an inch or two probably?—Not even that. I have read the evidence given here that it has been getting wet in the railway-trucks, but it does not get far enough into the bale.

124. Do you work right through the rain?—No, never.

125. As soon as it rains you knock off?—Yes; but, of course, there is work goes on in the rain—not if it rains hard. I do not mean you put on your hatches on the days when it is a kind of drizzle and drizzle, and you do not know whether it is enough to do any damage or not.

126. It is somewhat significant that three ships that were on fire, the “Perthshire,” “Wai-mate,” and “Gothic,” were all loaded in Wellington for London between the 19th and 21st April, when it was drizzling rain throughout, and on the 21st there were showers and hard squalls. It points to this that there was a good deal of damp among the cargo when loading, or else under certain conditions of the weather probably it had been packed damp before it came to the ship?—I am inclined to think that is more likely.

127. You do not think it is possible on account of the weather when loading?—I do not say it is not possible. If you get a lot of bags and stow them inside a shed you will get them to heat; but, taking the wool independently, I do not think it is likely.

128. From my own experience I know ships are loaded when they should not be?—Yes, you are tempted to go on when you should not.

129. What is the practice about covering the hatches up in rainy weather?—In London we have hoods.

130. But in Wellington?—We have only tarpaulins.

131. Stretches over?—A few hatches put on and tarpaulins stretched over.

132. If you have only got a few hatches, it would not stretch tight, and there would be a good many places that would hold water?—Yes.

133. You do not think there is any danger of the water getting down the ventilator?—No. All our ventilators are made so that there is no straight ventilator into the hold now. They all go down to the side before they go into the hold, to prevent any sparks going down. I do not think we have a straight ventilator going down on top of the cargo; they go down through the deck and tin lining. The old idea of being able to put your head down and look on top of a bale is out of date, and I do not think any of the modern ships have any of them.

134. I was referring more to wet than to sparks?—I think it is the practice right throughout the Shipping Company that every night all ventilators are covered and reported at 8 o'clock. The chief officer comes and reports all boats right, and fire-hose right, and ventilators covered for night.

135. Is there any system of testing the hold for the temperature in the ships?—No, sir, not except the meat-holds.

136. *Mr. Foster.*] Did you happen to notice in London whether the wool that was on fire was greasy or fellmongered wool?—No. Unless you know the marks you cannot tell.

137. Did you not see the wool?—No. What I saw actually on fire was in the barge alongside, and I did not go down into the barge. I saw the bales there, and the superintendent getting the hose to play on them.

ALFRED LUTHER BEATTIE sworn and examined. (No. 41.)

138. *The Chairman.*] What is your name?—Alfred Luther Beattie.

139. What are you?—Chief Mechanical Engineer, New Zealand Railways.

140. The Commission were of opinion that they might be able to get some information from the Department as to the treatment of wool while under their control, the method of covering it, and what steps you take to provide tarpaulins, or any other points?—Well, I think, with regard to the treatment of loads of wool in transit, my colleague, Mr. Buxton, the Chief Traffic Manager, will probably be able to give you more explicit information than I can, because it comes under his immediate jurisdiction; but with regard to the provision of suitable tarpaulins for covering loads and wagons, these tarpaulins are made and maintained by the Locomotive Branch—the branch of which I have charge—and in order that I might show you that the tarpaulin-stock on the New Zealand Railways is well maintained and well looked after, I might quote a few figures which may be of interest to the Royal Commissioners. On the New Zealand Railways at the 31st March this year there were 10,362 tarpaulins in service; on the upkeep of these tarpaulins during the year ending the 31st March last year, the Department spent £9,433 in repairs, showing, as I submit, that these ten-thousand-odd tarpaulins were very carefully looked after, and were not neglected and allowed to remain in use without reasonable attention. The actual amount spent per tarpaulin in repairs for the year averaged 18s. 2d., which, I submit, would go to show that the sheets were maintained in good order. Of course, it is quite impossible to guard against either accidental or careless tears, and that sort of thing; but I think Mr. Buxton will tell you that when a tarpaulin is not perfect from any damage such as a tear or rent, it is usual for the traffic staff to “double-sheet”—that is, to put an extra sheet over the damaged sheet so that the damaged part is well covered up. So far as my observation goes, and I have had to do with tarpaulins during the whole of the twenty-nine years I have been in the railway service, I can state without hesitation that the condition of tarpaulins generally has been maintained at a very high standard, and that at the present time they were never in better condition, for during the past year the attention we have given to tarpaulins has been greater than ever we have given, and, by reason of the increased number, the cost of maintaining them has also increased in proportion. Each tarpaulin averages one trip through the workshop per annum—every tarpaulin is supposed to be seen every year. If its condition is good it is simply passed out again, and if it requires to be redressed or repaired in any part it is then attended to. We have a very good system of regulating the repairs of these sheets and getting them in, and, speaking with a knowledge of the subject, I should say that it is most unlikely that there could be, to any appreciable extent, serious damage from unsound tarpaulins. A certain amount of leakage might possibly occur in isolated instances naturally inseparable in the case of carrying many thousands of tons, but I think the amount of leakage from defective tarpaulins is an inappreciable quantity.

141. The tarpaulins are apparently waterproof?—When they are in ordinary normal condition they are absolutely waterproof. They are made of very closely woven canvas, and then they are dressed with three coats, two on one side and one on the other, of a special linseed-oil dressing, after which they are impervious to the passage of water; but, of course, in the process of using and dragging over sharp corners of cases they do get torn and have to be patched, which patch is again dressed with the oil dressing, and it becomes just as waterproof as the original sheet.

142. *Mr. Foster.*] Have you any system of inspection after a tarpaulin has made a trip?—Tarpaulins are hung up at the various goods-sheds and also in the workshops in a doorway with a bright light on one side and comparatively little light on the other, which enables you to see even a small pin-hole in the sheet on a bright day, and that is the most efficient inspection you can get. If you have a bright light on one side and a dull light on the other, you cannot fail to see any defect.

143. But supposing a tarpaulin is damaged on the trip, is that at once detected on arrival at the end of the trip?—Yes.

144. It would not be likely to go out again before being repaired?—No, it should not be allowed to go out. It is sent into the workshops according to instructions, and there fixed up. Tarpaulins are sent daily to the workshops.

145. Do you at times have claims made upon you by insurance companies for any damage during transit?—That is a matter which I think Mr. Buxton would be better able to speak about—it does not come under my notice at all. There is one thing I might mention that bears on the subject to some extent. At Home, in England, in 1876, a case came under my immediate notice of greasy woollen waste taking fire through becoming wet. This particular lot of waste was a good-sized heap, stored on the upper floor of a stone building in a corner of a wooden floor, and it had been in this corner for some considerable time, and had been trampled down into a pressed mass; it was oily through having been used in connection with some weaving process. During a heavy storm a trickle of water made its way into the building, and ran down the inside wall and into this woollen waste, getting more particularly underneath it. The leakage was not noticed until smoke was seen coming from the heap of waste, and then the floor underneath was seen to be very badly charred, the lower portion of this woollen waste having heated and carbonised. The inquiry made at the time established the fact that this waste had fired from spontaneous combustion, due to the water getting to the oil and oxidizing it. There seemed to be no doubt about it at the time, and it came under my particular notice.

146. In your workshops you regard waste as suspicious?—We do.

147. I understand you have receptacles to put waste into?—Greasy waste we look upon as dangerous, and we have had spontaneous combustion take place in greasy waste in cupboards at different stations; we provide concrete lockers in some of the sheds as a measure of precaution, so that if the waste which the cleaners accumulate should heat and catch fire it will not set the building on fire. We have found it fire rapidly, and it is our opinion that spontaneous combustion has been set up. We have had the waste fire repeatedly, and we view it with considerable suspicion, and arrange to keep the accumulations as small as we can. I might read the particulars of a case of fire we had on a train running between Ashhurst and Palmerston on the 14th January, 1903, but which may be too far back for verification. The guard reported, "I beg to report that wagon L 4992, containing tow from Foxton to Masterton, caught fire at 7½-mile peg. The train was brought to a standstill by the driver, and the truck became instantly enveloped in flames. The truck was immediately separated from the rest of the train, and means used to push the top bales of tow over the side—without success. The truck was eventually thrown over clear of the line in a mass of flames. This truck was properly sheeted, and, if I am not mistaken, had two sheets on. The fire undoubtedly started in the body of the truck close to the floor. The general opinion of those who saw the fire was that it occurred from spontaneous combustion. I could name several reliable witnesses who could testify to this if the Department thinks it necessary." I merely read this guard's report to show that, in the opinion of the guard, and apparently of some of the witnesses, the fire occurred from spontaneous combustion. It is as far back as 1903, and possibly it would be difficult now to locate those witnesses.

148. *Captain Blackburne.*] I think it is the first case we have had of spontaneous combustion in flax or tow?—It was not a scientific investigation, although, no doubt, the guard made his report believing it to be true.

149. *Mr. Foster.*] If there had been a match lying in the bottom of the truck and the bales had rubbed it until the match had lighted, the guard would still have drawn that conclusion?—Yes, he might have done so.

150. Do you know whether that inquiry was followed up to the consignor of the flax?—That is more than I can tell you after the lapse of time. There were certain inquiries made, but I have not the particulars by me.

151. *Captain Blackburne.*] Can you say whether the flax or tow was wet at the time?—No. I have not any particulars as to the condition of the flax.

152. *Mr. Foster.*] All the evidence we have had so far is in the direction of proving that flax will not spontaneously fire?—Yes, but of course there is another thing which is no doubt perfectly within your own knowledge, and that is that haystacks frequently spontaneously fire. In the Dales of Yorkshire, where I was brought up, the hay there is always stored in barns on account of the inclemency of the winter, and I have known repeated instances of these haystacks having burst into flames, and in other cases I have seen, when the centre has been cut into, it has been burned—absolutely charred black. That is a vegetable fibre, the same as flax. stacks firing is a frequent occurrence.

153. But flax has the vegetable matter dressed out of it?—Yes, and the other has not. Haystacks firing is a frequent occurrence.

154. *Captain Blackburne.*] Probably flax would do the same if it was stacked up green?—Yes, very likely.

HERBERT BUXTON sworn and examined. (No. 42.)

155. *The Chairman.*] What is your name?—Herbert Buxton.

156. What are you?—Chief Traffic Manager for the Government Railways.

157. We understand that you can give us some information as to the way in which wool is looked after when it is under your control on the railways?—Yes, sir. Of course, there is a quantity of wool delivered to the dumping-sheds damp. I suppose, taking last year in Wellington for example, the quantity was about 1 per cent. of the total received by the railway, but in most cases it is merely damp on the outside—it is not wet. The cases in which wool carried by rail is wet are very, very few indeed. So far as the care of it is concerned—I am speaking more particularly of Wellington—the wool is delivered by the Department to the Harbour Board in trucks; the Railway Department does not handle it in any way, but it has a representative present, and any case of damp or wet wool is pointed out to the representative by the Harbour Board men. He takes a note of the marks on the bale so as to identify it, and inquiry is made as to how the dampness occurred. I could not tell you without further investigation the exact number of cases in which the senders themselves have been to blame, but in the generality of cases the dampness has occurred by allowing the senders to load their own wool to save expense. So far as tarpaulins are concerned, generally speaking, the tarpaulins are quite good, and will always shed water if they are properly put on, but, especially at stations where there are no officers of the Department in charge, a large quantity of wool is loaded and covered by the senders, and, of course, some of them are not very expert. It seems a simple thing to put on a sheet, but it is quite possible to put it on so that the rain can beat under it. In the great bulk of the cases in which wet wool, tow, or flax has been reported, the dampness has resulted from either faulty loading or faulty covering. To show you that, so far as the Department is concerned, it does all that is possible. I may say that for the present season we have not had a single claim in Wellington for either wet wool or wet flax. Of course, if goods were damaged by wet owing to the fault of the Department, the Department would be expected to pay, and it has had to pay in some cases in the past.

158. *Mr. Foster.*] I suppose your decision as to whether a claim lies with the Department would depend upon whether it came from a station where you had an officer? If it comes from a flag station you do not recognise any responsibility?—We would if it were shown to be our fault; but where the damage is due to faulty loading or faulty sheeting by owners, we would not recognise any responsibility.

159. What care do you take at flag stations—do you only put the engine on?—Rather more than that. For instance, we would not take a wagon away from a station at all if the loading was so bad that there would be great liability to damage. Of course, so far as flax is concerned, there is the danger of fire, which is far greater than the danger of water.

160. Do your officers in charge of trains give any inspection to trucks loaded at flag stations?—They do to a certain extent. They would not lift a wagon that was obviously exposed to the weather in case of rain; but, of course, a man can only make a hurried inspection. He looks at the load, and if it appears to him to be fairly well loaded and covered, he takes it on. The idea of every carrier is to get his traffic through, and if a man has loaded wool and is careless of his own interests, he cannot expect the carrier to protect him, although the carrier will in his own interests protect both the owner and himself by not taking on wool or other goods which are obviously exposed to the weather. The Department issued instructions to the members of its staff with regard to care in lifting articles that are liable to be damaged, particularly, of course, in the protection of its own interests. If a guard of a train lifted a truck of wool and the sheets were badly adjusted and water could get in, there is always the possibility of a dispute afterwards as to whether the Department or the loader of the wool was responsible—that is, whether the damage occurred through bad adjustment of the sheets, or from some other cause for which the Department could be held liable.

161. You refer to the conditions in Wellington?—Yes.

162. I think this is the only port at which the Harbour Board takes the wool-consignments?—That is so, to some extent; but where the Harbour Board does not dump, some firm does it. In Auckland, for instance, there is very little wool but a very large quantity of flax, and the dumping is all done by a firm representing the shippers.

163. That is the case at all other ports?—Yes, I think so. Speaking of Lyttelton and Port Chalmers, I know that is so, but I am not sure of the Bluff. The firms do their own dumping.

164. So that where it is delivered to the Harbour Board here or to private firms, so far as the railway is concerned, you have some system of inspection and delivery?—No, not so. Wellington is a special case. In the ordinary way we do not keep a clerk in the warehouse to inspect. It is only because the Harbour Board does the dumping in Wellington that we keep a clerk in the sheds. In the other places if there is any specially damp or wet wool or flax the firms send for our representative, but he does not stay there. I quoted the figures in regard to Wellington because we are specially able to say as we have a representative on the spot, but in the other places if a bale is simply damp on the outside the probability is that it would not be mentioned. The consignees do not fail to let us know if wool is wet as the Railway Department might be liable.

165. In the case of a carrier bringing wool to a station where you have an officer in charge, does the officer examine the condition in which that wool arrives at the station?—Yes, he does, to some extent. Supposing a carrier is carting for a number of wool-owners—and there are many carriers of that sort in the back country—men who carry from all the surrounding country—if he elects to load the wool on the trucks to save expense as he would generally do, the inspection is not minute; but if the wool is delivered into the Department's shed, the Department's officers then inspect the wool very carefully to see that it is not damp or wet.

166. And would that inspection be any more than a superficial inspection of the bales?—That is all. The officer would be guided by the outside appearances.

167. What I mean is this: knowing the risk from heating, do they ever in any way examine by feeling—if there was any heat would they be likely to detect it?—But we do not consider there is any danger of heat. I mean to say that we take no special precaution, because we do not consider there is any risk while the wool is in our hands. The wool is not then dumped, and it is only in the hands of the Railway for a very short time.

168. *The Chairman.*] At one of your stations where you have officers, would they refuse to take or reject a bale because it shows signs of dampness?—No; they give a "wet" receipt. We have never had, to my knowledge, the wet streaming away from a bale. A man would not present a bale like that to the Railway, because, for his own interests he would have it dry.

169. They do not trouble much about their own interests—they push it along, and we have had evidence of that; but we are inclined to think that there are some small men who are anxious to get a quick return and force their wool along?—I should say, speaking generally, that any intelligent officer would decline a bale of that sort, not that he thinks there is any danger of fire, but simply that any wet sloppy thing like that is an objectionable thing to have about—you could not put it in with other goods.

170. *Mr. Foster.*] From inquiries made from the Harbour Board, and also from the knowledge the Commissioners have, there is no doubt as to the arrangements the Railway Department make, but the only thing is that many outsiders have raised the question as to the possibility of damage in transit, and the Commission wanted to know if the arrangements by the Department are what they should be?—Yes, I quite understand. In making these statements I merely wish to give the Commission full information. If the Commission would like to have this on record, I can give some figures as far as last year is concerned. Taking the principal wool months of the year—that is, from the 1st November to the 28th February, we received by the railway in Wellington 67,957 bales of wool, flax, and tow. Out of that number 714 were signed for "wet," which is, roughly, rather more than 1 per cent. The majority of the 714 bales were only damp on the outside, not more than fifty bales out of the 67,957 being really wet. The largest part of the damp wool was loaded by consignors who failed to form a ridge on top of the load, or to adjust the tarpaulins properly.

171. *The Chairman.*] We saw a sample that came down by rail which had been covered by non-experts, and there was a very big sag in the tarpaulin?—Yes; it occurs mostly with the small consignors at flag stations, who only have a few bales of wool, and they think that, so long as they put a bale into a truck and cover it with a sheet, that is quite good enough, and the consequence

is that if there is a sag in the sheet it collects the water when there is any rain. I have myself seen several gallons in the sag of a sheet on top of a load, and, although that tarpaulin might be perfectly waterproof, it gets damp on the underside, and that resting on the bale would make the bale damp; but there would be no penetration, yet if it went into the Harbour Board shed it would be shown to our representative, and we should get a "wet" receipt. That is the class of dampness which I think I saw referred to as being put out in the sun to dry; but there is no penetration in that. In the case of wool, of course, we cannot ascertain what penetration there is, but my experience is that the wet does not penetrate into the wool to any extent. If a bale of wool were lying on its side, and there was a hole in the tarpaulin through which a stream of water was directed on to the edge of the fleeces, it is possible that it might penetrate the wool in that way; but in the ordinary way with wool packed, if water penetrates the tarpaulin it wets the cover of the bale and the wool in the neighbourhood of the leak, but it never penetrates the wool deeply, so far as my experience is concerned. I can suppose that if a bale were soaked in water it would penetrate.

172. *Mr. Foster.*] In the case of wool-bales when rained upon, have you noticed little streaks as if the bale which is rounded on top had not been soaking the water up, but as if the water had been running off to some extent?—Yes, I have noticed that.

173. We have had it in evidence that the railway-trucks at flag stations are frequently very wet in the bottom, on the floor, sometimes an inch or two inches of water in them. Do you say that is correct?—That is so.

174. An inch or two inches of water?—You could get an inch of water, I should say, easily enough in a railway-truck—the floor is close-boarded.

175. Would it not run out of the flap door?—It would not be all over the floor; but supposing, for instance, a floor in course of time becomes more or less worn, and the wagon was not standing absolutely level, it is possible to get a puddle, or there may be coal-dust or sawdust or refuse from previous loading which might pen the water up in the corner to the depth of an inch or so.

176. But when a truck is ordered at a flag station—they are not left there—they always have to be ordered?—Mostly so, a man orders a truck when he wants it.

177. When a truck is ordered, is it not swept out?—If a truck was sent to supply an order a clean truck would be sent; but if a truck was at the station when the order was received, the person ordering would probably be told to load the truck that was there. But any prudent man loading his own goods would see that the truck was clean.

178. *Captain Blackburne.*] The bottom is not so closely boarded as to be watertight?—It becomes watertight with dirt. If coal was carried in a truck the coal-dust would caulk the seams; but if the wagons were used for carrying stone, for instance, the edges of the stones will chip the boards and make them uneven, when there will be open spaces between the flooring-boards. It is possible for an inch of water to be in a truck, but it is very unusual.

179. *The Chairman.*] What would you think of a man who put his wool into a truck that had water in it?—I do not think he would do so. I have never heard of a man having done so. I have heard of a carter having loaded wool on to a damp wagon—the floor had been exposed to the rain—but I do not think that would do any material damage, though it would make the cover of the bale damp or discoloured.

180. *Captain Blackburne.*] We have heard of wool gaining two or three pounds in weight on the way Home if it is extra dry?—I have no knowledge of it.

181. And we have also been told of cases of wool losing 10 lb. in weight?—It would depend on how the weight was ascertained at each end. My experience is that wool does not absorb much moisture. I might say that while it is in the hands of the Railway Department it does not have a chance of absorbing much moisture, and the percentage of what we call wet wool is very small indeed. It is quite possible to get packs damp, but my experience has been—probably because the wool was never exposed to heavy rain while in the hands of the Department—that the moisture does not penetrate. I have never heard of wool gaining weight in the way you mention.

182. *Mr. Foster.*] Wool that has been extremely dry—it does not matter whether it is in the railway-truck or the owner's shed, it will gather weight from the atmospheric conditions?—So far as the Railway Department is concerned, we carry it by the bale and not by weight, so that we have not observed any difference in weight during transit.

183. As regards the trucks which would hold water or puddles, would it not be advisable to see that they could not be in such a condition as that by boring holes to allow the water to escape?—I should say not. The boring of holes in the floor weakens the floor, and small holes would be likely to become stopped up. I should say that so far as the carriage of wool and flax and damageable goods of that kind is concerned, it would be hardly necessary to take precautions to prevent a man loading wool into water.

184. *The Chairman.*] You would consider it would be the duty of the person shipping to look at the trucks?—Yes.

185. *Mr. Foster.*] Of course, you would recognise this: that, say, a farmer carting his wool some few miles arrives at the flag station and finds a truck there with two or three inches of water in it; he has no means of drying that truck, he is there with his load, and the question is whether the Railway Department should not inspect the bottoms of the trucks as carefully as they do their tarpaulins?—Well, the idea of the Railway Department is, of course, that all these trucks should be, if not exactly watertight, suitable to carry coal, shingle, or sand, and if we bored holes in the bottom, the coal, shingle, or sand would run through them. So far as the Department is concerned, we have not considered the possibility of a man being so stupid as to put his wool into a truck with water in it, and there would be no need for him to do it.

186. *The Chairman.*] Do you think that with a view to preventing fires it would be a wise thing that flax and tow should be covered with packing the same way as wool is?—For the purpose of carriage by railway?

187. For the purpose of protection from fire?—It would be a protection from fire through sparks; but I think it has been pretty clearly demonstrated that flax does not fire spontaneously.

188. I am not speaking of firing spontaneously. Take tow, for instance, the rough fibrous surface that it presents may catch fire from any extraneous circumstance. Do you think any advantage would be gained by covering the tow and flax?—So far as the Railway Department is concerned, we have never looked upon flax as requiring more than a little extra care; but tow, of course, is dangerous, and we have frequently had trucks of tow burnt. Speaking of a few years back, the tow was of no value at all, and I should say that if the owners of the tow had been asked to press it into woolpacks they would not have done so, but would sooner burn it. I believe there is now a process of utilising tow, but I am not sure whether tow is worth packing. With dressed flax I do not think there is special danger, but it requires care. My experience is that we have had fires with tow and chaff. I do not recollect any fire occurring in the case of flax—that is, the dressed fibre. I am speaking only from a railway point of view.

189. *Captain Blackburne.*] Does tow burn rapidly and easily?—Very much so. A case came under my notice where a load of tow caught fire on the outside of a truck—part of the load was on a cart on the other side—and the driver had great difficulty in getting his horses out before they were burnt, so that it is very rapid; and in the case quoted by Mr. Beattie, it will be seen that the train staff were practically unable to unload the truck, and had to capsize it.

190. Would the whole bale burn like that or start off with the fluffy stuff?—The whole bale burns up pretty rapidly.

191. Would flax do much the same?—I have never seen flax on fire. If we have had flax burn I do not recollect it—we may have had one or two cases, but I do not remember any particular instance where flax has caught fire.

192. *Mr. Foster.*] When you refer to the firing of tow, it is the tow that has been pressed—not dumped?—It is not even pressed—roughly put up in bales.

193. But it is put in a press?—Well, a great deal of it is not. I suppose it must be put into a frame to bale it, but it is not closely pressed.

194. *Captain Blackburne.*] Have you ever known wool heat quickly?—I have felt bales warm, but they have mostly been bales of locks and pieces, and that sort of thing. I put down the warmth to the extraneous matter in the wool; but I have never felt a hot bale.

195. Not so hot that you could not put your hand on it?—No. Of course, I have not had any experience in dealing with wool between dumping and shipping.

196. What about the heating of flax?—I have never heard of any case of spontaneous combustion or extreme heat while on the railway premises.

HENRY CORRICK sworn and examined. (No. 43.)

197. *The Chairman.*] What is your name?—Henry Corrick.

198. What are you?—I am a mechanical engineer.

199. Residing in Wellington?—Yes.

200. We understand that you have some invention which you claim will enable you to tell the state of the temperature in the interior of a bale?—Yes, that is so, sir; but I have also a little evidence to give you of a scientific nature.

201. What about?—It is dealing with this subject, and also dealing with the subject which one witness introduced when he said that oxygen or air must get into the bale before combustion can take place. For many years, ever since the loss of the "Motaka" and "Bluejacket" from Lyttelton about 1867, I have gathered information respecting the spontaneous combustion of wool, and I have come to the conclusion that moisture is the cause. First, by producing heat; secondly, by decomposition; and finally, combustion. Decomposition is the division of the elements of which the matter is composed. If we decompose water, we have oxygen and hydrogen gas, which are combustible when together. The decomposition of wool, fat, and vegetable matter may produce gases that will be combustible with little or no heat. It is generally believed that fire will not burn without air, and I will quote one or two simple examples to prove that air is not necessary for spontaneous combustion. Charcoal, sulphur, and saltpetre all require air when burnt separately, but together each one provides the gas for the combustion of the other. The elements from decomposed water, oxygen and hydrogen, also provide the necessary gas for the combustion of the other: fermentation may also provide elements for combustion with little change of temperature. I am disposed to believe that combustion continues only so long as decomposition supplies the elements, and, there being no air to keep up natural combustion, the fire dies out, as is proved by the opening of bales charred in the centre. I believe that if these gases were allowed to disperse by ventilation, there would be no spontaneous combustion. I would like to call your attention to the dumping, and the possible results. You are familiar with the process of freezing. Simply stated it is this: Suppose we have a cubic foot of air at a temperature of 60°, and we compress it to half its size, we have the heat of one half added to the other, and, provided there is no escape or absorption, we may expect an increase of temperature to twice 60°. Now, if the 120° is reduced to 60° by the application of cold water and then allowed to expand to its original size, the temperature would be 30°, because 30 is the half of 60. The principle in dumping is the same: the temperature of one-half is added to the other, and there is a rise in temperature according to the conditions of escape. There is also another result, the moisture will be twice the quantity per cubic foot after dumping, hence the cause of dumped bales heating more than pressed, as has been stated in this inquiry, and also, the vegetable and other matter is brought into closer contact. Thus, in a dumped bale we have more heat, moisture, vegetable and other matter to the cubic foot, and thousands of these bales in an unknown condition are taken into the hold of a vessel and subjected to more pressure and close confinement. I should like to have asked your excellent witness, Captain McKellar, what provision is made for ventilating the holds. Instead

of confining these gases under the impression that they will not burn without air, it would be better to disperse them. I could arrange an effective system of ventilating that would not interfere with the holding-capacity, and that would also be available for pumping in fumes or water for extinguishing a fire. In conclusion, I have shown that water or moisture causes heat, heat decomposition, and decomposition spontaneous combustion, and whilst it would be well to know how near the edge of a precipice the ground is safe, yet the wisest plan would be to keep as far away as possible, and so with wool, it may be well to know how much moisture is required to cause decomposition, but the safest plan is to ship it perfectly dry.

202. *The Chairman.*] Have you got the instrument which you have invented?—Yes, I have. The invention consists of the insertion of a tube either at the time of the making-up of the bale or subsequently. This tube is used for the insertion of a thermometer instrument for obtaining the condition or extracting a sample. If I extract 1 dw. of wool, I could tell you how much water the whole bale contains.

203. We want to know how you are going to insert this into a bale when it is dumped, or do you mean it is to be put into the bale before it is dumped?—The best principle of working it would be to put a pipe in.

204. We must get a practical idea, and therefore we must see how it is done?—Yes.

The Commission decided to have a practical demonstration made of the instrument in connection with a bale of wool at a future date, when the other inventions would also be shown.

The Commission adjourned till next day, Friday, the 31st August, 1906, at 10.30 a.m.

WELLINGTON, FRIDAY, 31ST AUGUST, 1906.

The Commission sat in the Upper Court, Magistrate's Courthouse, Wellington, at 10.30 a.m.

JOHN HERBERT SQUIRES sworn and examined. (No. 44.)

1. *The Chairman.*] What are you, Mr. Squires?—I am chief officer of the steamship "Rimutaka."

2. We understand you know something about the circumstances attending the fire which occurred on the "Gothic"?—No, not the fire on the "Gothic"—the "Rimutaka." The first I knew of our fire was being sent for to come back to the ship. When I got to the docks I found the fire was almost out. I heard that the fire broke out at about 6 o'clock on the Saturday night. On the Sunday morning I was sent for, and I learned that the fire had occurred in No. 5 hatch. The hose was got to work, and some water was played on it to get the smoke under. The hatches were then replaced, and the Clayton fire-extinguisher set to work so that as little damage as possible might be done to the cargo in the hold. However, a certain gentleman went and informed the fire brigade that there was a fire aboard, and they came down, and, in spite of remonstrance, burst open the hatches and poured water below.

3. That is only hearsay—you were not present?—No, I was not present at that time, but I know these are the facts.

4. Was the fire brigade at work when you arrived?—No, they had left when I arrived, and the Clayton machine had been set to work for the second time. Now I am speaking of things within my own knowledge: When the hatches were taken off I went down below to see the extent of the damage. I found that there were two beams buckled and three plates. A considerable quantity of the wool was damaged by water, and the whole of it was taken out and the hold was cleaned, scaled, and painted, for there had been a considerable amount of damage.

5. Do you know anything about the state in which the wool itself was?—I saw it opened up on the wharf, and from what I saw of it I am of the opinion that the mischief commenced in the centre of the bales.

6. *Mr. Foster.*] Did you take notice of where the bales were that took fire? Were they right in the square of the hatch?—No, in the starboard fore corner of the 'tween-deck hatch.

7. It has been given in evidence that wool had been taken aboard some vessels in wet weather. If that were so, then, the hatches being off and there being no protection for that portion of the cargo in the square of the hatch, there would be a probability of there being more moisture, and the greater probability of the wool in the square being wet?—No, it would be impossible in this case. Besides that I do not see how these bales could get wet. We usually take them from the trucks or from the shed. If they are received from the shed there would only be about a quarter of an hour elapse between the time they came out and their being stowed under deck. Of course, if it was raining hard we would not receive them at all.

8. If you are taking from the Harbour Board's sheds or the trucks into the hold during rain—no matter whether it be light or heavy rain—the square of the hatch is unprotected for some length of time?—As they work the cargo in, the other layer is covered.

9. In stowing you make one level floor all the way through?—Yes.

10. To the lay mind it would appear that the bales in the square of the hatch would remain uncovered for a longer period than the others?—We always cover that portion up with a tarpaulin.

11. Yes, but what becomes of the water which would collect on the tarpaulin?—The tarpaulin is taken up by the four corners and hoisted up on deck, and the water poured off.

12. They are, of course, watertight?—Yes.

13. *Captain Blackburne.*] Do you often put a good tarpaulin down there?—As far as I am concerned we always see that it is watertight. It is usually the tarpaulin which is used for the covering of that hatch, and, as you will readily see, it would not be desirable to have a faulty tarpaulin there, for it would allow damage to the cargo.

14. Do you find that it remains good?—For a long time.
15. But the cargo is landed on to it?—No, the slings are not landed on it; the sling does not touch it once in a hundred times. The sling is a single piece of rope in the form of a snorter, and rove through itself. This is more convenient for the purpose of landing and releasing the sling from the bales. Then, again, the slings of bales are swung into the wing as far over as possible before finally being let go.
16. *Mr. Foster.*] It has occurred to me, however, that it would be possible for the bales to get wet while in the slings?—There would be very little chance of that. If you consider the size of the square of the hatch you will realise that very little water could get down below—unless, of course, it was raining very heavily, and in that case we would stop taking in cargo. It would only be while raining very lightly that we would continue working.
17. Have you ever noticed any of the bales after having been loaded under such conditions showing signs of damp—that is, external signs?—The covers may appear a little damp; but if they were really damp we would refuse to take them.
18. After they are lowered on to the tarpaulin?—We would send them on deck again. In any case they would not be lowered into any wet that might be on the tarpaulin. The men catch the sling of bales, and swing them over to the side as far as they can. They are never landed in the wet.
19. You do not consider there are any bad results from working the cargo during such weather as you yourself would work in?—No, no danger whatever. I think that in most cases the wool must have been packed wet, or else some other cause such as the sheep-dip or wool-wash has been present to set up spontaneous combustion.
20. *The Chairman.*] You see the trouble we are in; we have news from Australia to the effect that they have had very few cases of fires or heating in wool within the past thirteen or fourteen years—so we are told by the wool people in Sydney. Do you think it is necessary to take any further precautions than are at present taken in New Zealand ports, where the climatic conditions are so much different to Australia?—If you do not mind my offering a suggestion, the people who pack the wool should be a little more careful as to its dryness.
21. I am speaking now as to the loading of the wool in such weather-conditions as you sometimes meet here?—We cannot take any more care than we do. We do it for our own good and safety. Very few officers would allow damp wool to go into a ship's hold.
22. It is hardly fair to suppose that those in New Zealand are any more careless than those in Australia?—Then they have the different conditions of climate.
23. That is the point. Then, do you not think that, in view of the difference in climatic conditions, additional precautions should be taken as far as loading is concerned?—The precautions depend upon the people themselves.
24. Do you think the precautions are sufficient?—I think so. The shipping people, if they know their business, will not allow damp wool to go aboard their vessels.
25. It is an exceedingly serious matter, not only in so far as the added responsibility which is cast upon the shipping, but the increased rates of cover on cargo from New Zealand—as compared with other places. Then, do you not think that further precautions could be taken?—Not so far as loading is concerned. Of course, I only know my own company and my own ship.
26. *Captain Blackburne.*] If there was a drizzling rain throughout the day, would you continue loading?—That would not hurt the wool. It would only be while in the sling that it would be exposed to the drizzle.
27. Would you be surprised to learn that wool has increased in weight on the voyage?—Then I cannot understand where the increase in weight comes from.
28. Moisture in the atmosphere?—I quite believe that it might absorb moisture; but it is pressed so hard that there could be very little room for additional moisture, unless it is already in the bale. As I have said, if there is any pretence at rain we put the tarpaulins down in the square.
29. Would that not tend to make the water accumulate in one spot—there is always a certain amount of leakage through a tarpaulin?—There might be a little, but it is usually spread pretty flat.
30. There would be hollows caused in walking over it?—So soon as there was a hollow formed and water accumulated it would be taken up.
31. *The Chairman.*] Is it not likely to get adrift from the tarpaulin?—It might, but I have not seen much of it in my experience.
32. *Captain Blackburne.*] Your No. 5 hatch is the after hold of all?—Yes.
33. Did you find out the seat of the fire?—Yes. I located it exactly as in the starboard fore corner underneath the wing.
34. Was that far away from the hatch?—Five or six feet from the hatch-coaming. Far enough away to be sure that the damp would not have affected it.
35. If the wet got adrift from the tarpaulin it might run over the edge?—No, it would not jump that 6 ft.
36. *Mr. Foster.*] The bale was in the top tier, close under the deck?—Yes, close under the deck.
37. So water from the tarpaulin could not get there?—No, the tarpaulin would be two tiers below—that is, if there was one in use, and if there was any occasion for it.
38. Do you remember the brand of the bales of wool that fired?—No, I do not; but I think the company would be able to give you that.
39. Do you remember noticing whether the wool was fellmongered wool or in the fleece?—Not exactly scoured—water-washed. It was either scoured or slipe. However, it was wool that had been through a preparation of some sort.
40. Where was that wool taken in?—In Wellington.
41. *Captain Blackburne.*] You have your log-book to which you could refer for the brands?—No, not the deck log, only the ship's log. I could produce that.

42. There you have an entry of the state of the weather during the time this cargo was taken in?—Yes.

43. *Mr. Foster.*] Did you take in much wool in Wellington on that trip?—I could ascertain that for you.

44. You could produce that in Christchurch?—Yes, I will do that.

45. *Captain Blackburne.*] How many bales were damaged?—The damage was merely done by the fire getting to the deck above and making it red hot, and the wool on the top of the deck caught fire and ignited when the hatches were taken off.

46. You found that wool would burn all right?—Oh, it burned all right. When you see the bales charred and blackened you can make up your mind that there is no doubt about it.

47. *Mr. Foster.*] Do you think you could say the particular bale that was the cause of the fire?—I could say either a particular one or two.

48. You would be able to locate the commencement?—Yes, and know exactly where it commenced.

49. Did you notice if any of the bales were charred on the inside yet the pack be intact outside?—I could not say that. Where the wool was charred the pack was also burnt.

50. We have had it in evidence that a bale from the "Gothic" was consumed inside so much as to cause the bale to collapse, yet the woolpack or covering was intact?—I have never seen any like that.

51. *Captain Blackburne.*] What made you suppose the fire started in the centre of the bale, then?—Because the whole business was burnt from the centre to the sides. Part was not burnt, yet it was burnt from the centre to the sides, and that shows that it must have started in the centre of the bale. The other bales that were burning were just charred on the outside.

52. How long had you been in London when the fire occurred?—We arrived on the Friday morning early, and the fire occurred three days after. It was 6 o'clock on the third day that I was called to the ship.

53. *The Chairman.*] We understood it occurred on the Saturday night?—Yes, that is correct. We arrived at 4 o'clock on the Friday morning, and the fire started at 6 o'clock on the Saturday night. We had discharged a certain amount of cargo at the time.

54. *Captain Blackburne.*] Would it have been possible to originate through men smoking in the hold?—That would be impossible, because they were working in the 'tween-decks at the time, and this bale was away underneath the deck.

55. *Mr. Foster.*] The hatches to that hold had not been opened?—No, not yet. This was in the top tier of the lower hold. There were the 'tween-deck hatches between it and the men.

56. *Captain Blackburne.*] And you had not reached that cargo?—No.

57. *Mr. Foster.*] You had to get away the cargo to get down to where the seat of the fire was?—Yes.

58. Yet a certain amount of air could get to the bales?—Yes.

59. Can you tell me if an inquiry was held into the cause of that fire?—They were speaking about it, but I think it must have taken place after I left.

60. There was merely an inquiry by the company, or did the insurance people meet the average-staters?—I think it was taking the form of a law-case, or whatever they call it. The Clayton-machine people, assisted by the underwriters, were going to prosecute the fire brigade, for they contend that had they not taken off the hatches the Clayton machine would have subdued the fire without any damage to the balance of the cargo. I, myself, think that is so, too.

61. *The Chairman.*] Do you know if these inquiries, as a rule, are held by the underwriters, or do they take the form of a magisterial inquiry?—I could not say for certain. I have an idea they are held by the Board of Trade.

62. You have never been called to give evidence in such cases?—No.

63. And you have no idea as to the course that may have been taken in respect of your own ship?—If an inquiry has been held it must have been since we left London. Our marine superintendent was present at the fire, and could give the company all the information they would require.

64. *Captain Blackburne.*] There would not be likely to be any leakage through the deck where this wool was stowed?—No.

65. Or ventilators?—It was stowed away from ventilators, and when the top bales were taken off there was no sign of any leakage.

66. Do you know if any of the wool which was discharged before the fire was discovered was warm?—No. But when I went into No. 4 hold on the Sunday night I felt some of the bands, and they were very hot.

67. That was probably some of the same stuff taken in at the same time in Wellington?—Yes.

68. *Mr. Foster.*] But water had been poured down?—No, not into No. 4 hold, only into No. 5. There was a watertight bulkhead between each hold.

69. *Captain Blackburne.*] You did not hear if any of the wool in your shipment had been found charred inside?—No; I do not think any special damage was discovered. As soon as the wool is landed the bands are cut as it goes out. I think the compression has a lot to do with the heating.

70. If there was heat I think it would be discovered?—As soon as the bales are out of the hold they cut the bands—mostly on the ship's deck; if not on the deck, on the wharf alongside. So that before it is out of sight it is into two separate bales. That is done with every bale in the ship.

71. Have you had any experience of other ships?—Not so far as heating in wool is concerned. That is all I have noticed since I have been in the trade.

72. Have you never before found it hot?—I may have noticed it a little bit warm, but that may have been owing to its being in the sun.

73. Was there no other cargo damaged on this occasion?—No, only the wool.

GEORGE MUMFORD sworn and examined. (No. 45.)

74. *The Chairman.*] What are you?—I am in the permanent employ of the Wellington Harbour Board.

75. And have been during the period when the "Pitcairn Island" was loading?—Yes, for three years and a half.

76. We understand that in consequence of some evidence that has been given relative to the state of the weather at the time of the loading of the "Pitcairn Island," Mr. Ferguson, the Secretary of the Board, has sent you to tell us some facts as to the conditions under which the vessel was loaded?—Yes. I practically look after the loading. I tallied the Wellington wool into the "Pitcairn Island."

77. *Mr. Foster.*] I understand you wish to deny the statements made in evidence, and which you observed from the newspaper report of the evidence, relative to the conditions under which the vessel was loaded?—Yes; according to the newspaper report it would appear that it was stated that the whole of the wool was loaded in the rain, was dumped down on to the wharf, and allowed to lie there in pools of water. I think that is all wrong. No doubt wool is sometimes run out from the shed quicker than they are ready to take it in, and if there is a sudden shower it might damp the bales, but it would not be sufficient to do more than damp the outside covering. On the last day we loaded the "Pitcairn Island" we started at 8.30 in the morning, and knocked off at 9.30 on account of the rain, and at that time they would not take in any more wool. They started again at 1 o'clock and worked till 9 p.m. Then, as far as receiving cargo, she was done with. She went into the stream and then left for London. Another point about this wool: it is always customary to take it on the trucks from the shed to the ship's side, and keep it on the trucks until the ship's whip is fixed into the bales, and it is hoisted up and into the hatch.

78. *The Chairman.*] Lift them off the trucks, not off the wharf?—It is not allowed to be put on the wharf if the wharf is wet. If it was dry the bales would be turned over. I saw the whole of the loading, and know that this was done. She also took wool over the side from the small steamer—the "Blenheim." On the 3rd March I went down to get the manifest, and, although we have nothing to do with the over-side wool, the mate pointed out to me some wool, and said it was a little bit wet. Ten bales were taken back to Blenheim and dried, brought back, and reshipped on the 10th March. I have the entry in my book to prove that, for the number of bales was altered from 136 to 126. If we had a lot of wool out on the wharf and a shower of rain came on, they would pick it up and drop it into the hatch anyhow, and spread a spar over the hatch and spread the tarpaulin over it. No wool would be taken out while it was wet. As to the remarks about the wool lying in pools of water—well, that is a little bit far-fetched. If a sudden shower did come on it would not do more than damp the outside of the bale. The corner of the bale might touch the wet, but that is all. A dump of wool is very hard—not quite as hard as a board—but it is too hard for water to get in.

79. So you say the evidence which was given here to that effect was false. This evidence was given: "I have noticed pools of water on the wharf after the rain, and the wool-bales dumped down on to the wharf where it had been wet." You say that is not correct?—That is so.

80. The same witness said there were a large number of bales out on the wharf ready to go into the ship when the rain came on, and it was taken back to the shed?—Well, if he was speaking about the 14th I can tell you how many there were. There were thirty-nine bales run out between 8.30 and 9.30.

81. During that hour you only put out thirty-nine bales. What would be the average number at any one time remaining on the wharf? Would you be ten ahead of them?—Yes, sometimes they have a lot run out.

82. Had you all of this out before any portion of it was taken aboard? How many would they be likely to leave on the wharf?—Only a matter of five or six bales.

83. Well, you were only a few bales ahead of them?—Yes.

84. Would you stop bringing it out if a shower came on, or would it require to be a considerable shower before you ceased?—We would not work if there was any rain at all—that is, unless it was very slight.

85. *Mr. Foster.*] A witness was asked how long would this wool remain on the wharf, and he said it would not go into a quarter of an hour. If there were only half a dozen bales it would not take a quarter of an hour to run them in?—No.

86. The witness could not say the number of bales, and he said if the wharf was wet and there were pools of water on it the wool would be rolled through them into the shed. Would there be any truth in that evidence?—I think it is a bit far-fetched.

87. You deny it?—Yes.

88. In the event of the wool on the wharf getting a little wet on the corner—say, from those small pools—is it taken into the ship and no notice taken of it?—It never has wet more than the outside covering.

89. If it penetrated to any depth you take steps to have it dried?—Yes. The bales would have to be undone and dried. If they were very wet they would be sent to the scourers or back to the senders, and the wool would be scoured.

90. So the same care and watchfulness as to the condition of the bales would be exercised whether it had been on the wharf once or twice, even if it came back again?—Yes.

91. Do you find that the officers are careful also as to the condition?—Yes, the skipper of the "Pitcairn Island" was rather fidgety if anything; he seemed to worry a lot about it, and the mate seemed to be a very smart sort of a chap.

92. Did you form the idea that they were more pernicky than usual?—No. Careful. The captain was a man of age, and from what I saw of him I thought he was a bit of a fidget.

93. *The Chairman.*] Did he appear to be dissatisfied with the condition of the wool?—No, he did not. If there was a little rain he would say, "We do not want any wool."

FREDERICK DUNNING sworn and examined. (No. 46.)

94. *The Chairman.*] What are you?—I have been for three years and eight months in the employ of the Wellington Harbour Board.

95. You have had a good deal to do with wool?—Yes.

96. We understand you wish to contradict some evidence which was given by some witnesses as to the conditions under which the "Pitcairn Island" was loaded. You take exception to that evidence?—Yes.

97. You were engaged at the loading of the vessel?—Yes.

98. You have heard Mr. Mumford's evidence?—Yes.

99. And do you corroborate it in every particular?—Yes. I only send the wool out from the shed. He receives it at the ship's side. I send the wool out of the shed. He would be better able to see it when it reached the ship's side.

100. *Mr. Foster.*] When wool is brought back to the shed would it come under your notice?—It might and it might not. If the weather looked bad they would say, "Knock off." As soon as it is entered out in my book I have finished with it.

101. *The Chairman.*] If they send it in again they have to look to the getting of it out again themselves?—Yes.

102. *Mr. Foster.*] When once it is on the trucks you are finished with it?—Yes, I get the signature for it after the day's work.

103. What steps do you take to examine any wool brought back into the shed?—We have a look at the woolpacks.

104. Is that a rule or may it be done or not done?—It is a rule.

105. And would be strictly carried out?—Yes.

106. And in the event of there being excessive damp on the bales, would you take steps to have it sun-dried or anything like that?—Yes, it would be put out in the sun.

107. *The Chairman.*] In the event of the bales coming back into the shed after having been sent out to the ship, would you inspect them when they come back?—Yes.

108. *Mr. Foster.*] So you are satisfied that if there should be any serious dampness on the bales coming back from the ship it would not be likely to escape the Harbour Board's officials, and it would not be again sent for shipment in a damp state?—The Harbour Board's representative is there always.

GEORGE HERBERT SCALES, previously sworn, was recalled and further examined. (No. 47.)

109. *The Chairman.*] You have read the evidence given with reference to the weather-conditions and the loading of the "Pitcairn Island," and you have something to say with reference to that evidence?—Yes, I have read the evidence. I was not aboard the vessel during the forenoon, but I know the stevedore came up to my office at about 10 o'clock and told me they had knocked off on account of the weather. He thought they would be able to start again in the afternoon, and at 1 o'clock, I believe, they did. I went down to the ship on the last day at about twenty minutes to 9 o'clock, and stayed on board until they had completed. I was with the captain, and I can say that he was a very particular man. He had been in a very serious wreck, and had spent three weeks in an open boat, and I know that for that reason he was particularly careful about everything. What little rain there was in the forenoon was not sufficient to stop the loading under any circumstances.

110. *Captain Blackburne.*] That was on the 14th February?—Yes, and that was about the only day that we had any rain on which loading continued. There was a wet day, but I do not think we did any work that day.

111. And you were down the following day?—Yes; I saw the last bale go into the hold. I remember it was a tight squeeze to get the last bale in, and they were trying to force it into the hatch.

112. I have an extract from the Harbourmaster's log which says it was raining throughout the day. The "Pitcairn Island" was loading the second time between the 27th February and the 19th March, and went out into the stream at 8 o'clock in the morning?—On the morning of the 15th it was.

113. The 9th and the 15th were wet days?—I do not think she was loading on the 9th.

114. *Mr. Ferguson* said, from the 13th to the 24th?—She was finished on the 14th. There is no possible doubt about that. I am quite confident that there was practically no rain on the afternoon of that day. She did not load on the 9th. I have my shipping clerk, who was down at the hatches all the time.

115. *Mr. Foster.*] You had a glance at the evidence just now. Is there any special point to which you take exception? First of all it is stated that a shower came on, and they trundled a number of bales along the wharf to the ship's side. The witness could not say how many bales were left on the wharf. He said there were pools of water on the wharf, into which the bales were dumped down. A shower came on, and they rolled the bales back into the shed through the wet?—I do not know of any bales being rolled back. It is customary to take as much into the ship as possible, and if a shower comes on which promises to be sufficient to cause any damp, to take the bales back into the shed.

116. Do you deny the statement?—Practically yes, because I do not recollect seeing wool rolled along the wharf.

117. Did you notice if there were any pools of water on the wharf. Where the wharf became worn there might be depressions in which the water would collect?—I was on the ship, but do not know of any pools of water.

118. Do you know if the wool was dumped off the trucks on to the wharf hastily?—I do not recollect.

119. That has been denied by the Harbour Board officials?—Yes.

120. *The Chairman.*] They say it is lifted off the trucks by the ship's whip?—That is the custom, I know. If the wharf is wet the trucks are wheeled alongside and underneath the slings, and they are put round the bales and hoisted aboard.

121. *Mr. Foster.*] As the barque was finishing, it would be hardly likely that there would be an accumulation of many bales on the wharf at any time—particularly if the weather was at all doubtful?—I know the only possibility of an accumulation of bales would be after the sheds were opened at 9 o'clock.

122. It was stated that they took wool back to the shed?—That would only be in the morning that they were referring to. I cannot state as to what took place when I was not there. I know I have been down there when there was a little rain falling, and I have never seen anything like what has been described. I know that some time during the loading some fifty bales were sent out that were not for the ship, and they were sent back to the shed. It was for the "Sardhana," and if that is the wool which the witnesses were referring to it had reached home all right in the "Sardhana."

123. *The Chairman.*] Was that at the same time as the "Pitcairn Island"?—No, she followed her.

124. Is it likely that these men would mistake the wool?—No; the lot I mentioned—some fifty bales were brought out and taken back to the shed at some time during the day, and I am wondering whether they confused the time and circumstances. That wool was put aboard the "Sardhana," and arrived all right.

ALBERT SANDERSON COLLINS sworn and examined. (No. 48.)

125. *The Chairman.*] What are you?—I am shipping clerk to Mr. Scales.

126. You know something about the conditions under which the "Pitcairn Island" was loaded?—Yes.

127. You also have heard the evidence which was given as to the wool being allowed to remain on the wharf and being rolled through the pools of water?—Yes. On the morning of the 14th March, to which the witnesses referred, we started loading at half past 8, and finished at half past 9, and during that period we only took out thirty-nine bales from the trucks from U shed.

128. That was the whole quantity which was taken aboard till 1 o'clock. Was that lying on the wharf while it was damp?—I never saw any.

129. Were you there the whole of the time?—Portion of the time. I was down at the ship every morning.

130. Did you see any of that wool brought or rolled back into the shed?—There might have been some, but I never saw any.

131. Did you see any of it rolled along the wharf?—I do not see how they could roll those heavy bales along the wharf. However, there would only be nineteen and a half dumps.

132. *Captain Blackburne.*] Are they taken out singly?—Two bales are dumped together, and only one would be taken at a time.

133. *Mr. Foster.*] Did you notice if any other wool was out on the wharf?—We had two lots of wool which were stopped from shipment, and were taken back into the shed.

134. Might that be the wool these witnesses were referring to as being taken back?—Probably it is.

135. *Captain Blackburne.*] Is it possible that this wool may have been lying on the damp wharf?—The Harbour Board officials are very careful as to giving receipts for damp wool. I have never had a receipt for a damp bale.

136. And you got a clean receipt for that wool?—Yes, absolutely.

137. *Mr. Foster.*] It came from the shed and went back again?—You understand we never like to split a grower's clip by sending portion on one vessel and portion on another. We could not get the forty bales aboard. If we had done that we might have had to split some-one else's clip, so this wool was sent back to the shed.

138. I thought from your remark that this wool came by rail on to the wharf, and you got a receipt from the Board when they received it, but you had it from the shed?—Yes.

139. If wool comes by rail consigned to you, the Board would receive it?—This wool originally was sent down by the United Farmers, and I had it put in an outside stack, so as to put it into the ship, but after going out it was sent back again to wait for the "Sardhana."

140. At the time it was on the wharf it was still under the Board's responsibility?—Yes. If there was the slightest sign of rain they would be very careful to see that it was not taken out of the sheds, for they are particular about loading wool in the rain.

GEORGE HERBERT SCALES, previously sworn, was recalled and further examined. (No. 49.)

141. *The Chairman.*] You wish to correct something?—I have listened to Mr. Collins's evidence, and I am not quite clear whether he gripped the point of Mr. Foster's inquiry, and I took it that you inferred that wool was lying on the wharf all the morning.

142. *Mr. Foster.*] My object in asking was to show that it would not be on the wharf all the morning?—That wool was not amongst the thirty-nine bales.

143. *The Chairman.*] Was it on the wharf on the 14th?—No.

144. So that could not be the wool they saw?—No.

145. *Mr. Foster.*] You mentioned a certain wool you sent back: it was delivered to the ship's side and you were told they could not take it. That might have been the wool these people saw taken back to the shed?—That could not have been between half past 8 and half past 9, for it was not on the wharf. We had a line of forty bales which could not be taken without splitting a consignment, and portion of it was sent out and put back again.

CHARLES WADLEY, previously sworn, was recalled and further examined. (No. 50.)

146. *The Chairman.*] You read some of the evidence given by some of the crew of the "Tutanekai" as to wool being shipped during wet weather: you wish to make a statement?—I cannot make out what they are referring to.

147. They did not give us any dates: they would not fix any date?—I can only remember one occasion when there were about twenty bales on the wharf. I saw a black south-wester coming up, and, as I could not get the wool aboard the ship, I had it sent back to the shed. It would take about four minutes with ten men to get it back—that is, two bales each. The hatches would be covered, and everything ready in a few minutes.

148. *Mr. Foster.*] Did any of that wool come out of the shed again?—Yes, about three days after.

149. We have been talking about the last loading day?—The last day we started at half past 8 and knocked off at about half past 9, and started again at 1 o'clock, because it was bad weather. All the wool that came out that day was on trucks.

150. Did you take any wool off the trucks that had afterwards to be taken into the shed. Every bale you took off the trucks went into the ship?—Except a line of forty bales which was brought out and had to go back again.

151. Was that at early morning?—Yes, between half past 8 and half past 9.

152. Was there any lying on the wharf at that time?—No, none at all.

153. So you are clear that there was no wool lying on the wharf when a shower came on which forced you to take it back again?—No, only that time I said to the men, "You will have to take that back again." A black south-wester was coming up.

154. *The Chairman.*] Was that on the last day?—No.

155. *Mr. Foster.*] That only happened once?—Yes.

156. And you are satisfied it was not out sufficiently long to get wet?—Ten men were running it in—two bales each. They did not roll them.

157. It was too hard work for them?—One man could roll a dump along, but the truck would be faster and easier. But the wharf is always swept up after any rain, and there would not be likely to be much water on it.

158. The Commission is hearing it now; but what we understood was an agreement between those who were carrying out the observations?—What I have told you in the box is true, as I have always known that wool is liable to catch fire. We have always had that impression, and take precautions against it if possible.

The Commission adjourned *sine die*.

The Commission proceeded to Christchurch this day.

CHRISTCHURCH, TUESDAY, 4TH SEPTEMBER, 1906.

The Commission met in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

STEWART HENRY WILLIS sworn and examined. (No. 51.)

1. *The Chairman.*] What is your name?—Stewart Henry Willis.

2. What are you?—I am surveyor to Lloyd's Register, and a master mariner.

3. The Commission understand that you have had a very extensive experience with reference to the shipping of wool and other articles, and also an intimate knowledge in regard to the stowage of these articles, and we should be glad to have the benefit of your knowledge on the matter?—Well, I presume it is in connection with these fires that have occurred during the last few months in the different ships. Of course, it is a difficult matter without having full data in reference to these fires for one to express a definite opinion, but a great deal of what has occurred here on different occasions both on board ships and the condition of the wool that has been found in stores has been, so far as my personal opinion is concerned, caused by spontaneous combustion in wool.

4. Can you say, in your opinion, what is the condition of the wool to which that may be due?—Well, it may be caused by several things—by the wool being packed damp, by excessive vegetable matter in the wool, and we have had several very bad cases in connection with the heating of wool of which I have some notes here. I may state that from 1893 up to the date the underwriters' surveyor was abolished, I was surveyor to the underwriters as well as to Lloyd's Register, and these instances came before me principally in that position. Since last June twelvemonth, of course, I have not had the same amount to do with the shipment of wool. I think the worst instance that came under my notice was in connection with a vessel that has just been burnt entirely at sea—the "Pitcairn Island." These bales were found on board shipped in a very bad condition indeed. They were stowed in the 'tween-decks, and were practically in a completely charred condition. The pack had to a great extent disappeared, having been burnt, and the condition of the wool itself—it was very much shrunk—reminded me of a caked mass of pitch, and the heat was very great indeed. There was no other cargo stowed in the vicinity of the wool. I am not quite sure whether it was slipped wool or scoured wool, but it was one or the other. There were a number of bales of the same mark—103 bales on the vessel of the same mark.

5. What was the mark?—"C.M.C. Ltd." And this was in January, 1896. On behalf of the underwriters I suggested that the whole of this mark should be taken out of the ship. My report in connection with the matter was as follows: "Confirming my verbal message of this morning, I beg to inform you that two bales of wool marked 'C.M.C. Ltd.' were found by me this

morning on board the 'Pitcairn Island' in a burning condition. I send you a sample of wool out of these bales. I find there are 103 bales of this mark on board the ship, and I strongly recommend that all of these be broken out from amongst the cargo, and that the bands be broken and bales thoroughly examined previous to the ship being allowed to sail." This was done with a considerable amount of difficulty, and no other wool was found heated. These bales I am speaking of were marked with a by-mark of "XX," and they were the only bales of that by-mark on board the ship, although there were 103 bales in that particular shipment. There was considerable discussion about that at the time, and it was a very grave case indeed. It was fortunately found in time, but undoubtedly that vessel would have been on fire if she had been allowed to go to sea with the wool in that condition. From memory I do not think the deck was charred underneath, but it was, at any rate, brown with the heat. Then there have been a number of other cases where wool has been found in a wet or very heated condition. For instance, in one case a number of bales had been shipped, and the temperature was from 100° to 150° in fourteen bales. In another instance there were twelve bales found on board a steamer, and the temperatures were 120°, 100°, 130°, 130°, 82°, 120°, 64°, 130°, 54°, 110°, 58°, and 120°, and the temperature of the air at this time was 54°.

6. *Mr. Foster.*] Can you give us the numbers, marks, and date of shipment of those brands?—Certainly. I will give you all the particulars I have in my possession. For instance, I will take the case of the "Gothic" on the 16th July, 1904: "While shifting some cargo on board the s.s. 'Gothic,' taken on board at Dunedin, a bale of wool has been discovered in a very much heated condition. It is scoured wool, and is now opened and spread out in Messrs. Shaw-Savill's shed to dry, and was taken on board the 'Gothic' at Dunedin. The bale had developed a very large amount of heat even in this short period." I have not got the mark of that bale, because the mark did not appear when the letter was being press-copied. I think one of the most glaring cases I ever came across was in connection with this letter of mine to the underwriters, August, 1897: "As reported in my log-book on the 11th and 13th August, twelve bales of wool marked 'J.R.,' and shipped on board the s.s. 'Otarama' at Timaru, were found to be, on that vessel's arrival at this port, in a badly heated condition. Two bales were found in the No. 1 hold, and the balance in No. 3. They were taken out of ship and placed in the New Zealand Shipping Company's shed, all bands having been burst. Twelve hours after they had been opened (consequently they must have cooled to a certain extent) I tested their condition with a thermometer, and found the following temperatures in the centre of bales: 120°, 100°, 130°, 130°, 82°, 120°, 120°, 64°, 130°, 54°, 110°, and 58°. During my visit to Timaru on the 18th and 20th August, I found that twenty-five bales of same mark, part of which had been intended for shipment on the 'Otarama' had been detained by Messrs. Guinness and Le Cren in consequence of their condition. I examined these bales, and found them in a scandalous state. Four bales, Nos. 16, 17, 15, and 22, had been spread out to dry, but were still damp, and the whole shipment in a more or less damp and wet condition. Those bales which had been squeezed up against others in the stacking were heated, and gave the following temperatures: 110°, 94°, 132°, 88°, and 80°. None of these twenty-five bales had been dumped or the heat would have been much more intense. I would point out that here is a clear case by which a steamer with valuable lives and cargo would have been seriously imperilled if in the first instance the heated wool had not been found after shipment, as without doubt she would in a short time have been on fire in two separate holds. In the second case, through the care of Mr. Young, who has charge of Mr. Mills's store, the danger was avoided and shipment stopped, but I cannot too strongly condemn the utter callousness shown by shippers sending their wool forward in such a disgraceful condition, and especially as regards the lot of twenty-five bales found at Timaru, some of which gave unmistakable signs of being wet even on outside of packs. The bales of wool *ex* 'Otarama' were in some instances smoking when the bands were burst."

7. What was the name of the shipper on that occasion?—I ascertained that the name was J. R. Rooney.

8. What is he—a fellmonger?—Yes. In fact, I took this matter up very strongly, and tried to institute a criminal prosecution in the matter. There are a number of other instances very much of the same nature, and there is a case in which the wool was up to a temperature of 150°, and that ran into a very large number of bales. In that case there were sixty-nine bales wet or heated, and they were for shipment on board the "Papanui." "Ackland" was the mark. There were fourteen bales of a temperature of 100° to 150°, and the others slightly heated.

9. What was the nature of that wool?—It was scoured wool. My own experience is this, in connection with the heating of wool, that most cases of heating have occurred in scoured or slipped wool. It is very seldom you have greasy wool in that condition. As a matter of fact, I do not think shearers will shear greasy wool if it is very damp. The preponderance of greasy wool that has come under my notice has been wet either through lying on a sandy beach or being carried on the decks of small steamers or through insufficient sheeting; but it is very seldom I have found greasy wool coming from the stations in a wet condition. The thing that strikes me about scoured or slipped wool is this: that in every instance that I have found heated wool—for instance, take wool heated up to 150°—all the wool in the centre of the bale was more or less of a chocolate colour, and the outside of the bale was the ordinary colour. The wool was charred.

10. *The Chairman.*] In the interior of the bale?—Yes, in the interior of the bale.

11. *Mr. Foster.*] Was that undumped?—Undumped and dumped.

12. The case in which you referred to the temperature being 150°, was that in undumped or a dumped bale?—That was in an undumped bale.

13. Were there any dumped bales of which you have the temperature?—Yes, all the bands were burst.

14. And did they show a greater range of temperature than the others?—No, they did not in that particular instance; but I find from my own experience that a bale which is dumped generates heat quicker than a bale which is undumped.

15. Do you attribute that to the pressure or to the fact that the heat is imprisoned more closely?—It is a difficult matter to say. I am not prepared to express a definite opinion upon that.

16. Were the dumped bales of the same brands as the undumped that reached a temperature of 150°?—I think I had better look that up. [After looking up record] I find I am wrong about that bale of 150°—it was dumped; they were all dumped bales.

17. As regards the dumping in Lyttelton, we understand it is not the same as that in Wellington, where it is all dumped by the Harbour Board. At Lyttelton it is dumped in different sheds?—The principal dumping is done by the New Zealand Shipping Company and the Shaw, Savill, and Albion Company in their own sheds, and great care is exercised by their officials in watching for heated wool. In fact, I think it would be very difficult to suggest much greater care than they take. For instance, the storeman of the Shipping Company is a man who has had a great deal to do with wool for many years; but you take the height of the season when there are four thousand bales in their sheds, it is a difficult matter for a man to sample every bale; in fact, it is an impossibility. The same applies to the Shaw-Savill Company's shed; the men are careful there, but the danger is this: that a great amount of wool comes down here without ever going into the shed, also wool comes by steamers and small craft which lie alongside the Home boat, and is taken direct on board. In many cases I have found wool in a bad condition on board small craft. I may say this: that a great deal of assistance is also given by the captains of these small steamers, who, if they know a bale has got wet, would come and tell me, but that does not always apply.

18. As representing the insurance companies, you are satisfied that the inspection that prevails in these sheds is as good as you could expect it to be?—It is as good as you can expect it to be, but I do not think it is sufficient. It is as good as you could expect it to be with the staff there, but I do not think it is absolutely perfect.

19. Do you think an increased staff would mean increased security?—I can only point to the fact that during the period that supervision existed on behalf of the local underwriters we did not have the wave of fire amongst the ships that there has been during the last few months.

20. You mean the special man appointed by the underwriters?—Yes.

21. What was the method that obtained during his appointment?—I used to have a steel pricker with a barbed end, and put it into the wool and test it. I had another arrangement by which I had a thermometer inside, but that was a difficult matter, because, as a rule, in putting it into the dumped bale you break the thermometer. Another method is to put a mirror on a bale in a shed after it has been lying in the shed for a time. I have tested wool by moving it out on the floor, and if it is heated you will find a mark on the floor.

22. What steps do you take to ascertain the condition of the wool?—Sample the wool. I used to take a pricker with me, and I think it is practically the same thing that is used in most of the ports of the colony.

23. The inspector would not depend upon reports from the owners or men in the sheds?—Oh, no, he would make a personal inspection. The foreman or storeman would also draw the inspector's attention to anything that was suspicious—that is a great help.

24. From what you said I assumed you considered the water-borne wool is somewhat more risky than the land-borne. You mentioned something about coming by boat?—Yes.

25. You consider there is a greater risk with that than with the other?—It is more likely to get wet with salt water.

26. And do you think the salt water is more dangerous than the fresh?—Yes, undoubtedly I think so.

27. Have you ever had any instance from which you form that impression?—No, excepting by a little experiment that I made by wetting wool in a small way. I found that wool that was slightly damped with salt water and screwed up in a letter-press got heated quicker than that which was damped with fresh water.

28. With the same proportion of water?—Practically the same—it was a rough experiment.

29. Has it come within your experience whether wool with a small amount of moisture heats more rapidly than wool with an increased amount of moisture?—Well, no I cannot say that. The scoured or slipped wool that has come under my notice—that is, a heated bale—has not had a large proportion of water in it; it has had a moderate amount of damp in it.

30. It has been given in evidence that it is a very clever flockowner who can absolutely say that his wool is dry—that is, before it is shorn. Supposing such a condition as this, that the owner was in doubt, would you imagine that that wool would be dangerous—that is, the man being in doubt as to the wool being slightly damp, but not sufficiently so to make the owner positive?—You are speaking of greasy wool.

31. Yes?—It is a difficult thing to say. It is difficult to tell greasy wool that is damp, but if the moisture is as slight as that I do not think, myself, that the heat would be sufficient to cause danger; but it is a difficult matter for a man to tell whether wool is slightly damp or not.

32. Have you had any advices from London in reference to the fires on the wool-ships?—Not yet.

33. And you cannot give us any information as to those particular fires?—No. Those ships were loaded since the services of the underwriters' surveyors were dispensed with, and I have no knowledge in connection with it.

34. Then you were one of the surveyors?—I was the underwriters' surveyor here.

35. What led me to ask you the question as to how your inspection was conducted was from statements we had in Wellington that Captain Bendall, who was the underwriters' representative there, simply had to depend upon the storeman or the manager of the store to report to him when they discovered any bales?—Yes.

36. And from that I had not a clear idea as to the measure of inspection that you personally conduct yourself?—You see there the wool all goes to the Harbour Board shed. Here it goes to the New Zealand Shipping Company and Shaw-Savill Company; it is all centred in Lyttelton. At the time I am speaking of the Shaw-Savill Company's shed was, say, 500 yards from the New Zealand Shipping Company's shed, but it is further away now. The foremen and men in the shed were of great assistance, and always drew my attention to any doubtful bales of wool.

37. Do you consider that the inspection that you were able to make here was sufficiently satisfactory to yourself?—I can only point to results. It is absolutely impossible to sample every bale that comes to the port; but, at any rate, we were able to keep sufficient check on it.

38. Would you consider that one inspector would be able to do all that was necessary?—In Lyttelton I think he would.

39. Notwithstanding that the sheds were a quarter of a mile apart?—They are not so far apart as that; they are only a matter of ten minutes' walk now.

40. *Captain Blackburne.*] Did you inspect the wool that came on board the ships from over the side as well as from the sheds?—I used to make it a rule that a vessel arriving from the Chatham or Cheviot or Port Robinson, &c.—I made a practice to be there or thereabouts when a ship was loading, but if you had to see every bale that goes on board and sample every bale, it would take half a dozen men. I think, myself, that the co-operation given by the shipping companies in this matter is invaluable. There is another factor in the case: there is a large amount of sale-wool comes down direct to the ship. The extraordinary thing about it is—in connection with the heating of other cargo—that during the twelve years I have been surveyor I have never come across a hot bale of flax.—We have found flax in a damp condition, and had some difficulty in the early days in connection with wet flax coming forward. There was considerable trouble made about it by myself and others, and the result of it was that the shipping companies initiated a system of drawing a hank from the centre of every bale. I am under the impression that that is still done.

41. That is done by the Government Graders?—Yes, now; but previous to the Government Graders coming in, Mr. Dale, who was storeman down there, and myself have often gone over and examined hank after hank, but this does not apply to tow.

42. Have you ever found tow heat?—I have never come across a bale of hot tow.

43. It has been given in evidence that flax and tow do not heat dangerously from being damp?—From what I have found, when flax is wet and packed, it rots. It is the same with jute. I was for many years in the Indian trade, and carried many thousands of bales of jute. I have never found a hot bale of jute, but I have found them damp inside, and I think if wool was pressed to the same extent as jute was it would affect the fibre.

44. Do you think there is more danger in the case of wool and flax being stowed together than with wool alone?—Of course, with wool generating heat I think there is more danger if it is stowed with the flax.

45. Did you interfere at all in regard to the stowage of these ships?—We had stowage rules here, and the wool and other articles were separated by mats and dunnage.

46. You thought that was sufficient?—I do not like flax stowed on wool.

47. *The Chairman.*] Are not the mats somewhat combustible?—Very much so, especially if there is heat. I have not seen any cases where that has been the cause.

48. *Mr. Foster.*] Some fires have taken place from outside causes in ships in the colony—sometimes the men lighting pipes—and it has come under my notice that stevedores or shipowners whoever may be in control, find it extremely difficult and almost impossible to prevent these men doing so?—That is so.

49. Would you suggest that any legislation might be brought in to assist those who are interested in absolutely punishing the men who do it?—I would make it a criminal action.

50. You know these difficulties exist?—Oh, yes, undoubtedly.

51. Do you think it possible or within the range of probability that smokers may have dropped a match, and under somewhat peculiar circumstances, such as friction, and so forth, they may have started fires in wool-ships?—It is possible. I have not known of any case. It has been known in the case of cotton-shipments for matches to have been put into the cargo on purpose. Take the case of the "Gothic," she was very near her destination, or approximately so, when the fire broke out, and if a match had dropped there I think the fire would have taken place earlier. I find, myself, that the shipowners at the present day, with the rates cut down, are very anxious to get as much cargo into the ships as they can, and, speaking of the Port of Lyttelton, I do not think you could get wool better packed in any part in the world. It is stowed sufficiently tight to prevent any serious friction.

52. *The Chairman.*] You do not think there is any danger of friction in regard to the packs rubbing against one another?—Not the packs—I do not think so.

53. Well, of the bands?—It is only those bands that are crossed at the sides where there would be a possibility of the bands touching.

54. *Mr. Foster.*] And in that case there would be hardly enough to accumulate heat?—No; that is my personal opinion.

55. Have you ever known of the stowage of tallow on top of wool or hemp?—I knew of one case in a sailing-ship here once, when tallow-casks were stowed on end on an uncaulked 'tween-deck—that is the only instance I know of. I never saw it done in a steamer.

56. Supposing a steamer had a small amount of empty space and that tallow-casks came down at the last moment of a rush, do you think that they would put them on top of such a cargo?—It would be simply madness to do it, and I do not think any foreman of a shipping company would allow it; I have never seen it done.

57. And you would not credit it among men of any responsibility?—I think it would be a very regrettable action if it was so.

58. I think you know of the fire on the "Waimate" at Napier?—Yes.
 59. There was a quantity of wool taken out of her for reconditioning?—Yes.
 60. And I think it was scoured?—Yes.
 61. And, at any rate, after the scouring there was a considerable amount of tallow amongst it?—Yes.

62. Did you see any of that?—No, that was in Wellington, but I heard of it.

63. Could you give us any idea how the tallow got into the wool unless it was stowed on top of it?—The tallow may have been stowed in the 'tween-decks. I do not know the circumstances of that particular ship; but there was a large amount of tallow, I believe, found its way amongst the wool. The tallow may have found its way down through the hold. The "Waimate" has steel 'tween-decks: they are not quite tight, but they do not leak sufficiently to allow tallow to find its way down.

64. It is extraordinary that that should take place unless the tallow had been stowed on top?—That has not come within my knowledge.

65. *Captain Blackburne.*] You have heard of a bale stowed in the 'tween-decks alongside wool sometimes, separated, of course, with hurdles, and so forth?—You very often find tallow stowed butt to butt with wool, with dunnage between; but I do not remember an instance where the wing has been lined with tallow-casks and the wool stowed in the centre, and *vice versa*. In fact, if I had seen that I would have protested very strongly against it when I was the underwriters' surveyor.

66. Can you suggest any method by which shipping people can be protected against shipping wool in a dangerous condition?—One thing I would suggest would be the elimination from the Act of the word "knowingly"; and I would further put a heavy penalty on every owner that was responsible for the shipping of dangerous wool.

67. Make it a crime?—Yes. In connection with the "Auckland" brand which I mentioned, I wrote, "I would point out that the majority of the shipment appears to me to have been very inefficiently scoured and carelessly packed. Had the two hot bales not been found in the store of Mr. John Mill, there is no doubt whatever that in a very short period a serious fire would have occurred on board the 'Papanui.' I would point out in the strongest terms, to my mind, the criminal neglect on the part of the man who scoured this wool, and would strongly recommend the underwriters, in their interests, to push this matter to its extreme limits."

68. Is it not amongst the small fellmongers that you have the most trouble?—Yes. There has been more trouble amongst the small fellmongers than among the other people. In fact, the only cases I have known amongst the larger firms were the two I have already mentioned; but to show you the carelessness that exists, I was called in lately by the manager of an insurance company to survey some wool at Lyttelton. This wool had been stacked on sand or in a damp place, and the wool was actually mildewed, and the packs rotten with the amount of moisture—that is, the outside of the bale; the wool in the centre was dry. But this had been sent forward for shipment. If you wish particulars of that I will give them to you later on. Another thing in connection with wool: Within, say, the last six months, I have seen a ship lying alongside the wharf at Lyttelton loading wool in the pouring rain. Now, it was not a question of the amount of rain that fell on the wool from the time the truck was unsheeted until the wool was put into the hatch, but the amount of rain that was going down the square of that hatch on to the wool on the floor of the hatch; and, although it will take a considerable period of time for the water to find its way into the centre of a dumped bale, it does not take so long in a bale that is undumped, and even with a dumped bale, and the way the water was pouring down into the hatch, there would be quite sufficient moisture for the bale to generate sufficient heat, although I do not say it would come to combustion.

69. *The Chairman.*] It would facilitate other conditions?—Quite so. Then I have had reason to complain in past years in connection with sheeting. I have some correspondence here in connection with that matter, which I will read. There are two letters to the chairman of the underwriters: "28th November, 1895.—Two bales wool, mark and number as per margin, have come to hand in a wet condition. These bales are now in the Shaw-Savill shed, and have now been opened out to dry. I may point out that all the wool which has up to date come to hand in a damp condition has been from the railway, and has been caused by imperfect or defective sheeting of same." The next is, "29th November, 1895.—I wish to draw your attention to the large amount of wool that is coming to hand in a more or less damp condition. I believe the most of it is caused by improper and insufficient sheeting when loaded on the trucks. Two shipments of wool now in the New Zealand Shipping Company's shed, of which several bales are wet, is a case in point. Those marked 'J.N.' with numbers running from 1 to 36, all show (or nearly all) unmistakable signs of having been wet. Nos. 31, 5, and 2 are still wet. Those marked Nos. 1 to 22 are just the same, and Nos. 2 and 18 are still slightly wet. I am of opinion that they have got wet in transit, either by rail or wagon during the last rains, and have simply been dried or partially so, before sending on, by being left standing in a shed. I do not consider the above shipment a good line for insurance." That year was a very wet year down here, and we had a number of cases where the wool was damp in the trucks. Sometimes you would find wool come down and instead of the sheeting being tented it would be flat, and there would be a sag in the sheeting, and the water would lie in the hole of the tarpaulin and find its way through.

70. *Mr. Foster.*] Do you know whether that wool was loaded at a siding or at a flag station?—No, I did not have that information.

71. *The Chairman.*] The Railway authorities have told us in evidence that it is not the fault of the sheeting so much as the fault of those who cover the wool themselves at the side stations, who do not know how to do it properly?—Well, I have seen trucks of wool alongside the shipping companies' sheds in the act of being unsheeted, and the tarpaulins were sufficiently secure, but yet the wool was badly wet underneath.

72. There had been some sagging in the sheet, possibly?—Yes, and the water had percolated through.

73. *Mr. Foster.*] Might it not have got wet when being carried before being put in the trucks?—I think this lot came from Chertsey way, but I forget now; but there was sufficient evidence at that time to prove that it was through a defective tarpaulin. Of course, a number of instances have come within my knowledge where a road-wagon in transit has been upset in a river, and this wool has been put on the side of the road to dry, and, although the pack was apparently dry on the outside, the water had found its way further in.

74. Then, for general purposes, you would assume that when the Railway people get the wool it is in a good condition?—In that particular instance that I am speaking of, that was the only year that I found the trouble with the sheeting, and that was some years ago. Of course, no doubt there is a lot of carelessness at side stations and flag stations in the covering of wool, but in the case of wool from small steamers I have often found traces of sand in the pack where it has evidently been lying on the wet sand.

75. *Captain Blackburne.*] If wool was carried in a wagon without any tarpaulin on it, and it rained very heavily and then dried on the outside, and these bales were dumped, do you think that would be dangerous—would there be sufficient wet inside to become dangerous?—It depends on the amount of moisture. It takes a considerable time for moisture to find its way into the wool, but if a bale is undumped and is exposed to a steady drip and steady rain, the water will find its way sufficiently far in, and if it was dumped it would be sufficient to cause heat.

76. Of course, the bales would have to be dumped, and if they had been wet and then dried on the outside, do you think it would be dangerous?—I have very seldom found that where wool is exposed to moisture the moisture travels in more than three or four inches, but where exposed to a constant drip or stream of water, then it gets further in. And wool absorbs moisture very quickly. All the heated bales that I have found—I think I may say in every instance it has been caused by the damp in the centre of the bale, and not on the outside.

77. That would point to the fact that it was being baled damp?—Yes, baled damp. But there have been very few cases of greasy wool—very few indeed.

78. *Mr. Foster.*] Have you ever had to return many bales of wool to the owners for reconditioning in Lyttelton?—If wool is found in that condition it is examined. Although the owner has a right to say what he shall do with that wool, he generally accepted my verdict, and it is sent away to the wool-scouring works to be reconditioned. A great deal depends on the season; sometimes you will never find a bale of damp wool, and other seasons you will find a lot of it.

79. *The Chairman.*] Have you any experience of last year as to whether there was a larger quantity of low-class wool came in?—No, sir; I have not. My connection with the local underwriters had ceased.

80. But it did not come under your notice some other way?—No, it did not. I would not like to express an opinion upon that.

81. *Captain Blackburne.*] You were here when the "Beltana" came in?—No, that was before my time.

82. I think that was greasy wool?—I think that was so—I think the underwriters mentioned it.

83. And the "Strathgryffe"?—Yes, that was Australian wool.

84. It was stowed on wheat?—Yes.

85. Do you think any damp could have got out of the wheat?—No.

86. *Mr. Foster.*] If the wheat got damp it would have to be dug out?—Yes. I know that rape-seed heats as quick as anything does. I think it quite possible Mr. Denniston, Lloyd's agent in Dunedin, might be able to give you some information in connection with the matter. He was connected with the "Strathgryffe."

87. *Captain Blackburne.*] The fire originated in the lower hold close to one of the tiers of wheat?—Yes. I do not think there would be any possibility of the moisture from the wheat affecting the wool, and, besides, there would be a considerable amount of dunnage between the wool and the wheat.

WALTER HILL sworn and examined. (No. 52.)

88. *The Chairman.*] What is your full name?—Walter Hill.

89. You are a wool-buyer?—Yes.

90. You have had considerable experience in the matter of wool-buying and dealing with wool generally, and the Commission would be pleased if you would give them your experience as to the condition in which wool is shipped, and any special information in regard to these fires?—You, no doubt, have had a lot of evidence placed before you, but I do not know that I can give you much assistance with regard to how these particular fires have occurred. I know, of course, that wool with an excess of moisture will generate heat, but I do not think it is liable to fire through spontaneous combustion. I never saw it on fire, and do not think it will fire. It might generate sufficient heat to start a fire in some other combustible material adjoining it. I have seen it under all conditions after it has been through fire, and so hot that you could not put your hand on it, and my experience in that case has been that it has a tendency to melt away or decompose, but as to any sign of fire, I never saw any where heating had occurred.

91. You mean that the sole condition in which you have seen it has been in the form of a cinder or carbonised form?—No, more in the form of dried horse-dung. After heating it falls away, and the heat—I am giving you my own opinion—would seem to evaporate the moisture; it settles down, and when you pick it up it is merely dust. The wool is discoloured round it and yellow, and where I have seen that there is a cavity formed inside the bale.

92. How do you account for that cavity?—Simply by the wool melting away.

93. What becomes of it?—It seems to me that it is the moisture which has evaporated, because if you take wool in what would be called an absolutely dry state, scientists say it contains 18 per

cent. of moisture—that is, clean-scoured wool—and if, when clean-scoured, wool will carry 18 per cent., then what percentage of moisture does greasy wool contain?

94. Do you think that can be put down to spontaneous combustion—that is has simply been through the heat and evaporation of the moisture that has been in the wool?—If fire has been caused in wool it has been through the heat generated through the moisture, and coming in contact with a more combustible material, such as woolpacks, or the chances are it may be through wool and flax being stowed close together. Wool may be the indirect cause of the fire, but I think it is some other more combustible material that is likely to fire.

95. *Mr. Foster.*] Might it not be the woolpack?—Yes. The woolpack would also carry an excess of moisture—with greasy wool especially, because the moisture is always evaporating with greasy wool. If you get wool shorn in the height of the season, especially in the warm weather, the sheep seem to carry such an excessive amount of moisture that, almost under any conditions, from the time it comes off the sheep's back until that wool is finally dealt with, it is losing weight all the time—the moisture is evaporating.

96. And yet we are told that it is the experience of many shippers that the wool increases in weight between here and London?—That is scoured wool, not greasy.

97. And it has been referred to as greasy, too?—Well, the conditions are so varying that it might be so in many instances. My experience is this: that in the past, when getting wool from the colonies in sailing-ships, it was a regular thing to find bales weigh from 5 lb. to 10 lb. overweight, as against the colonial invoice weight, but since the days of steamers we have lost that overweight, and it is now a difficult matter for us to make a shipment weight out.

98. Supposing a number of very old greasy woolpacks were thrown together in a heap—the same as greasy sacks, we will suppose—would you imagine there would be any liability of those to spontaneous combustion?—I should imagine there was a probability, if they were thrown in a heap, and if water was thrown on to them; but as they came from the wool, I do not think so.

99. Then, from that, you think there would be no danger of spontaneous combustion in the case of greasy woolpacks coming together in a ship's hold?—I do not think so.

100. And that there would have to be something else before they could take fire?—Yes.

101. Do you happen to know whether there was a larger quantity of low-quality wool, such as locks, pieces, &c., shipped this year as compared with previous years?—No, I do not think a bigger percentage. We had a bigger quantity of wool offered in the colony than previously, but I do not think locks and pieces.

102. I mean, shipped in that condition?—Well, perhaps that might be so. If so, it was because of the increased competition which is coming to the colony. Continental firms are sending buyers here, and they are taking wool which an English buyer would only take in a scoured state. This class of wool has previously been scoured in the colony, but now a great deal of it is going out of the colony unscoured.

103. We have had that fact stated in evidence in Wellington, but we have failed to get anything to support it?—It is not that any greater proportion has been sold in the colony; it is because the Continental buyers come in and prefer this class of wool in the grease—locks and pieces—and they seem to give a better price for it than the local fellmonger.

104. You think there was a larger proportion of locks and pieces shipped last year than in previous years?—Yes, I think so, in grease.

105. Do you think the risk is greater, assuming the locks and pieces are damp?—I think, assuming they are damp, they would heat more readily, because there is more foreign matter in them. It is in the foreign matter where the heating takes place, but it is only so with regard to those bales shipped on account of local owners or local buyers. I should not think there is the slightest risk in the case of the foreign buyers. They are most particular with every bale they buy of that class to get to the centre; they turn almost every bale out of its pack, and get to the centre, to see that it is in a perfect shipping or reliable condition.

106. Do you personally buy any of these low-grade wools?—Yes, I do. As a rule, I manipulate them here.

107. After making your purchases at the wool-sales, what measure of inspection do you give them to satisfy yourself?—We never inspect for dampness. When we inspect we inspect to see whether the bales not shown are equal to those that are shown—that is, in regard to the point of quality more than condition. The measure of moisture is usually detected when valuing.

108. And if you do happen to detect any moisture, do you mark it?—I usually mark it "wet."

109. You do not value it?—If I bought that wool I should go and examine it very carefully afterwards, and if it was not in a shipping condition I would scour it. After having marked it "wet," I might buy it, but I should certainly buy it under its proper value, and if I examined it a second time and found I had only struck a wet patch, then I would probably let it go, thinking the patch would not harm the remainder.

110. At last year's auctions in Christchurch, or at any other place where you go, did you happen to notice any damp wool?—Yes, I think that last year we had a bigger percentage. Of course, we always have some, but we had a bigger percentage taking New Zealand all round. I think it was an unfortunate circumstance that, in many cases, before the catalogues for sales were issued we had wet weather, and consequently the sheep were shorn before the wool was in a fit condition to shear.

111. You think the sheep were shorn in a hurry to catch the sales?—Yes.

112. In the case of large lines of wool—take a clip, is it customary to show the whole clip or merely samples?—There is no rule for showing samples, but if we had a clip containing six or eight different classes, and fifty bales in each class, then they would probably cut ten or fifteen open of each class. We have the option to cut others open.

113. There are not only the samples exhibited: they stock the whole line and open up some?—Yes, they stock the whole line, and perhaps open up ten bales in each class.

72. There had been some sagging in the sheet, possibly?—Yes, and the water had percolated through.

73. *Mr. Foster.*] Might it not have got wet when being carried before being put in the trucks?—I think this lot came from Chertsey way, but I forget now; but there was sufficient evidence at that time to prove that it was through a defective tarpaulin. Of course, a number of instances have come within my knowledge where a road-wagon in transit has been upset in a river, and this wool has been put on the side of the road to dry, and, although the pack was apparently dry on the outside, the water had found its way further in.

74. Then, for general purposes, you would assume that when the Railway people get the wool it is in a good condition?—In that particular instance that I am speaking of, that was the only year that I found the trouble with the sheeting, and that was some years ago. Of course, no doubt there is a lot of carelessness at side stations and flag stations in the covering of wool, but in the case of wool from small steamers I have often found traces of sand in the pack where it has evidently been lying on the wet sand.

75. *Captain Blackburne.*] If wool was carried in a wagon without any tarpaulin on it, and it rained very heavily and then dried on the outside, and these bales were dumped, do you think that would be dangerous—would there be sufficient wet inside to become dangerous?—It depends on the amount of moisture. It takes a considerable time for moisture to find its way into the wool, but if a bale is undumped and is exposed to a steady drip and steady rain, the water will find its way sufficiently far in, and if it was dumped it would be sufficient to cause heat.

76. Of course, the bales would have to be dumped, and if they had been wet and then dried on the outside, do you think it would be dangerous?—I have very seldom found that where wool is exposed to moisture the moisture travels in more than three or four inches, but where exposed to a constant drip or stream of water, then it gets further in. And wool absorbs moisture very quickly. All the heated bales that I have found—I think I may say in every instance it has been caused by the damp in the centre of the bale, and not on the outside.

77. That would point to the fact that it was being baled damp?—Yes, baled damp. But there have been very few cases of greasy wool—very few indeed.

78. *Mr. Foster.*] Have you ever had to return many bales of wool to the owners for reconditioning in Lyttelton?—If wool is found in that condition it is examined. Although the owner has a right to say what he shall do with that wool, he generally accepted my verdict, and it is sent away to the wool-scouring works to be reconditioned. A great deal depends on the season; sometimes you will never find a bale of damp wool, and other seasons you will find a lot of it.

79. *The Chairman.*] Have you any experience of last year as to whether there was a larger quantity of low-class wool came in?—No, sir; I have not. My connection with the local underwriters had ceased.

80. But it did not come under your notice some other way?—No, it did not. I would not like to express an opinion upon that.

81. *Captain Blackburne.*] You were here when the "Beltana" came in?—No, that was before my time.

82. I think that was greasy wool?—I think that was so—I think the underwriters mentioned it.

83. And the "Strathgryffe"?—Yes, that was Australian wool.

84. It was stowed on wheat?—Yes.

85. Do you think any damp could have got out of the wheat?—No.

86. *Mr. Foster.*] If the wheat got damp it would have to be dug out?—Yes. I know that rape-seed heats as quick as anything does. I think it quite possible Mr. Denniston, Lloyd's agent in Dunedin, might be able to give you some information in connection with the matter. He was connected with the "Strathgryffe."

87. *Captain Blackburne.*] The fire originated in the lower hold close to one of the tiers of wheat?—Yes. I do not think there would be any possibility of the moisture from the wheat affecting the wool, and, besides, there would be a considerable amount of dunnage between the wool and the wheat.

WALTER HILL SWORN and examined. (No. 52.)

88. *The Chairman.*] What is your full name?—Walter Hill.

89. You are a wool-buyer?—Yes.

90. You have had considerable experience in the matter of wool-buying and dealing with wool generally, and the Commission would be pleased if you would give them your experience as to the condition in which wool is shipped, and any special information in regard to these fires?—You, no doubt, have had a lot of evidence placed before you, but I do not know that I can give you much assistance with regard to how these particular fires have occurred. I know, of course, that wool with an excess of moisture will generate heat, but I do not think it is liable to fire through spontaneous combustion. I never saw it on fire, and do not think it will fire. It might generate sufficient heat to start a fire in some other combustible material adjoining it. I have seen it under all conditions after it has been through fire, and so hot that you could not put your hand on it, and my experience in that case has been that it has a tendency to melt away or decompose, but as to any sign of fire, I never saw any where heating had occurred.

91. You mean that the sole condition in which you have seen it has been in the form of a cinder or carbonised form?—No, more in the form of dried horse-dung. After heating it falls away, and the heat—I am giving you my own opinion—would seem to evaporate the moisture; it settles down, and when you pick it up it is merely dust. The wool is discoloured round it and yellow, and where I have seen that there is a cavity formed inside the bale.

92. How do you account for that cavity?—Simply by the wool melting away.

93. What becomes of it?—It seems to me that it is the moisture which has evaporated, because if you take wool in what would be called an absolutely dry state, scientists say it contains 18 per

the wool we got had to be put into ovens to warm the bales to get them to open up. It struck me that these wools were all packed wet.

130. Have you ever had any impression or given any thought to sheep-skins as a source of danger?—No, I do not ship many sheep-skins. I have seen a lot of sheep-skins in England, but they seem to me that if the usual care is not taken in drying them, they come out more mildewed than anything else—the wool is discoloured; but I do not know that I ever saw any bale damaged by fire, and yet there must be a considerable amount of moisture in sheep-skins.

131. In the case of country skins there is a considerable amount of moisture about the neck and points: would you consider that any danger?—No. Well, of course, I have never had any experience. I have never heard of much trouble with sheep-skins. I have known skins that have been shipped, and very few bales sold as damaged.

132. Evidence was led in Wellington in regard to the conditions under which sheep-skins are now bought and shipped, and that some years ago they used to be very careful to take off the ears and shank-pieces, while now, I understand, that buyers take anything, and therefore they are not as careful?—Well, I do not know. I cannot imagine that any one sending sheep-skins away would send them away in that condition, unless they are sold before they are shipped. If they are sent on consignment to sell, it seems to me the best thing for any one to do it to get them up in a proper manner. I cannot understand a man sending sheep-skins away in a bad condition, on the off-chance that the buyer might not see the faults.

133. It was stated that the buyer received orders for them, and therefore all buyers in Wellington for further orders did not trim off?—I know some buyers are apt to do certain things which you cannot account for. I am of the opinion that they are considered legitimate game for any one who can get at them.

134. *Captain Blackburne.*] Do you think there is any danger from the chemicals used in slipe wools?—No, I do not think so—not slipes. I can only speak for my own case. I do not see where the danger can arise, if you use ordinary care and use sodium and lime—the two will not work unless properly mixed—the lime if not properly slaked would burn the skin. Most of the wool, in cases where they do not scour it, is kept about for a long time, so that a great proportion of the lime would come out of it. In most cases it is shipped in a better condition than when pulled: some is scoured, and is then in a better shipping condition than this slipe wool.

135. *Mr. Foster.*] What is the chemical?—Sulphide of sodium and lime.

136. Do you know any other combination?—There are other preparations. Before sulphide of sodium and lime they used sulphur.

137. Would you say that now practically no one uses anything else but sodium and lime?—Yes, practically. There may be a few who do not use that or anything else, but simply sweat the skins and hang them in a sweating-room.

138. When your skins are pulled you take off the trimmings?—The skins are trimmed before the chemical is put on, and afterwards the skin is put over a beam and the wool taken off. The clean wool—the back and down to within a couple of inches from the edges—is put into proper classes, and then the edges are run off on to the floor, and those are washed afterwards.

139. I mean the trimmings of the skin: what do you do with those?—We usually allow them to lie, and put them into heaps about 12 in. thick to generate heat, which releases the wool from the skin-pieces; we then pull the wool away from the skin and bury the skin, washing the wool and shipping it, as scoured wool.

140. And that wool, of course, could not be termed slipe wool?—No. I dare say it is termed “slipe wool,” but it is not slipe wool—it is pulled wool—pulled from the sweated pieces.

141. To call it “slipe wool” is wrong?—Yes.

142. In trimming the wool that has this chemical on, you do not take any skin with it?—No. I said, to call this “slipe wool” is wrong: it is not wrong; “slipe wool” is any wool which is slipped off the skin, so that, strictly speaking, any wool pulled off the skin is slipe wool; but, as we understand the term, “slipe wool” it is wool slipped with chemicals.

143. Of course, it is the general acceptance of the term that I wanted to get at?—Yes, the general acceptance of the term is that it means wool taken off by chemicals.

144. As to the wool that has chemical on, there is no skin amongst that?—There cannot be any skin in the wool that is taken off if the skin is painted with the chemical, because if it will not come off with a man rubbing it, it is left and taken off later with a knife.

145. What becomes of the skin from which you pull the wool after having sweated it—the first trimmings: do you make glue-pieces?—No, I bury them all.

146. There are no glue-pieces shipped?—I do not know of any. We have glue-works close to us, and they take them from us.

147. You do not export it?—No.

148. Supposing that in a bale of slipped wool there was a proportion of skin with it, and, of course, the presence of moisture, would you consider that an added danger?—It is an added danger, but it would have to be a very big quantity to materially affect it. One piece would not affect it, and it would be only rare pieces that got in. If any danger does arise from slipped or scoured wool, it is likely to arise in the winter-time where the wool is dried outside, and where they do not have the machinery, or it may happen where they have artificial appliances. Owing to its liability to attract the moisture from the atmosphere, it is a very difficult matter to get men who are able to tell when wool is in a fit condition for shipping. I have frequently put my hand into the bin when seeing the men packing the wool, and said, “This wool is not in a fit condition.” I might find there was an excess of moisture, or I might find it had not been cooled after coming from the drying-machine. I should then tell them to let it lie on the floor for an hour or two, to let the heat get out. If it was excess of moisture, I should have it put back into the bin to dry, or cool, and then leave it for, say, twenty-four hours, and then see what it is like. I have often found a wet patch which generally, when put back, has afterwards been found in perfect condition.

149. Would you consider that wool coming off a drying-table would be dangerous—the wool being dry?—I could not express an opinion as to whether it is. That is one of the things I have guarded against—packing hot wool. It is the prevailing idea that if we do get wool into the pack hot, and there may be a little moisture in excess, of normal—that heat helps to absorb it and makes the heat leave it. If we get some that we term over-dry, and some that is not as dry as it ought to be, the two things equalise, and the fact of leaving it for twenty-four hours puts it in perfect condition. I should say that the fact of packing wool hot would tend to damage it; but not to fire it. I have not had any fear of it firing—my fear would be in regard to the discoloration of the wool.

150. Would you think that wool packed hot, and at the same time being dry, could increase in temperature?—No.

151. It would go down?—Yes.

152. That is to say, hot wool would require moisture to enable it to get hotter?—Yes.

153. *The Chairman.*] Do you know of any precautions that might be taken, but which would not be taken for fire, in order to preserve the quality of the wool?—That is, from my point of view? Not as a user, nor to save insurance; my precaution would be to save any damage occurring to the wool which would interfere with its ultimate use for the most profitable purpose. Knowing that excess of moisture will discolour and destroy the fibre, I should have it dry and cool.

154. *Captain Blackburne.*] In your experience as to the “Strathgryfe” wool, do you think that fire originated from some outside cause—smokers?—I never thought of that; but it has struck me that the ventilation on board ship might have something to do with it. I have seen, when travelling at sea, people put their heads into the ventilators and light their pipes. I should think that in all cases where wool is concerned in a fire, some outside cause is really responsible for the fire. I do not think wool would blaze. You could put a light to a mass of wool, and it would burn so far as the fire can reach it, but no further.

155. Do you know whether there was any flax alongside the wool in the “Strathgryfe”?—I do not know what was alongside it. I only saw the wool outside the ship, and bought a quantity of it. With regard to the “Waimate” fire at Napier, I was called in to see some wool that was reconditioned there. I examined it on behalf of the underwriters at Napier at the time—some thirty or forty bales which had been reconditioned. After being reconditioned the wool was saturated with tallow—after the wool was supposed to have been scoured. They had not got the tallow out. Some of that wool was subsequently shipped, and when it got to Wellington it had to be scoured again—I think through the tallow being melted on the ship. It was stated at the time that she was practically red-hot, and had to be put down to the water’s edge. It struck me that if they had to flood her it would bring that tallow up to the top, if it was at the bottom.

156. I should hardly have thought that possible, because if there was tallow and water together, the water would have a better chance of getting inside than the tallow would?—Yes, but if we take a bale with tallow on it and give it to an incompetent person to handle, he opens his wool out, and, not knowing how to get the tallow out, perhaps puts it into hot water, which spreads the tallow all over the wool, and this is what happened at Napier: they put the tallow and wool together and spread the tallow through with the process of trying to get it out. I do not mean to say the tallow is likely to go through a dump of wool, because some bales came out of the ship into which the water had not penetrated more than 6 in. There must have been a tremendous heat in that ship when they put the water in, my theory being that the water would get hot and float the tallow.

157. And they would have to flood the hold?—I think they did flood her, and almost put her under water. I only speak with regard to that I was called in to see. That was my opinion—that they had a proportion of tallow on the bales, and that the scourer had simply put the whole thing into water and saturated the whole of the wool with tallow. She had water pumped into her.

STEWART HENRY WILLIS recalled. (No. 53.)

158. *The Chairman.*] Do you wish to make a remark?—Yes. In connection with the heating of wool from the inside. I have in several instances found scoured wool from external appearance show no sign of moisture or heat, but through putting the tester in I found the bale was warm. When we cut the bands of that bale the wool had been so dumped that, instead of the wool springing apart like a concertina, the bales remained together, and the wool was packed in flakes. Now, there was no heat at either end of those bales, but between the two bales when you separated them you could not bear your hand there. I think that proves the fact that the heating of wool commenced in the centre of the bale where most of the moisture is. Both these bales had been very wet.

159. *Captain Blackburne.*] Yes, we had a good deal of evidence in that direction?—It seems to me quite clear that any heating that does occur takes place in the centre. As regards the wool burning in those two cases of the “Pitcairn Island,” there are other men who saw these bales as well as myself. The heat was so great that you could not bear your hand near them, but they were not flaming. They looked like so much molten pitch, and had shrunk in size. There was no flame. I had some of that wool afterwards, and, as a matter of fact, I think Mr. Bennett did the same thing as an experiment. Whether the heat generated inside had eliminated the moisture entirely from it I could not say, but when I put a match to that wool it went like a flash of gunpowder. You take ordinary greasy wool or scoured wool and it will not do that.

Mr. Foster. It is a matter of temperature.

WALTER HILL recalled. (No. 54.)

160. *The Chairman.*] Do you wish to make a remark?—Yes, I have one statement to make. Captain Willis said he would make it criminal to hold a bale of wool if it was found in a heated condition.

Captain Willis: I said the "owner."

Witness: If that recommendation was adopted it would place some of us in a very awkward position, because I ship from twenty-five to thirty thousand bales a year, and I never have anything to do with the packing of twenty thousand bales of it, and it would be a very awkward position to place me in. I own it at the time you find it. If you make it criminal for the man that has packed it, I agree with you every time.

Mr. Foster: That is practically what Captain Willis meant.

Captain Willis: That is really my meaning. I did not mean that Mr. Hill should be made responsible for the sins of the other people.

Correspondence between the Canterbury Frozen-meat and Dairy-produce Export Company (Limited) and the Railway Department, Christchurch, put in, and marked Exhibit No. 17.

Letter from Walter Hill, dated the 5th September, 1906, relative to damaged wool, was put in, and marked Exhibit No. 18.

Copies of survey reports (three) by Captain Stewart Willis, Lloyd's surveyor, were put in, and marked Exhibit No. 19.

Extract from letter from Shaw, Savill, and Albion Company (Limited), dated the 30th June, 1906, was put in, and marked Exhibit No. 20.

Copies of letters written by Captain Stewart Willis, relative to damaged wool, were put in, and marked Exhibit No. 21.

FREDERICK WAYMOUTH sworn and examined. (No. 55.)

161. *The Chairman.*] What are you?—I am managing director of the Canterbury Frozen-meat Company (Limited).

162. The Commission will be pleased to hear any suggestions you have to make relative to the possibility of tracing the cause of the fires on wool-ships?—I cannot make any surmise as to the cause of the fires; it has only occurred to me that I might say that I think it is more a matter for proper supervision before shipment. This, I think, is most desirable in the interests of life and property. I think provision should be made that no wool shall be shipped unless it is known to have been baled for a certain length of time, when any possibility of heating will have passed or the heating will have been detected. I agree with Mr. Hill that wool will not burn so as to set fire to itself, but it will generate sufficient heat to cause charring, and to cause the baling to catch fire. As far as my own company is concerned, we take every precaution; we send on an average ten thousand bales of wool a year, and we never have a bale sent back owing to its being out of condition—excepting in the case of it being damaged on the railway in transit. Our fellmonger (Mr. Ellis) is here, and can give you more information on the subject, perhaps, than I can. Our account sales of wool sent to London invariably show a greater weight than those at which the wool is shipped, which will be proof sufficient in itself that the wool is perfectly dry when shipped, as it invariably gathers weight on the voyage.

163. *Mr. Foster.*] Have you had any wool in the late troubles?—Yes, in the "Gothic," "Rimutaka," "Waimate." We ship in such large quantities from both here and Timaru that it is possible we have some on each vessel leaving these ports.

164. Have you heard anything as to the damage to that wool?—None. The only reference we have had to our wool is that which we see in the catalogues. I have a letter from our brokers, who advise us of the sales of the wool *ex* "Gothic," in which they say, "We may mention that the wools per 'Gothic' in this catalogue were in perfectly sound condition, and showed no external signs of any deterioration through smoke, water, or other cause, while, as far as we could see, the interior of the bales was also in good order."

165. What was the brand of that wool?—"CFM" within a rhomboid, and various side marks indicating the names of the owners. I do not know if you have seen the catalogues of the damaged wool *ex* "Gothic." She is the only one which shows damaged wools, "smoke," "fire," "water," and "tallow." We received the catalogues by the last Frisco mail. I have a copy of that catalogue here which I will hand to the Commission if it would be of any use. [Catalogue handed in.] I would like to refer to one matter which you mentioned just now—that was as to the railway damage. I have recently had one case of wool being damp in transit, and this, to a large extent, is due to the fact that they make us put so many bales in a truck; the consequence is that we cannot form a slanting top, but are obliged to form a flat one, and the result of that is that heavy rain causes the sheeting to sink in the centre and the wet drips down between the bales, and that causes damp wool.

166. Is it compulsory on you to put a given number in each truck?—They have a regulation which compels us to put a given number in each truck.

167. If you have not a certain number, what do you do?—Well, in that case you have to send an ullage truck; but if you have a hundred or two hundred bales, they only supply you with so many trucks to take that quantity, which you must specify. A certain number of trucks only are sent.

168. And it is compulsory to stack them in a certain way?—Yes. Mr. Ellis can describe the method more clearly than I can. We have recently been in correspondence with the Railway Department on the subject, and the outcome of that is that they have given us authority to depart from the regulations in wet or doubtful weather, so far as Fairfield, Ashburton, is concerned.

169. Have you that in writing?—Yes.

170. Will you produce that?—Yes.

GEORGE ARTHUR ELLIS sworn and examined. (No. 56.)

171. *The Chairman.*] What are you?—I am manager of the Canterbury Frozen-meat Company's Fellmongery-works at Belfast.

172. What experience have you had of the business?—I have had twenty-seven years' experience.

173. Can you detail to us the system by which you carry out your fellmongery? How do you receive the wool in the first place?—First of all, we take the skins from the freezing-works; they are treated with sodium and lime to take the wool off, and when this has been done they are slipped. The wool is then dried in the driers, and then put in the loft for three days.

174. That is, after it comes from the driers?—Yes. It is then placed in the sheds for about three days—in fact, in some instances, it remains for as much as four months before going away. Ultimately we send it to be dumped.

175. Who bales it?—We do. We have men baling it in the works. It is packed up there.

176. What is the minimum of time within which you bale up the wool after it comes from the driers?—From two to three days is the shortest time. We never bale anything with heat in it.

177. What is the minimum time for cooling it down?—Not less than two or three days.

178. You never bale it in one day after passing through the driers?—No, never.

179. Could it be cooled down in one day?—If it was opened up it might cool down in that time, but you would have to turn it to assist it in doing so.

180. *Mr. Foster.*] Do you fellmonger many besides factory skins?—All on commission. We do not own an ounce of wool in the place.

181. You do not take butchers' skins?—No; purely factory skins. For shareholders we take skins from their stations and work them.

182. Have you had any trouble in the nature of your wool being returned to you?—No, never.

183. How long have you been at Belfast?—Twelve years. And during that time the only wool I have had damp was some we had from the "Oswestry Grange," which was wet in transit.

184. Have you any assurance that it was wet in transit?—There is no doubt about that. It was wet through the sheeting; that was at the same time as Mr. Hill's wool was damp. That was the first wool we have had damp.

185. Have you had any advices as to the condition of any of the wool arriving in London *ex* "Gothic"?—We had advice that it arrived in good condition. I only know by the letter which you have heard read.

186. Was all your wool *ex* "Gothic" absolutely sold?—I could not say for certain. No, some was withdrawn.

187. It was all offered?—Yes.

188. Your brand is "CFM" in a rhomboid?—Yes.

189. You have not heard that one bale of that, at any rate, suffered from fire?—Not officially.

190. Why not officially?—Well, not officially.

191. Do you know otherwise?—Only from what I heard in the street.

192. Do you know?—No, I do not.

193. How do you treat your skins for fellmongery purposes? You heard what Mr. Hill said: do you follow the same process exactly?—No, we dolly them first before painting them.

194. After that you follow the same process?—Yes, we paint them after we have dollied them.

195. You trim them to take off all the bloody parts, then you wash them and sweat them in order to take the wool off them?—Yes.

196. How would you describe the wool from bloody parts when it becomes baled?—With the brand and a letter. In the invoice of the shipment the quality would be described as scoured pieces.

197. You would not put on the specification 'sliped wool'?—No, that is washed stuff.

198. Are you always careful to avoid putting any pieces of skin or fat in with that?—Yes.

199. There is no likelihood of its getting in?—No, not with ordinary care. At least, there is not supposed to be any.

200. What supervision is there to correct any possibility of its getting in?—I see to it. We have men taking it off and picking it over, and we have it picked over again when it has gone through the scouring-machines.

201. Are you satisfied that this supervision is sufficient to insure nothing passing through which should not?—Yes. We have put through fifty-one thousand bales, and have never had any trouble yet. That speaks for itself.

202. You use only sulphide of soda and lime?—Yes.

203. Do you know of any other chemicals being in use for the purpose?—I do not know of any being in use. They have been trying ammonia and other things, but it has been found to be too slow.

204. *The Chairman.*] Why try them if they were too slow?—We did not know that they were too slow till we tried them.

205. Was there any trouble with your present process?—No, we thought this new process might be an improvement.

206. And you were not satisfied with the new process?—No.

207. Had you any wool marked "CFM" over "Bramdean"?—Yes.

208. Is that your own mark?—No, it is "CFM"; the "Bramdean" is the owners' mark.

209. Would that be from frozen skins?—Yes.

210. Do you remember the description of any wool of that brand shipped per "Gothic"?—Mostly lambs' wool that I can remember.

211. Do you remember if any of it was dirty?—It was nice clean wool, as fine as we turn out. I suppose that "Bramdean" wool had been about the place for some considerable time. We started on it on the 3rd January.

212. The parcel I refer to was shipped by the "Gothic"?—Yes, that was the shipment we made. I think she left here about April. Some of that wool was in the place for about four or five months. We started freezing in November, and the first of that wool we got would be about

December. It would be in hand from about December to April. It came in early—about January—and was stacked in our store most of the time I have stated. The bulk of it was made in January and February.

213. *Mr Foster.*] You held it until the whole parcel was ready to go forward?—Yes, the owner is a man who does not like to split his shipments.

214. *The Chairman.*] It seems peculiar he should hold it so long in view of prices being so high?—He perhaps thought they would go higher. He usually does hold it. Our instructions are to hold it until the whole parcel is ready.

215. *Mr. Foster.*] How many bales would there be approximately?—Somewhere about a hundred, I should think.

216. *The Chairman.*] Can you understand how it is that a large proportion of these fires—so far as we have been able to trace them—have been attributed to slipped wool shipped from this port—Lyttelton?—No, unless it is due to packing the wool hot from the machines. I do not think any one can tell whether the wool is dry or not if it is packed straight from the machines.

217. You are a fellmonger?—Yes.

218. The wool is heated up to a certain point. When do you pack it?—Not earlier than three days.

219. How do you arrive at the length of time it should be left to cool down?—If it is half-bred wool it will be right in two days if it lies light in the bins. The Lincoln and Leicester, and such wools of long coarse fibre lie solid, and you cannot cool them down so rapidly, and you require to leave them there for three or four days.

220. But some of it might be cooled in forty-eight hours?—Yes, from forty-eight hours to three days. We generally make a practice of packing after three days.

221. Do you pack the long and fine wools together?—No, they are classed as they come off the skins. The men who slipe are wool-sorters, and the wool is classed by them as they take it off the skins.

222. Do you ever take into consideration in classing this slipe wool whether or not it will be liable to fire?—I do not think, myself, wool will reach a state of firing.

223. Do you ever consider that if the wool is packed up hot it may be liable to fire?—We never think of that. I would never pack it unless I was sure it was all right.

224. Why make sure then?—Because it might heat. By heating it would lose its colour.

225. It never enters into your calculations that it might fire?—No, that never enters into my head. We never pack it if it is not right. I know that it will not burn.

226. Will a pack burn?—The heat might be sufficient to burn the woolpack.

227. Still, you say wool will not burn?—I say it will not blaze. It might char. I have never seen it fire.

228. Then, how does it come about that vessels have been burnt?—That is what I want to know.

229. Then you are wrong about your theory that it will not burn?—I do not think so. During all my experience I have never seen wool burning. I think the heat which the wool might generate might be sufficient to start flax or tallow.

230. We have sufficient evidence to tell us that flax in itself will not cause the fires. We are perfectly satisfied that the flax will not spontaneously ignite of itself. It will burn extraneously. As that is so, do you not think that wool will provide that extraneous heat sufficient to cause flax or other such material to burn?—Yes, because I have always been of the opinion that wool would get hot enough to cause tallow or flax stored close to it to fire. It will char, but it will not burn. It will char and go like a lot of tar. I have seen a place on fire, and hundreds of bales in it on fire, but the wool would not blaze.

231. Do you say an opened-up bale will not blaze?—It will not blaze, it might char but it will never blaze; I am certain of that.

232. What makes you certain?—I have seen it. I have seen a place burned down with some four to five hundred bales of wool in it, but that wool would not blaze. The fire was all round it, the building was burnt, but the wool was only charred on the outside.

233. Do you contend that there is no such thing as spontaneous combustion in wool-bales?—Not the wool itself. I do not think so; it will char in the centre, but not blaze.

234. Is that not a distinction without a difference?—I mean it will not blaze up—the wool will not burn.

235. Do you think it will burn enough to set other things afire?—Yes, that is what I say. It might set flax or tallow on fire, but you cannot make wool itself blaze.

236. What about the woolpack around the wool?—Yes, the wool-bale will burn.

237. *Mr. Foster.*] Will you say that wool will not blaze of itself?—I do not think so.

238. Suppose you heat some wool up to a certain temperature, and apply a light to it when at that high temperature, do you not think it will then burn?—No, you will make it char.

239. I think it is quite a matter of temperature. I quite appreciate what you say?—The only way you will make it blaze is to keep putting small portions of it on the fire.

240. That is the point—at a certain temperature it will burn?—But the bales are pressed.

241. But when you make the statement that it will not burn it goes forth as a statement of fact?—I am talking of packed wool.

242. You were asked if it would burn—if it would blaze. Supposing the pack is burnt, and the bands set free with a high temperature in the hold of a ship, do you mean to say that the wool would not then blaze?—I do not think it would.

243. *Captain Blackburne.*] We have had several witnesses who have said they have seen it blaze?—They might have had experience that I have not had.

244. *Mr. Foster.*] Then, your opinion is only based upon what you have actually experienced?—Yes. I have seen wool put into a bale from the wool-drier at a temperature of 120° and bound very tight. I have seen it get very hot and char in the centre, but I have never seen it blaze.

245. Do you mean that it will smoulder?—The grease would cause it to do so. My experience has been of merino wool with grease in it. The wool I have in my mind was not damp at all; it was simply the grease in it.

246. Then, from that, you would infer that the same wool packed in the greasy state would acquire an increase of heat?—If dry without any heat? No, it would never have got hot.

247. If the grease would not increase the heat on the one side, how do you account for it being so in another?—I do not know. If you get merino out of the drier and try to pack it up you would find it. I had to stop it at once.

248. Would it have burned in the pack?—It had started to char.

249. You were satisfied that it was thoroughly dry. You know grease itself is dangerous without moisture?—Yes, merino slipes are dangerous.

250. *The Chairman.*] Do you still say that you have never seen wool flame?—No, I have not.

251. Have you ever heard of it burning on board a ship?—No, I have had no experience of ships.

The Chairman: We have evidence that it will.

252. *Captain Blackburne.*] Even after being buried in the sea for three or four days it burned when opened out?—My opinion is that it will not flame. It might be like a hot ember, but I do not think it would flame. I know that it will char, but not blaze.

253. *The Chairman.*] Do you know that wool is the worst conductor of heat. Then, where is it going to get the heat from to cause the fires?—I do not know.

254. Do you think it is friction between two bales?—I do not think it is.

255. Wool will not conduct heat; it is the worst conductor of heat known: then, as we know that it has generated great heat, in spite of its non-conductivity, will you still maintain that it will not of itself burn? We have had evidence of instances of cargo bursting into flame immediately the hatches have been removed?—I do not know anything about that. I have never seen wool blaze, and therefore conclude that it will not. I am pretty sure it will not blaze.

256. *Mr. Foster.*] Do you think you would like to test it?—Yes, I will do that.

257. Put it into the oven in place of your dinner, and when you have thoroughly heated it apply a match to it and observe the result. I think it will satisfy you?—It would if I saw it blaze. I do not like to admit that it will until I have seen it.

258. It will require to be a high temperature—a pretty hot oven. My impression is that it will burn, and the evidence is that it does?—As far as we can do it we will make any test you like, for we are ready to help the Commission in any shape or form.

259. Will you put up some wool damp, press it, and try to burn it?—Yes, we will do that for you. We will put up a bale damp and put it out of the road. I will require to see it blazing before I will believe it.

260. *Captain Blackburne.*] One witness told us that his store was afire, and, although wool is rather difficult to start burning, he said that when it did burn it took more to put it out than most material?—Yes, it is charring all the time, and the wool is melting. Dampness in greasy wool will produce heat.

WILLIAM WOOD sworn and examined. (No. 57.)

261. *The Chairman.*] What are you?—I am a merchant—a shipper of wool, flax, and tallow.

262. You understand the object of this Commission. We shall be very glad if you can throw any light on the question before us?—I have been a shipper of wool for over twenty years, and we have had occasional fires on different ships, but the fires have been more frequent this last year than previous years. If you remember, the "Turakina" was on fire at the wharf at Lyttelton—that was not long ago. There are a certain number of fires every year—

263. That brings us up to the question. Can you give us any idea as to why these fires should take place every year?—I think that in those ships carrying flax, and tow, and wool, we have had examples of them burning alongside the wharves.

264. Are you going to put it down to flax? Because, if so, I can tell you that, so far as the evidence has gone, it has shown that since the grading of flax was inaugurated there has been none of the fires attributable to flax?—I do not contend that it is the cause, but where ships are burnt alongside the wharf, I think there is no doubt it is due to carelessness on the part of those stowing the flax. It is only a little time ago since there was a vessel burnt in Lyttelton. There was one of Mr. Scales's ships afire at Wellington.

265. We have gone into all those fires, and there is no case of the fires being attributed to spontaneous combustion in the flax?—I do not think flax will burn from spontaneous combustion.

266. No, nothing has been traced to spontaneous combustion of flax; there may have been extraneous fires, and fire may have been caused by other agencies?—By smoking particularly.

267. *Mr. Foster.*] Do you think there is a special risk in that respect?—Yes, because smoking alongside flax would be an extraneous risk.

268. Do you wish to draw the attention of the Commission particularly to the danger of men smoking while loading flax?—Yes, I should like the Commission to take special note of that, and, if possible, make it criminal for any man to smoke in the hold of a ship while he was employed loading flax or tow.

The Chairman: Go further, and prevent any one smoking on the wharves.

269. *Mr. Foster.*] No?—The difficulty is that these men are paid for doing certain work, and instead of doing that work they are sometimes smoking.

270. Before invoking the assistance of legislation to prevent this, would it not be as well to ascertain if it could not be prevented by the employers of these men?—A shipmaster cannot prevent it. I suppose that with proper supervision it might be minimised to some extent, but if you sack a man how are you going to get your ship away to time.

271. Before you seek the aid of the Government and legislation, is it not desirable to endeavour to show that the employers themselves cannot prevent it, and that it calls for that intervention?—If you sack the men for smoking you will have no other men available for loading your ships.

272. Might it not be similar to the regulations in an ammunition-factory, where the men are compelled to leave their pipes, matches, and tobacco in a certain place outside the works? Could you not insist upon these men doing that?—That might be done, but you see, at the present you are forced to go to the Labour Bureau. If these men were sacked for smoking you would still have to take unionists, and the trouble would then arise and would be endless.

273. Have you, as shippers, taken any steps to bring this question before the Chambers of Commerce with a view to getting legislation introduced?—No, not in Christchurch.

274. Would it be desirable to take some such step as that? If that could be brought before the Commission through such a body as the Chamber of Commerce, it might be the means of putting some weight into the question?—Yes, we might do that. I observe that there is a regulation in other parts that men who may be found carrying loose matches are liable to instant dismissal; but what would be the good of that? I do not suppose that notice prevents them from carrying loose matches.

275. I think we can consider that aspect. I think it should come before the Commission as strongly supported as possible, and if you could procure a well-signed petition supporting the danger which is likely to accrue, probably the Commission may be able to make some recommendation?—I will see what I can do with the Chamber of Commerce.

276. Seeing that the stevedores employ the men for the loading of the vessels, would it not be possible for them to see that they are divested of all matches before going aboard the vessel?—Yes.

277. Would it not be desirable to try that—to make it a condition of their engagement? I think it would be possible to have some better system than exists; but if it is found that that is insufficient it will be time enough to appeal for the intervention of the Government?—Yes, probably so.

The Chairman: The desire is to eliminate all possibilities of fire—to see if we can eliminate first the extraneous possibilities, and through the various stages until we reach the article itself. By that means, and that means only, shall we be able to get at the real trouble.

278. *Mr. Foster.*] Have you had any intimate connection with the actual handling of the produce you ship?—No.

279. Has it ever occurred to you that anything might be done in the way of prevention?—I think that lies mostly in the good name of the shipper. I do not think any more care could be taken than is taken now, except that it be in the direction of inspection. I presume that if wool is going to heat it will heat in the stores, but you would have to wait for some time to make that observation.

The Chairman: We have had one opinion to the effect that it should lie for so many days but that is out of the question.

280. *Mr. Foster.*] You could not possibly provide for that?—Last year seems to have been such an extraordinary year. I fancy I saw an account of a fire in a jute-ship, too.

281. Yes, and we have been told that jute will not fire?—I remember seeing an account of such a fire.

282. Jute will fire right enough?—It is only a few years ago that the "Aparima" was afire with a jute cargo. While we have had fires in New Zealand, we have also had accounts of our hemp being burnt while crossing the Atlantic after reshipment; and while we have trouble with our wool here, we must not look upon that fact as the only one, and this the only place that it will fire.

Mr. Foster: But New Zealand wishes to be in the van in all discoveries.

283. *The Chairman.*] We cannot get away from the fact that these are our ships, in spite of Mr. Seddon being dead. Is there anything which suggests itself to you in the nature of precautions—having in view the possible causes—which may or should be taken to endeavour to guard against these recurrences of fire?—No, I cannot suggest anything else.

JOHN GRAY sworn and examined. (No. 58.)

284. *The Chairman.*] What are you, Mr. Gray?—I am Railway Traffic Inspector, Christchurch District.

285. I presume you have read something of what has been said about the possibilities of wool being damaged by wet in transit on the railways. We have had the evidence of Mr. Beattie and Mr. Buxton at Wellington on the subject. Some reflection has been cast upon the Railway Department with regard to defective coverings, and we should be glad to hear what you have to say in reference to that?—I might state that when we get an order for trucks for flag stations, we require to know what it is intended to load in the trucks. That is one of our regulations; and, in the case of their being required for wool, we endeavour to know as far as possible the quantity which it is intended to forward. When we know the quantity we supply the wagons for that quantity. We supply with each truck two tarpaulins, and sometimes three tarpaulins to each truck—double sheeting. It depends upon the size of the load which it is intended to send—for instance, an L wagon will take more than an L wagon, and tarpaulins are provided sufficient to cover it, ends, and tops, and sides. In regard to the actual trucking at flag stations, I have no control, of course. The guards have instructions that they must carefully examine the loading to see that the wool is sufficiently sheeted. It is then brought on to Christchurch, or to where it is consigned.

286. Is there no inspection when it comes through Christchurch?—If it is raining when it arrives, and the wool appears not to be well sheeted, we should add another sheet. We have three

or four men engaged in doing all necessary sheeting. That is done as much as possible to prevent the possibility of claims, as well as to protect the goods.

287. *Mr. Foster.* The instructions which are given to the guards to examine the trucks for loading—I presume that is for traffic purposes, not with the idea of inspecting the condition of the contents of the truck?—No. It is impossible to examine the contents. The object is as to the safety of the loading. At the same time, I might say that if anything was loaded at the flag stations and was not well sheeted, we should not leave it if it was safe to travel.

288. *The Chairman.*] Where the trucks have been sheeted and shunted ready for travelling?—If they are badly sheeted and there are no extra coverings available, it will be a question of whether guards will bring them away. The instructions are to bring them away and put them under cover, or take them where they can be sheeted.

289. *Mr. Foster.*] We heard evidence this morning to the effect that the regulations provide that the trucks must be loaded with a given number of bales?—I may say that it is my duty to provide the trucks, and it is also my duty to see that the traffic is moved; and, as you may realise, it is the desire of the Department to get as full loads as possible. An ordinary four-wheeled wagon will carry—according to the size of the bale—from fifteen to twenty-three bales, and an extra-size four-wheeled wagon will take from twenty-three to thirty in good weather and with plenty of sheeting. In good weather we want full loading, and insist upon it as far as possible; but in bad weather we allow them to put less loading on, so as to allow for a better ridge on the top of the trucks.

290. Do you charge per truck?—No; per bale.

291. The evidence given this morning was to the effect that—well, I might tell you that it was the Belfast people who said they have had wool damaged through being compelled to put a certain number of bales in each truck, and, in order to get the tarpaulin on, a flat top has to be left, which allows the wet to remain in the sagging of the sheeting on top of the bales?—Yes, I have a statement of the complaint here. On the 16th July there were five trucks of wool sent. Four of the trucks were of large size, each containing twenty-seven bales. Each of them had three sheets on them, but when taken out one of the trucks was found to have eight wet bales, although the other three trucks were found to be all right. That, to me, proved that it was not owing to the method of loading, but the sheeting, which may not have been properly put on. It must rest entirely with the person who put the sheeting on.

292. *The Chairman.*] Not the Government servants?—No, the Belfast company loaded it themselves. I have been told of an occasion when they loaded the trucks, and they stood on the siding all night. At about 8 o'clock p.m. a south-wester came up, and they were at once inspected, and found to be as dry as a bone. So, what I contend is that if they are fully loaded and well sheeted—the sheets being in good order—there could be no damage.

293. Your trouble is only where it is left to the people to do the covering themselves?—As a matter of fact, it is our desire to have no complaints whatever.

294. The whole responsibility is on them?—Yes.

295. You insist upon them filling the trucks?—Yes.

296. *Mr. Foster.*] The complaint of the Belfast people is that you compel them to put a certain number of bales on each truck, and compel them to make the top of the stack flat. By that they are unable to get any ridge to throw off the water, and it leaks through on to the wool?—They are waterproof.

297. Yes, but it will take in a little if the water settles on the top through the sheeting being uneven?—Yes, it may.

298. Is that the only occasion on which you have had complaint?—That is the only occasion which I can think of.

299. Have you had any complaint from Mr. Hall, of Waipara?—I do not remember one.

300. He mentioned to me that owing to the compulsory loading of a given number of bales in a truck it was mischievous to the settler?—I do not remember the case at all. I will tell you where the trouble is with the settlers. The men who are sent to load the wool on the wagon finds it difficult to top the tiers, owing to there not being sufficient labour available to do the work. They want to load the trucks in such a manner as is easiest for themselves. They put thirty-five bales on their own wagons, but when they come to load them into the trucks they find they have not sufficient strength to get the top tier on.

301. What would be the effect? Supposing, for instance, Mr. Hall sent for two trucks and he had insufficient to fill them, and did not put the full number in each truck, would you receive them?—Yes.

302. And without any remonstrance?—We should write to him, and draw his attention to the fact that he had not utilised the space allotted to him.

303. Supposing he insisted upon continuing it?—We should endeavour to insist upon knowing the number of bales he intended to forward, and then send trucks sufficient, and no more. We must have control of our rolling-stock. More particularly in the wool season is this necessary.

304. You can say unhesitatingly that the necessity for loading the full number you require is not an element of danger as to wetting the wool?—I can. In any case they would be subject to so little wet that it would not be a source of danger.

305. *The Chairman.*] Have you any trouble whatever about keeping your sheeting in water-tight order?—No. We have about 2,790 in the Christchurch District.

306. Do they come in for periodical examination?—Yes.

307. *Mr. Foster.*] In regard to flag stations, I suppose you would not recognise a claim were any made in respect of damage caused there?—I am only Traffic Inspector—

308. I thought that was a condition with you?—I know of occasions when claims have been paid, but that is a condition.

309. *The Chairman.*] Have you had tarpaulins come in with a slit in them, and those same tarpaulins go out again?—Not if we know it.

310. I am speaking of the flag stations?—No. That could not be, for you could only take them off the truck by spreading them out, and you could not miss seeing a slit in a tarpaulin when spread out. There have been cases where loaded wagons have gone to a flag station and the sheets covering them may have got damaged, and if not brought in, they may go on to another station and be used there.

311. Would you send them out again?—We should not be in a position to stop that, particularly if they go from one flag station to another; we should not have the opportunity to see them. It would be the duty of any Stationmaster to at once send them in for repairs.

312. But in the meantime it might do a little journey, and when it is eventually discovered it would be sent to you?—Yes.

The Commission adjourned till to-morrow (Wednesday), the 5th September, 1906, at 10.30 am.

CHRISTCHURCH, WEDNESDAY, 5TH SEPTEMBER, 1906.

The Commission met in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

CHARLES HOBBS sworn and examined. (No. 59.)

1. *The Chairman.*] What is your name?—Charles Hobbs.
2. What are you?—I am storeman for the New Zealand Loan and Mercantile Agency Company.
3. You have had considerable experience in dealing with wool?—I have been with the firm for seventeen years. I have not been storeman all that time, but I have had practically seventeen years' experience—I have been mixed up with it all that time.
4. Could you give the Commission some information with reference to the condition of wool when you receive it in the stores, and how you deal with it if it is not satisfactory, and as to the amount of moisture in it or not?—I have had wool on the damp side, and whenever we find it that way in opening a bale for inspection, the flap of the bale is cut down, and that wool is spread and dried in our shed. The only instance that I know of a bale being badly heated in our place was a bale of locks: that was last season, and that was a bad case.
5. What were the particulars—where did it come from?—It came from the country.
6. What was the brand?—I really could not tell you. Of course, it was really not a full bale. They do not ship locks; that is all for local scouring purposes.
7. Are you sure they do not ship locks?—There are very few of them shipped.
8. But you cannot say that they do not ship them at all?—I could not say that they do not ship them at all.
9. They are sent in to you for sale?—We pass very few locks through our hands for shipment.
10. What was the condition of that bale of locks?—I should say it was badly heated: it was hot—there was no fire about it; it was just in a sweat and felt very hot.
11. Was it simply pressed?—It was simply put into the bale—a loose bale.
12. *Mr. Foster.*] Could you put your hand in it?—Yes.
13. Have you ever seen wool of any description hotter than that was?—No, never. The shearers on the stations are very particular; they will not shear wet sheep.
14. No matter what they are paid for it?—I do not know that, but they do not like to do it.
15. *The Chairman.*] Do you know that shearers are offered a shilling more to shear wet sheep?—I have not heard that. I do not think you would find that to be the case, because at the large stations they are too careful. I suppose we handle as much wool from these large stations as anybody, and we always find our wool in tiptop condition.
16. *Mr. Foster.*] When you say you handle that, does it go through your hands?—I weigh all of it.
17. Are you located at Christchurch?—Yes.
18. You would not have the big clips for local sales?—No. The growers usually ship, but last year prices were good, and the majority sold at the local sales. There was more wool handled by everybody last year than in previous years.
19. Take, for instance, Rutherford's and the big Amuri sheep-farmers, I suppose most of them ship their wool?—I believe a lot of them do—we do not handle their wool at all.
20. *The Chairman.*] How do you handle St. Helen's wool?—It comes to the station, and is then passed over our scales and stacked for inspection; then the bales are, of course, opened so that the flap is turned down.
21. Only a certain proportion of the bale?—Yes. A good half of the bale is opened on the floor, and the buyers pull it out, and they are very particular if there is any damp.
22. Is there a very large proportion of the St. Helen's clip sent away?—We handled a greater proportion of it last year. The late wool from St. Helen's is shipped.
23. A lot of St. Helen's wool is scoured and washed on the station?—Yes, on the station.
24. *Mr. Foster.*] Do you think you are able to state definitely that in your opinion there has not been a larger quantity of locks and pieces shipped this last year as compared with previous years?—Taking them all through, our local people buy the locks and pieces as a rule. The large buyers that come out from Home deal very little in them.
25. In the case of locks and pieces, when offered at your auction they are offered on reserve?—Yes, there is always a valuation placed on them.
26. In the event of those locks and pieces not being sold, do you ship them?—No. You mean sold at public auction?

27. Yes?—As a rule they are sold privately.
 28. But as to exceptions?—We never ship them.
 29. You do not know of any locks and pieces being shipped by your people?—No.
 30. None?—No.
 31. You, I suppose, can only certify as to the wool or the clips that come to you first of all for local sale—I speak of your own store?—That is right.
 32. But there is a very large proportion that does not pass through your store at all, but goes direct to the port of shipment?—Yes, that is so. I am only speaking of our own handling.
 33. So that your remarks only apply to what comes immediately under your own notice?—Yes, to what comes under my own notice.
 34. Did you ever notice any trouble with sheep-skins heating?—Yes; I have noticed that trouble with sheep-skins—they heat very badly, but when they heat they seem to wither right up—they go black. If the wool moves from the skin it seems to wither away; it smoulders away, but I have never found any fire. You find great heat, but no fire.
 35. Do they dump them now and stretch them—spread them out and then dump them?—We do not handle skins for dumping.
 36. Only for sales?—Yes, only local sales.
 37. Have you noticed them heating in your stores?—Coming from the country butchers—green skins.
 38. That is the process of sweating?—Yes, sweating under railway-covers.
 39. That is not what I mean?—Of course, the skins for Home shipment—they give them a thorough drying before baling.
 40. But in the dry skins you have never noticed any heating at all?—No, not in the dry skins.

EDWARD SMITH sworn and examined. (No. 60.)

41. *The Chairman.*] What is your name?—Edward Smith.
 42. You are Superintendent of the Fire Brigade?—Yes.
 43. You have had considerable experience, I believe, not only with the ordinary run of fires, but also considerable experience with fires on board ships at Lyttelton?—Simply one—the “Bel-tana.”
 44. You are aware of that case personally?—Yes.
 45. Was there an inquiry?—No, I think not—just a report put before the Underwriters’ Association.
 46. What were the particulars of that fire?—About seventeen years ago I was called to a fire in Lyttelton, and got down there with the chemical engine. I found a wool-ship alongside the wharf battened down, and supposed to be on fire. They thought that, having the chemical engine, we might be able to extinguish it without damaging the cargo too much. We put in a good many charges that day—a Sunday—and left again for Christchurch thinking that it would settle it; but we were called back in the evening, and brought more acid and soda down. I stopped down there about four days altogether, and put in a considerable number of charges, and finally the sides of the vessel and decks were getting cooler, and, of course, we considered that the fire was practically out. The captain did not feel inclined to open the hatches for a day or two, but gave it a fair chance, and when they opened the hatches the fire was practically out until they got into the centre of the cargo, which was still on fire.
 47. Was it a general cargo or wool?—All wool. It came from South Australia somewhere. There were two distinct fires found there separate from each other, and forty or fifty bales were altogether pretty well charred up. I was there when they were baling them up, and in the different bales you could see pretty well the centres and sides were gone.
 48. Could you tell us whether that fire originated in the centre of the bales?—I could not tell you that, but there were two distinct fires.
 49. You said the centres just now?—Most of the centre bales were almost like cinder. They had to put some of the wool into baskets to bring it on deck.
 50. Did you notice whether the centre was burning in any case, and it had not got to the sides?—No. There were one or two bales gone in the centre, but it must have caught from the other bales.
 51. Your mean it caught from the exterior to the inside of the bale?—Yes.
 52. *Mr. Foster.*] Did you notice any of that wool that was brought up in the baskets?—Yes.
 53. Did you notice whether there were any lumps of it that could be broken apart to show what it was?—No; it was all in cinders. It was well alight when we brought it up, although we thought we had got it out.
 54. *The Chairman.*] That fire had been burning for some days?—Six days before they reached Port Lyttelton.
 55. And then it was some days before it was put out?—Yes, four days putting it out and two days before taking off the hatches.
 56. The best part of a fortnight?—Yes.
 57. And still some of it was so hot that you could not handle it?—Yes.
 58. So that there must have been a very great amount of heat in the hold of that ship when the fire was at its height?—Yes; after we went away from the ship on the Sunday the captain and the underwriters went round the ship and found it very hot.
 59. *Mr. Foster.*] When breaking out the cargo, did you notice any of it glowing as if on fire?—No.
 60. Any of it smoking?—When we got to the centre of it it smoked.
 61. When the air got to it?—Yes.
 62. Was that smoke or sweat?—It was smoke.

63. It would not have the smell of ammonia in it?—No, I think not.
64. It was smoke?—Yes. Of course, it is many years ago.
65. *Captain Blackburne.*] It was in 1889?—Yes.
66. *Mr. Foster.*] Of course, when you say it was a cargo of wool and nothing but wool, it might be so termed if there happened to be a little of something else?—I did not notice that. I was not interested in that. I really wanted to see where the fire had started from.
67. You saw nothing to lead you to suppose that it was anything but wool?—No.
68. *Captain Blackburne.*] What chemicals did you use?—Acid and soda—one gallon of chemical to about 40 gallons of water. We have used it this last twenty-five years.
69. It spreads much better than water?—The gases being heavier, it settles right down through the cargo. No fire can live where that is.
70. *The Chairman.*] It chokes the fire?—Yes.
71. *Mr. Foster.*] Would you consider that a fire choked in that way—that the chemical reduces the risk?—Yes.
72. Assuming the cause of the fire was the excessive temperature generated by moisture in the wool, this chemical would not take out the moisture, would it?—Oh, no.
73. If that moisture remained the heating process would still go on?—Yes.
74. But you think that this chemical would carry off that heat or absorb the heat?—Yes, it does in a few minutes.
75. Would you have thought that, having put that fire out with the chemical, there would have been any danger to the ship if she had gone away with the rest of the damp cargo?—Oh, yes, I think there would have been.
76. Whilst it suppresses the fire, you do not think it finishes the danger?—No. Of course, if you put a few more charges in and leave it for a day or two, the whole lot would have been soaked with the chemical.
77. Is it a vapour that in any way condenses?—It is a water-and-chemical compound. We have a 60-gallon cylinder which forms the gas, and the gas forces the water out with it.
78. The wool being wet, would you consider that the entire suppression of the fire rendered the rest of the wet wool safe? You say, if you could put a few more charges in: if you put charges in for a month and the cargo had remained as before, still wet, do you think that ship would have been safe to go on?—No, I do not think so.
79. It does not remove the cause?—No.
80. *Captain Blackburne.*] Was the fire deep down in the ship?—Yes, in the second hold, I think.
81. In the lower part of the lower hold?—About the centre.
82. They had to take out a lot of cargo?—Yes; they had to take out a lot of cargo before they got at it.
83. Was the ship burnt at all at the sides?—No. The cargo was simply damaged by smoke really.
84. *The Chairman.*] There was no doubt whatever in your mind that the fire had actually taken place in amongst the wool itself?—I am quite certain of that.
85. It had not begun from an extraneous cause and worked down, but had originated from the wool itself?—Yes. There was another vessel after that, the "Netty," but we were not called to attend to her, and there was another vessel with shale on board, and we were not sent down to that either.
86. Have you had any experience with regard to the behaviour of wool when it is damp, and has been dumped?—No; I have had no experience of that except in a warehouse where there are woollen goods.
87. That would be mixed with cotton goods, and so forth—half cotton?—Yes.
88. *Mr. Foster.*] Do you remember the occasion of a big fire at Belfast in the wool-store?—Yes.
89. Were you called there?—Yes.
90. Did you notice anything there about the burning wool?—No; we were too busy trying to put the fire out, and took no notice of that.
91. *Captain Blackburne.*] Was the other ship you mentioned a wool-ship?—One was shale and the other was mixed wool and flax—we were not called to that.
92. *Mr. Foster.*] Do the dangerous trades in any way come under your supervision in connection with the fire brigade in Christchurch?—Oh, yes, dangerous goods.
93. Did you ever hear of a dip-factory down Manchester Street somewhere? We are told that when the place was empty the next tenant found a number of powder-flasks there?—Dipping for dogs, I think.
94. Only for dogs?—Yes.
95. Not sheep-dip?—No.
96. Where was that?—At the back of the Union Shipping Company.
97. Could you find out?—Yes, the owner of that place is in town now, Mr. Dombrane.
98. We were told they were manufacturing sheep-dip, and that they were using a considerable quantity of powder in connection with it?—Yes. There is a firm of Blackburne and Smith in Manchester Street who are agents for Little's sheep-dip; but I do not know whether they manufacture anything—they mix it.
99. You think they were, at any rate, only mixing the dips for dogs?—Yes. I have taken my own dog there sometimes to be dipped. Of course, there may be another firm which I do not know of.
100. I cannot quite understand the use of gunpowder in the manufacture of a dip when the raw material would be very much cheaper?—Unless it is a quick way of killing fleas.

101. *The Chairman.*] Can you say, captain, from your own experience or from any reliable evidence, whether wool has ever been actually on fire or even aflame? We have very good evidence, in fact, that it has, but people down here seem to doubt the fact and dispute it altogether?—In a fire the other morning near the station the packing round a boiler was alight: it was all packed with wool and covered with wood, and then a sheet of iron over that. The smoke was coming out of it and was in the back, and we found it was the wool around the boiler. It is the first time I have seen a boiler covered with wool.

102. *Mr. Foster.*] Was that in a flame?—Oh, yes, blazing up.

103. *Captain Blackburne.*] Might it not have been the wood flaming?—It was wood and wool both flaming. We stripped the boiler before we left. In a few minutes it would have caught the building.

104. *The Chairman.*] Have you any doubt whatever that if wool is brought up to a certain temperature it will blaze?—I think so.

105. You have no doubt at all that it will?—No doubt about it.

106. *Captain Blackburne.*] Do you think this particular fire around this boiler was through spontaneous combustion?—No; it came from the furnace below.

107. What was the name of that ship you mentioned? How long ago was it?—One was called the "Netty," that was wool and flax, and that was a little while before the other fire.

108. *Mr. Foster.*] Was that not while she was loading—from some extraneous cause?—Yes, I think so, while she was loading.

109. *The Chairman.*] Have you anything that you could suggest to us in the form of prevention being better than cure that you may have thought of in connection with the matter?—The only thing is that if a vessel would carry a chemical cylinder on board there would be no danger of losing the ship, as they could discharge the chemical into the hold at a given time.

110. That would have to apply really in connection with each hold?—Yes. I am making a model in connection with the Exhibition which, I think, would answer the purpose. I suggested it years ago, and I think they should have it on all ships.

111. Would that be a very great expense?—It would not cost more than £200 or £250 to fit each ship.

112. *Mr. Foster.*] I suppose the stuff is in the cylinder, and you have to mix it by smashing it?—Oh, no, simply turn the lever over, and it mixes itself.

113. It is a mixture and ready when needed?—Yes, and then you can connect the delivery-pipe to another pipe going down the hold. That pipe down the hold should be perforated, in which you could put a charge as you wish.

114. I suppose the cylinders could be made any size to control the hold?—Yes, from 60 to 100 gallons, and if that was not sufficient, you could refill and recharge again, and they could be stowed away.

115. That is in the same nature as a life-buoy—to save life when a fire happens?—Yes.

116. But I think the question asked you was more in regard to preventing the fire on board ships?—I have no experience of that.

117. I think you are inspector of buildings?—Yes, Fire Inspector.

118. And I think you have a certain power to say that a building shall not be built in a certain way?—There are wide openings there.

119. You are assumed to have powers?—Supposed to have.

120. Then, could you suggest anything with reference to preventive means, assuming we could get them carried out, to prevent fires arising in ships?—No, only the chemical after the fire has broken out.

121. And the inspection beforehand?—That is all, sir.

ARTHUR ERNEST COOPER sworn and examined. (No. 61.)

122. *The Chairman.*] What is your name?—Arthur Ernest Cooper.

123. What are you?—A member of the firm of Sims, Cooper, and Co., meat-exporters.

124. Are you not wool-exporters also?—Yes, we ship wool from the sheep we buy.

125. What experience have you in regard to shipping wool?—Of course, we have only been in business for ourselves during the last year, but previous to that I was fourteen years with the Canterbury Frozen Meat Company, and for the last few years I was in charge of their Fairfield branch of the business.

126. You know something about the conditions under which wool is shipped?—Yes.

127. You might enlighten the Commission as to those conditions, and as to the precautions you take in regard to shipping wool that is damp?—As far as that is concerned, the wool we have been shipping has been mostly slipes, and, of course, we do not see the wool at all.

128. You get it from the fellmonger?—From the freezing-works.

129. Do you exercise any supervision over it?—None whatever.

130. They bale it?—Yes.

131. And who dumps it?—The shipping companies dump it.

132. And without exception you do not have any supervision over it?—No. During the time I have been connected with the business I have not seen a bale hot, and have never heard of a bale heating.

133. During the whole of your fourteen years' experience you never heard of a bale heating?—No, not with the Canterbury Frozen Meat Company's wool.

134. *Mr. Foster.*] Have you ever known of any wool being sent back through being damp?—We had five or six bales this year which got wet in transit.

135. Was it ascertained to have got wet in transit?—Yes. The Department insists on having wool packed in a certain way on the flat to get as many bales into the trucks as possible, and there is a chance of the tarpaulin sagging, and then the water getting through.

136. Did you claim on the Railway Department for the damage?—No, the wool was sent back to Belfast for reconditioning.

137. And the Railway did not have to pay?—I do not know—they may have paid the company.

138. You refused to pay the company, and they claimed on the Railway?—I do not know that they accepted the responsibility; but in putting in a statement on account we simply deducted the amount.

139. You considered the Railway or the company was responsible to you for the proper delivery of the wool?—Yes. I take it that the company would get it refunded from the Railway.

140. Is Fairfield a flag station?—Yes.

141. Do the Railway Regulations not provide that they will not recognise any responsibility for any damage done there except through any fault of their own?—Yes. When I was at Fairfield we were only sending fifteen bales in a truck, and the middle bales were stacked on end and the water would run off.

142. Did the Railway people ever refuse to take a truck from the siding if it had not the full quantity on?—No.

143. What would have been the result if you did not put on the extra number?—The Station-master as Ashburton made a complaint to me, and said the guard might refuse to pick the wool up because the truck did not contain the full number of bales, but he did not refuse at any time.

144. Had you any wool in the "Rimutaka"?—Yes.

145. Any of it damaged?—Yes, there must have been some damaged by fire according to the cabled advice of price it fetched.

146. With reference to the "Gothic" shipment, have you had any advices?—No.

147. You cannot give us any idea of the extent of the damage?—No. We had some wool in the "Gothic," but we can only tell from the catalogue the particulars of prices it brought.

148. Were any of your bales destroyed?—It was all shown in the catalogue.

149. Was any of it marked "Burnt"?—No, it was all marked "Water and fire damaged." There were only about seventy bales.

150. What is your brand?—"M B K."

151. What sort of prices did your damaged wool bring—were you satisfied it was fairly good?—You could not compare it with sound value—the highest price was 8½d.

152. There are various degrees of damage—fire-damaged and smoke-damaged. Could you pick your brand out of the catalogue [handed to witness]?—Yes. From the price I should say it was about half the value.

153. You should say the damage was severe?—Yes.

154. You had thirty-three bales damaged in "Waimate"?—Yes. We have not had any advices of the "Waimate" except as shown in catalogue.

155. Your brand is "M B K" under the Canterbury Frozen Meat Company's brand?—Yes, that is one of our brands.

156. There is one lot, "Slip super ½-bd. at 8d."—that is very low?—Yes.

157. And another lot, "Slip super fine X-bd. at 7½d.": would you assume that is very severely damaged?—Yes, it is.

158. I should have thought that as the wool was sold they must have rendered account sales?—We cannot complain. There is a deficiency on the wool between our draft and the sale price—it was right in the middle of the sales.

159. You are satisfied there has been no delay?—Yes.

160. Lot 548, "Slip super X-bd. @ 6½d."?—Yes, that is below half value.

161. "Seconds X-bd. lambs, 3½d."?—Sound value would be about 11d.

162. Those are all very low prices, and would indicate considerable damage?—Yes.

163. But you cannot give us any detailed information of any kind about this sale?—As to the cause of the fire?

164. As to the nature of the damage—whether it was really burnt or smoked, so as to be indistinguishable and deteriorated in value to a considerable extent?—No; we only know from the catalogue.

165. It might be that this was saturated with dirty water—charred, and smoked, and damaged with water?—Yes.

WILLIAM HENRY REYNOLDS DALE sworn and examined. (No. 62.)

166. *The Chairman.*] What is your occupation?—I am in charge of the New Zealand Shipping Company's wool-sheds in Lyttelton.

167. How long have you been in that position?—About seventeen years.

168. And you look after the shipping of wool?—Yes.

169. Have you anything to do with the dumping of the wool?—Receiving, dumping, and shipping of it.

170. When it passes out of your hands, who takes charge of it?—The new Zealand Shipping Company's stevedores. In the case of wool coming by railway it goes to the ship's side. Our sheds are on what is called the reclaimed ground, some little distance away from the ship. We put it into the railway-trucks at the shed for the ship.

171. Do you lose control of it then?—Yes, as far as I am concerned.

172. What is your supervision of this wool before you lose control of it in the manner you have described?—I receive the wool, dump it, and hold it in the sheds until such time as it is required to be shipped.

173. Do you exercise any supervision over the condition of the wool before sending it further on?—As far as the outsides of the bales are concerned only.

174. You do not test it in any way?—No. If anything in the nature of dampness was present our attention would be called to it; or should our suspicions be aroused in any way by the appearance of the bales the matter would be at once reported.

175. And, if your attention is not drawn to anything extraordinary in the appearance you would pass it on?—Yes; we should not know unless our attention was drawn to it.

176. Otherwise you reckon that the wool is in fair condition and fit for shipment?—So far as we know. If there was anything wrong with it I would stop it at once, otherwise I would allow it to pass on for shipment.

177. How would your men detect anything wrong?—Only by the feel of the bale—if it was warm. I am speaking of dumped wool now, not pressed wool.

178. Is there any inspection of the wool when pressed and before being dumped?—No, only it might appear hot in handling it.

179. Is there any inspection of the pressed wool before it is sent to be dumped?—Not the slightest.

180. Supposing your men found any pressed wool heated, would it be their duty to report it to you?—Yes. We have a storeman in charge, and we have special instructions to allow nothing to pass unless it is right for shipment. It would be reported to me if there was anything in the nature of dampness or heating or other damage. I have no means of ascertaining the quality of the wool inside the bales. The condition might be anything inside the bales, but so long as it is clean and dry on the outside that is all I can take notice of.

181. If bales contained stained locks and pieces you would take no notice of it so long as the bale was clean and dry on the outside?—So long as the pack is nice and clean and dry on the outside and showed no signs of damage in any way. If we found any indication of heating or wet we would immediately take steps to stop it going forward. The only reports we should get from the men handling the wool would be to the effect that certain bales appeared to be wet or heated.

182. How long does the wool remain under your control in the sheds?—Sometimes it may remain awaiting shipment for as long as two months.

183. Have any cases come under your notice or has your attention been called to any bales which have necessitated your reporting?—Yes, in isolated cases. I have noticed cases of bales of slipped wools being in a heated condition.

184. You think this is more prevalent in the slipped wools coming under your notice?—Yes, as much as 90 per cent. of the slipped wools, in my experience.

185. Have you noticed anything about greasy wool?—Yes; but in extreme cases—very rarely. In one or two instances only, where it has not been properly skirted or where foreign and vegetable matter has been left adhering to the wool. If this is packed damp the wool will heat. I have never known clean dry fleece-wool to heat—at least it has never come under my notice.

186. You sometimes receive the wool direct from stations where it is shorn?—Yes.

187. Have you had any fault to find with that wool so far as you are concerned?—Not the clean fleece-wools. You must remember that we pass through our hands some hundreds and thousands of bales of wool, and while that wool is passing through we might not have the bales in the sheds for one day at a time, and it might not be sufficient to detect any heat.

188. Do you hold yourselves responsible for that which is only left in the sheds one day?—No, not at all. We would exercise the same supervision as far as we are able to do—that is, as far as we can ascertain from the outside. If any wool is observed to be damp or heated it is my duty to report it to my superior officers, and it is then returned from whence it came, or it is ordered to be sent to the scourers. We would not ship it. The head office would communicate with the shippers of the wool, and instructions would be given as to its disposal, but not to ship it.

189. Have you ever been overridden in that matter?—No; they take my word for it. I have explicit instructions from the head office of the company not to pass any wool which is not fit for shipment. Then, again, it would not be passed by Lloyd's surveyor under any circumstances.

190. Have you had any complaint against wool coming from the sheep-stations?—I have had wool coming damp from the Chathams.

191. Apart from that?—I have known wool to be wet coming from the stations inland, but that would be on rare occasions.

192. Have you had any complaints against the Railway Department about wool coming in the trucks in a wet condition?—Yes, I have. I have complained of it myself in writing last season. There were some trucks loaded from Belfast, where the load was stacked flat on top, and the wool was wet in consequence. I know also of it having occurred at other stations.

193. Has the moisture in those cases penetrated to any depth in the bales?—If loaded flat on top the water might leak through the bale. The wool might be one or two days on the way before it reaches Christchurch, and it may remain another day before we can get at it.

194. We have evidence that it does not stand any length of time on the road?—It might stand out a night in a heavy shower. It may stand out at night on our siding at Lyttelton. Our stores close at 5 o'clock, and if a train comes along at half past 5 it will require to wait there until 8 o'clock next morning.

195. Have you known bales in consequence generate heat when dumped?—Yes, I have known wool, before being dumped, while standing in the shed generate slight heat. It had been damp inside, and that was the reason for the heating.

196. Captain Willis was the surveyor for the underwriters, and was in the habit of inspecting the wool when considered doubtful. Did he test the bales on his own account, or at your instigation?—He inspected the bales, and if there was any doubt about them they would be put under supervision and observation. If we found anything suspicious about the bales we would call his attention to them, and he would then inspect them. He has a free hand to do as he thinks fit. He could come in and inspect the wool, and if he thought fit he would call for any assistance he desired.

197. Can you tell me if there has been an appreciable increase in the quantity of locks and pieces in the greasy state shipped during this year as compared with last season?—No. I should not take any notice of the contents of the bales or the quality of the wool; the only thing I should observe would be a suspicious appearance of a bale indicating damage, otherwise I should treat them all as bales of wool. I should take no particular notice of locks and pieces or anything else.

198. Can you tell the Commission if a larger proportion of low-grade wools have been offering: have you formed any opinion yourself from your knowledge of the trade?—I could not say, really. I only take the mark and number on the bale, but have no means of tracing the quality or condition of the contents.

199. *Mr. Foster.*] Can you tell the Commission if there is the same amount of supervision kept up now as there was some two years ago?—No.

200. You do not remember, I suppose, how long ago it is since Captain Willis's services were discontinued?—I could not say. I should think, about two or three years.

201. Comparing last season with the preceding seasons, has there been the same class of inspection as during previous years?—No, not the same as when Captain Willis was there.

202. Is the same supervision exercised as when he was there?—Just the same, so far as we are concerned. We exercise the same care.

203. Would it be right to infer from what you say—having in view that there has been a greater number of fires—that there may have been some neglect?—We do not neglect anything as far as we are concerned.

204. Whether you think the fires of last season have been not entirely due to lack of supervision at this end or not, it is a coincidence?—I think so, but there has been no lack of supervision as far as we are concerned.

205. *The Chairman.*] If there had been the same supervision, do you think there would have been less fires?—I understand you are referring to the supervision of the expert, such as Captain Willis. I say that since Captain Willis has not been there we have exercised the same supervision as we did when he was there. We have given him every assistance at all times to help him in coming to his conclusions.

206. *Mr. Foster.*] I understand from you that Captain Willis has not acted for the last two seasons—since June twelve months, I believe?

Captain Willis: I have had no supervision for the last two seasons.

207. *Mr. Foster.*] Thank you. Then, I want to know from the witness whether the inspection he exercises—beyond what Captain Willis would have exercised—has been relaxed. Do you attribute the fires to something special attaching to last season which was not present on previous occasions?—I do not know anything about that. I know I have not relaxed my supervision in the least.

208. Your supervision this last year has been the same as the years before, and the year before you had no fires?—That is so.

209. Then, to what do you think it is reasonable to attribute the fires—apart from inspection?—That is a matter of opinion.

210. Yes, and we want your opinion?

211. *The Chairman.*] Do you think the high price of wool, for instance?—The high price of wool might have something to do with it.

212. *Mr. Foster.*] What about the wet season?—Yes.

213. Did you observe if there was much wet weather while wool was in transit last season?—Occasionally. It was a rather wet season. As far as heated wool is concerned, I did not come across one case of heated wool.

214. Did you find many cases of wet wool in transit on the railway-trucks?—Yes, on one or two occasions.

215. Less or more than in previous years?—Less this year.

216. And this last season you have seen scarcely any heated wool?—No.

217. And the season before?—Only two bales the season before.

218. *The Chairman.*] If it were considered desirable that the wool should remain in store for a certain length of time—sufficient to detect heat—for what length of time do you think you could accommodate that wool which comes through the port?—Considering that we put through from twelve hundred to fifteen hundred bales a day in the height of the season, we could not hold it long.

219. Has it occurred to you that any preventive measures might be taken to insure the wool being shipped in a proper condition?—Only proper supervision when being baled up.

220. At the fellmongery, for instance?—Yes.

221. Has it occurred to you what the cost might be?—No.

222. *Mr. Foster.*] What an army of inspectors you would require! What about the port of loading?—It is not easy to detect it in the rush.

223. Apart from that, you approve of the conditions as they were when inspection was carried out?—Yes. There is one thing I should like to be allowed to say in reference to flax. I have had a great deal of experience of flax, and several fires have occurred in my time. At the time the "Leading Wind" was burnt in Auckland, the question arose as to the possibility of the flax being the cause of it in itself. Captain Ticehurst purchased two bales of flax, and we dumped them, and put the two of them up in two woolpacks, and wetted them. We left them for ninety days—which we considered to be the average period of a trip Home—and there was no sign of heat in either of those bales. The inside of the bales was rotten and decomposed, but no sign of spontaneous combustion.

224. Is the flax graded in your stores?—Yes; they open one bale in ten, and draw hanks from the balance of the line.

225. In Wellington they draw hanks from one in three, and open up one in ten. That, you think, would be quite sufficient to detect any danger?—Yes. They pull out the inside of the bale in drawing the hanks.

ARTHUR HUGHES TURNBULL sworn and examined. (No. 63.)

226. *The Chairman.*] What are you?—Merchant.

227. You include with that term, wool?—Yes.

228. We understand you can give us some information as to the conditions under which wool is received. You receive wool—that is, you are not a wool-grower?—I do not receive wool.

229. What do you do with it?—I do not receive wool.

230. Well, are you quibbling on the word “receive”? Have you anything to do with wool at all?—I have had a fair quantity.

231. Do you deal with wool?—Yes, I deal with wool.

232. Oh! You are not a shuffler?—I do not know that you have a right to address me thus. If I do not leave this box I shall want to have the questions put to me courteously.

233. Very well. Do you say you have nothing to do with wool?—I do not know that you are in a fit condition to question me.

234. I will put an open question to you. Do you receive wool?—No, I do not receive wool.

235. Then, what do you do with wool: be good enough to tell us that?—Yes. I want that recorded. I do not receive wool. I am perfectly willing to answer any questions that may be put to me courteously.

236. Have you anything to do with wool, courteously or otherwise?—I have had a fair quantity of wool.

237. You do not understand that you receive wool?—No.

238. Where do you buy your wool?—Generally in auction sales.

239. And what is your business? What are you here? You said a “merchant”?—I am a merchant.

240. In the widest sense of the term, or in what sense of the term?—[No answer.]

241. You are a merchant?—[No answer.]

242. Can you give us any information about the cause of these wool-fires?—We will give you any information, as I have told you. I will give you any information which I think will be of information to the Commission.

243. Oh! you are the man who would decide that?—If you will be good enough to ask questions I will answer.

244. I see. Then what is the name of your firm?—A. H. Turnbull and Co.

245. And who are the members of that firm?—I am.

246. And the “Co.”?—I am.

247. You are the only man, and there is no “Co.”?—I trade under the name of “A. H. Turnbull and Co.”

248. And there is no “Co.”?—Only the title.

249. So you are the gentleman who represents the company?—Yes.

250. And what is your business?—Merchant. I buy wool.

251. Do you buy direct from the growers chiefly, or in the auction sales?—[No answer.]

252. Do you buy from the growers or simply as it is put in the sales?—Chiefly in the auction sales. I buy it from the auctioneers.

253. Not from the growers direct?—No; not once in a year.

254. Do you ever buy from the growers?—Yes, I have, at times. I think so.

255. You are thinking about it?—I might have had one line in a year direct, but not more.

256. Have you ever shipped wool?—Yes.

257. I do not know why you should take this attitude?—I do not know why you should treat a witness in this discourteous manner.

258. You have had wool to ship?—Yes.

259. Do you ship it direct yourself?—I ship it in the ordinary way to London.

260. Direct, or through anybody else?—Yes.

261. What do you mean?—Do you mean through merchants?

262. Direct. I am giving in even you?—If you insist upon treating me in this manner I will refuse to answer any questions.

263. We will let you alone directly. Where have your last shipments been made?—About January.

264. This year?—1906.

265. Through what shipping companies do you ship?—I could not tell you from memory.

266. Your business is so extensive?—There are so many steamers that you cannot carry them all in your mind.

267. Can you tell us one or two of the steamers?—No.

268. Have you no record?—I cannot remember any of the vessels which have taken our wool.

269. Have you sent any by the “Gothic”?—No.

270. Any through the “Rimutaka”?—No.

271. “Waimate”?—No, none.

272. “Pitcairn Island”?—None.

273. Then where have you shipped it through?—Shaw-Savill ships. I could not give the names.

The Chairman: You are a merchant, and cannot give the names of any of the vessels which carried your goods. (To Commissioners.) I think we had better get this witness to come tomorrow morning, and produce his books, showing by what steamers he has shipped.

Mr. Turnbull (to *Mr. Foster*): Will you put some questions to me, *Mr. Foster*?

274. *Mr. Foster.*] Can you give us any information as to the fires on any of the vessels which may have come under your notice?—Only as a merchant—a shipper, but nothing in regard to the “Gothic.” I do not see the actual shipments now.

275. Has anything come under your notice in connection with the “Rimutaka” or any other vessel?—I will give you any information, but I must be treated courteously.

276. I have no doubt you will give us any information you have. If you would not mind looking up what you have we should be pleased?—In what way. I do not ship by the Shipping Company.

277. You have not had any losses from fires?—No.

278. Have you had any experience in the warehouses or wool-sales of damp wool or heated wool?—When I was managing the Farmers’ we passed a good deal of wool through the auction sales, and I have seen damp wool through the stores.

279. Have you seen any serious heating in that?—Not to a very high temperature.

280. Have cases of fire ever come under your notice in any way?—Spontaneous combustion?

281. Yes?—No, never.

282. In connection with your position in the Farmers’, did anything come under your notice as to land or water carriage which could be improved upon, and which you would consider the elements of risk?—Occasionally wool comes down damp.

283. Were the indications of its having been wet on the road from the shed to the railway or through a defective tarpaulin? Have you seen anything like that?—No, not any wetting to a great depth.

284. Supposing it could get into the bales, would it be dangerous to ship it in that condition?—Might I qualify my answer? With fleece-wool I do not think it would, but with scoured or slipe wool it might. Sometimes, as you know, the grease shows through the packs, and it might be water or grease, and it might pass unnoticed.

285. You think there might be more danger with scoured or slipe wool than with greasy?—Yes.

286. We have had evidence from wool people that there is considerably more danger from scoured than greasy?—Scoured or slipe wool, yes.

287. They speak of scoured as distinct from greasy?—I have not had so much experience with those.

288. Has it occurred to you as a speculator in wool to consider if the present means adopted for the prevention of shipping wet wool could possibly be improved upon?—I think all reasonable precautions are taken as far as I have been able to see. I think the people in the dumping-stores would notice anything suspicious, and they examine it.

289. *The Chairman.*] Is this hearsay, or do you know it yourself?—I know it myself. You misconstrue my attitude. [Witness proceeded to leave the box.]

290. Wait a moment. You desired to straighten me up: now I will straighten up this point. What is your exact position with regard to the wool you deal with?—[No answer.]

291. Why should we fight?—You misconstrue my answer.

292. It is your attitude?—It is my wish to give all the information as it is.

293. What we want to get at is, what is your knowledge about this wool, and can you help the Commission to ascertain why these fires occur. It is a very serious thing?—And as for my part, if you will allow me to make a statement, I will do so, and you can leave out anything you might not consider necessary. So far as wool is concerned, until it arrives in port there is reasonable supervision, and I think that every care that can be taken is taken. If I might say what, to my mind, is the cause of many of the fires, I would say it is due to the habit of smoking and carrying loose matches while at work on the wharves. Further, to a system of imperfect ventilation of the holds of vessels.

294. *Mr. Foster.*] Do I understand you to mean that that is the cause of the fires?—In my mind it is entirely the cause of the fires.

295. Well, how do you account for the fires breaking out only when the vessel arrives at and is discharging in port?—Probably the same thing.

296. Well, as to that, cases have occurred where the cargo has been removed from two upper holds, but on reaching the lower hold of a ship it has been found that wool has been in a state of combustion and ignited. Would you think that was attributable to matches? In the case I refer to there was evidence of the heat having been present for some considerable period, for the beams in the hold were red-hot and twisted, showing that the wool must have been in a state of combustion for some time before arrival in port, yet it had not reached a state of ignition?—It might have been observed then, but might have happened before. You see a vessel passing through the tropics, and with an ill-ventilated hold, a great amount of heat is generated outside and on the decks, and with bales perfectly dry a match ignited would flash up the fibres of the bale.

297. Yes, but when you find the bales are burned inside, and the outside of the bale is in apparently good condition, how would you reconcile that?—I could not explain that.

298. That will controvert the theory of matches. However, one witness referred to the practice of smoking near the ventilators, and it was suggested that something should be done by legislation to prevent the carrying of loose matches, and the practice of smoking while vessels are being loaded. Do you think it would be possible for the stevedores to combine and enforce a rule that no matches should be carried by the men while engaged in stowing cargo?—Yes, it should be a condition of their engagement.

299. And you would not think it necessary to invoke legislation?—No; it is a rule of their employment, and they should be compelled to conform to it. There is no doubt it is an element of danger, although you know, wool will not burn—

300. You may say that it will not flame, but you are not going to say that it will not burn?—It will combust.

301. Raise the temperature of wool to a sufficiently high point, and it will then flash?—The oil, but not the fibre.

302. If you say wool will not burn without sufficient temperature, I agree with you, but with a sufficient temperature there is no doubt it will?—That is what I mean to say. Then, I was referring to ill-ventilated holds. You know that wool may be carried in a refrigerator hold which is perfectly airtight; then perhaps the heat rises to such an extent that anything may happen.

303. On the other hand, take the case of the "Gothic," there was a bale of wool that had heated and was in a state of incandescence, yet nothing was known of it until the air got to it. Had that been in a place where the air got at it the "Gothic" fire might have been a more serious matter?—You are quite right in saying it is a very serious matter.

304. *Captain Blackburne.*] We have had quite half a dozen witnesses who have stated that they have seen wool blazing—even after it had been put into the lighters?—Not greasy wool. Of course, there is a distinction that will have to be drawn between greasy wool and slipped wool and scoured. I am speaking of greasy wool.

305. In the case of the "Beltana" it was greasy merino wool which is said to be specially dangerous, and in the report of that inquiry we have evidence that the fire was in the centre of the bales, and when it was opened up they found that the wool was charred in the centre of the bales?—Yes, I saw that.

306. And the fire had broken out in two different parts of the vessel. Do you think those fires were caused by matches?—I should not wonder, because it was shortly after leaving port.

Captain Blackburne.] The "Gothic" was just the same.

307. *The Chairman.*] You must remember that the whole thing appeared to originate in the centre of the bale?—I cannot account for that. I have told you my opinion; I cannot tell you anything more.

STEWART HENRY WILLIS, previously sworn, was recalled and further examined. (No. 64.)

308. *The Chairman.*] You wish to make a statement, do you, Captain Willis?—Yes. Mr. Turnbull has referred to the fact of wool being carried in refrigerator holds, but he did not tell you that those holds are ventilated for the carriage of ordinary cargo as well. Although the hold is insulated for the purpose of carrying frozen meat, still it is properly ventilated for the carriage of ordinary cargo.

Mr. Turnbull. I said "insufficiently ventilated."

Captain Willis. Most of these holds have four deck ventilators. Then, that case of the "Rimutaka," where the wool was afire under the orlop deck, was pretty far down.

The Commission adjourned till to-morrow (Thursday), 6th September, 1906, at 10.30 a.m.

CHRISTCHURCH, THURSDAY, 6TH SEPTEMBER, 1906.

The Commission met in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

ALEXANDER McDUGALL sworn and examined. (No. 65.)

1. *The Chairman.*] What is your name?—Alexander McDougall.

2. What are you?—Marine superintendent of South Island for the Shaw, Savill, and Albion Company.

3. The Commission understands you have had an extensive experience in regard to the shipping of wool and other things, and we should be glad if you could give us some information with reference to the conditions under which it is shipped?—I shall be only too pleased to give all the information I can. I may tell you that the company have five stores, which are under my supervision, in Lyttelton, Timaru, Port Chalmers, Dunedin, and the Bluff, and practically I have the superintendence of those as well as looking after the steamers. Before I was superintendent I was master of different steamers, and prior to that I was master of sailing-ships, always trading in the New Zealand trade—with wool principally. I have no experience of fire in cargoes. I have had some experience of fires in the bunkers. In the early days in the sailing-ship times most of the wool came coastwise in small craft, steamers, and smacks, and a considerable quantity of that was on the decks of these little vessels, and naturally it was sometimes wet with salt water. In the case of wool that was received coastwise, when there was a bale that we were a little doubtful of we put it in the sun for two or three days, and that was dumped. If it was at all seriously wet that bale would be put on shore and reconditioned, so that sometimes we took Home wool at that early date damp, if not wet.

4. *Mr. Foster.*] You said just now that any that was seriously damp you sent ashore for reconditioning?—Yes.

5. What had you in your mind in regard to the danger of that wool—why did you send it ashore?—Fire never entered my mind. My idea was that it would damage the wool, and that it would be unsaleable when it got Home.

6. It was not on account of fire on the ship?—No, sir. In a steamer, I know of an instance where water was running on a hundred bales of wool for fifty-five days, every day some water was going on this wool, and naturally when I arrived in London and saw the condition of the affair I was very anxious, but it was landed in good condition. When we took it away it was a little warm, but the owners of the wool were quite satisfied that it was in quite a good condition for sale.

7. What was the water running on this wool from?—From a leaky pipe.

8. What quantity of water?—I could not tell you; it would depend on the amount of the rolling of the ship, but every day there was water going on about a hundred and fifty bales—from a hundred to a hundred and fifty bales.

9. Was that dumped wool?—Yes.

10. Did you find that water had penetrated right through it?—Not fully through it; but in some instances half through it.

11. Have you ever noticed a case of wool heating seriously?—Never.

12. Or running up to a high temperature?—No, never.

13. Have you ever noticed any wool that had heated even slightly, as to the location of the heat—was it in the centre of the bale?—It was only just by feeling the outside of the bale that a little warmth was felt.

14. You did not open that bale?—No. We would cut a slit in them and pull out a little of the bale, and we could then tell whether it was soaking with water or not. If it was not soaking with water the bale was sent Home.

15. In dumping wool on board ship, have you ever seen it sufficiently wet to see the water running from it?—Oh, yes.

16. Would that water get in from the outside?—Yes, I think from the spray they would get on the little ships.

17. It might be on the corner of a bale, for instance?—Yes.

18. Would you consider that so wet that exposure to the sun would not dry it?—It would. If we got a bale a little wet on each side generally two days would dry it.

19. It was not in any serious quantity that water would squeeze out of it?—No; but, of course, there must have been a considerable quantity left in it which did not squeeze out.

20. And there also must have been a considerable amount went into it?—Well, if it was on the lower part it would naturally show the water first.

21. If you say there was a considerable quantity came out of it, there must have been a considerably greater quantity went into it?—Yes.

22. You say that was probably wetted whilst being carried in small vessels?—Yes.

23. Would you imagine that a very great quantity could get into the boat unless it was in the scuppers?—It would be something like that.

24. It would not merely be spray—it would probably soak it up from a pool on the deck?—Yes, through the ship rolling; but at the same time there might be some little crevice where the spray might go on to it.

25. Do you think from mere spray a bale would get seriously wet?—Oh, yes, in the small craft where the spray was hitting the bow every few minutes.

26. You think spray going on to a bale would be certain to soak through it?—I think so.

27. Do you not think a bale would shed it a great deal—that it would run off?—Oh, yes, a certain amount would run off, and as the outer covering got thickened the swelling out of the jute outside would naturally tend to keep the water from going far in.

28. Have you known of many cases of wool heating in the stores?—Not a great many. When a bale comes into any of our stores wet, it is generally put on one side and ultimately is it practically dried by cutting the pack open at the wet part of it. By pulling the wool out you can practically tell whether it is a very bad bale or not. Where a bale has sometimes fallen overboard it is sent back to the fellmongers by the owners and reconditioned.

29. And you have seen wool that you have regarded as damp reach Home in good condition?—Oh, yes. I have never had a bad bale reach Home in my life.

30. There was no sign of heating and no sign of deterioration?—No, no more than if you left a bale in the sun. I question if there was 90° of heat.

31. Then, from your experience you would think spontaneous combustion in wool impossible?—Unless I saw it from scientific investigation. Clean greasy wool in my experience will not take fire.

32. Amongst your cargoes you must have carried some inferior quality?—Yes.

33. And you have never found any of that fire?—No, not even in that.

34. *Captain Blackburne.*] How do you know that this water had been running on the bales for several days?—Well, we had a pipe leading from the outside which burst, and this water went into the ship and into the 'tween-decks first. In these 'tween-decks was an iron deck, and in the middle of the 'tween-decks was a little hatch where the coamings were about 5 in. or 6 in. in height, and when this part of the deck got full of water it ran over these coamings on to the wool.

35. I take it that if you had discovered the pipe was leaking you would have taken some steps at once to remedy it?—We had no idea there was any leakage.

36. *The Chairman.*] How did you come to the conclusion that there was such a long period of it?—On one voyage we arrived here in the steamer and had a large freezing-machine in our 'tween-decks for freezing the sheep. We sold that to the Gisborne Freezing Company, and that was taken entirely out of these 'tween-decks; and, of course, the lower hold could not be used for meat, and so we put wool in it. We also put wool in the 'tween-decks where this machine had been, and on the side of the steamer was the hole where the water went out. There ought to have been a blind flange placed to keep the water from coming in, but we did not place one there. Every time the ship rolled some of the water came into these 'tween-decks until it got high enough to go over the coamings, and we did not know of this until we arrived in London, and we opened the hatch and saw it.

37. *Mr. Foster.*] But you found it only when you got to London, on the outside of the wool?—After the voyage.

38. That water was keeping that wool continually cold?—Yes, I know it was.

39. There would not be any rise in temperature so long as the temperature of the water did not rise?—Not above the temperature of the water, but even then that wool was not hot at all.

40. I do not see quite how it could be unless any of that was soaked up into the centre of the bale?—Of course, in a sailing-ship with damp wool stowed away that would be so, but although the water was not running always, still that bale was wet and had received no fresh additions of water to it.

41. But still when you mentioned certain bales on which water had been running for some time, the inference that I drew was that those bales had been discovered wet on the voyage and had not been dealt with?—No, sir. Of course, during the time we were going through the tropics there would be very little water going down there, and that would be the time that the wool would increase in temperature; and after that wool had increased in temperature the water that came on to it after we got into the colder climate would not heat it.

42. But there would be water washing all the time?—But it would not go over the lip of this coaming until the ship commenced to roll.

43. *Captain Blackburne.*] When she did begin to roll again the water would be colder and reduce the temperature?—If the temperature had been increased it would reduce it a little.

44. If you do not believe in spontaneous combustion in wool, how do you account for the "Gothic" fire: I suppose you have had some talk with Captain Moffatt about it?—Yes.

45. And there is evidence the fire was in the centre of the bales, and the pack—the outside part—of many of the bales was free from any fire?—I mean to say that if there is a foreign substance in a bale it might cause spontaneous combustion; but clean greasy wool, even although damp, will not cause spontaneous combustion in my estimation. Of course, scientific men may be able to say that that is not according to facts, but that is my opinion.

46. *Mr. Foster.*] You say you require something besides clean greasy wool?—Yes.

47. Very well, you see "a bale of wool" does not mean all fine fleecy wool; it may be unsound stuff, and in regard to that do you think that is not likely to fire?—I am a little doubtful of this spontaneous combustion. I think that this foreign matter might be the cause.

48. But have you seen any wool in which there is any foreign matter?—Yes.

49. Have you carried it on the ships?—Yes. I would not say it was very bad, but I have seen it, and you could certainly smell it—it was bad enough for that.

50. If you could smell it, would you think it was damp at the time?—What I saw was not damp—it was more of a cake. Of course, the bale had been pressed or dumped, but this was more flattened out; but I can understand that if that had water on it it might increase the temperature.

51. Then if that sort of wool is sometimes shipped, it would not surprise you if a fire originated in that class of material?—No, as far as I know.

52. Have you any supervision over the way the wool arrives at your store—does it come under your notice?—Yes.

53. Have you ever noticed any trouble from insufficient or bad sheeting of trucks?—Occasionally we get that. We sometimes get a damp bale that we can almost attribute to leaky tarpaulins.

54. And do you regard those occasions as indicating anything worthy of serious complaint?—We have often complained to the Railway authorities about giving us bad tarpaulins; but they turn round and say, We have nothing to do with country side stations in loading the wool or covering it up: we leave the tarpaulins, and the consignor of that wool loads the trucks and puts the tarpaulins on.

55. But does the Department go so far as to say that, if they give you bad tarpaulins at these stations, they are not responsible?—Oh, no, I would not say that.

56. Would you attribute the wetting at these stations to bad tarpaulins?—Not so much as to putting the tarpaulins on carelessly.

57. Have you noticed whether the tarpaulins have been bad—faulty?—Yes.

58. Would it be worth while pointing out that the Department should be careful where flag stations are concerned?—I have not seen it so much in regard to flag stations; but at Timaru and here I have had in my mind the thought of complaining about the faulty tarpaulins, but I think they do their best in that respect, because sometimes the tarpaulins are torn and they are not aware of it.

59. Do you know of any cases where flax is stowed with wool on your boats?—As a rule we stow flax in every ship.

60. How do you stow it?—We keep it in one end, and when the wool gets up to it—if we have wool in one end and flax at the other—when we come up to the wool or flax we put two loose battens between the two and drive it home that way. We have sometimes complaints about the wool soaking up tallow out of tallow-casks, so that it makes us very careful in stowing wool on tallow. If you put wool on top of a tallow-cask, somehow or other the tallow inside the cask is drawn into the wool, so that we invariably cover these casks with battens of wood and mats.

61. In regard to wool arriving at your stores, have you any control of that?—In what way?

62. Control of the receiving, delivering, and dumping in the stores?—We receive it.

63. Have you control of that?—Yes.

64. You would issue general instructions?—Yes.

65. In the event of wool coming to your stores, have your men strict instructions to look out for moisture in wool?—Not for moisture in wool. They would report if one bale was warm, and they would report if one had a little dampness on it.

66. That is moisture?—Yes, moisture, and they report if a bale was very damp.

67. Have they any definite instructions as to what should be done with wool that is damp to a certain degree or faulty in any way?—Oh, yes, we always have it reconditioned.

68. And that is without reference to the owners?—No, after that.

69. You have no control—it is not within your power to say what shall be done?—No. As a rule there is no difficulty: when we see that a bale is not fit for shipment it is taken away and reconditioned.

70. Where there are indications of slight heat in a bale, what does your storeman do confirming the impression that it is hot—does he do anything further?—I fancy that there is nothing done.

71. And if it was only very slightly above the temperature of air, would he dump it and ship it?—Unless it was recognised—that is, if he and the other men felt that it was hot.

72. No matter how slight the difference in temperature might be?—Well, as a rule, it is not gone into that carefully. If they came across a bale and it felt hot to their hands it would be put on one side; but if it was almost common heat I presume nothing would be done.

73. So that it would be possible for your storeman to detect a bale of wool just slightly above normal temperature?—I dare say.

74. And still pass it?—Yes, and still pass it.

75. And it would be possible for that bale to be just commencing to set up the heat?—It might be so.

76. And it might be possible that that bale might turn out to be very dangerous?—It might be so.

77. *Captain Blackburne.*] Who is directly responsible for the stowage?—I would feel called upon to be responsible.

78. Would you yourself have the general supervision of the stowage on the ships?—I have men under me of good experience, men who know exactly what is required.

79. Have the stevedores got a free hand, or is it left to the officers of the ships?—I might say that the officers are there to detect anything. Supposing anything was wrong with a bale of wool the officers are in the hold to detect it, and not to allow it to be stowed away; but, of course, naturally my foreman knows better in regard to how to stow wool or cargo than a great many officers do.

80. Are general instructions given to the officers about stowing cargoes alongside one another?—Yes, they have their written instructions in regard to stowing the cargo.

81. I suppose if you only had a limited amount of wool, and your lower main hold was only three parts full, you would not hesitate to fill that up with flax on top of it?—Oh, no.

82. You would not think there was any special danger?—Oh, no, as long as it was well protected from the flax.

83. *The Chairman.*] Protecting the wool from the flax or the flax from the wool?—Either.

84. You say that wool will not spontaneously combust?—Not clean greasy wool, but we carry other wool that I have not dealt with.

85. *Captain Blackburne.*] Did you hear of the "Beltana" case?—Yes. I was not here at the time. I was in Dunedin at the time of the "Strathgryfe."

86. I think that was clean greasy wool?—Yes; but there may have been some foreign matter in it.

87. If it is damp?—With regard to clean greasy wool, although damp under some conditions, it might take fire, but unless some scientific process tells me so I cannot tell from my own experience.

88. *Mr. Foster.*] Considerable comment has been made as to the practice—I will not say "practice"—but on occasions when cargo-stowers smoke in the holds?—Our instructions are that no smoking is to be allowed, and my foreman has instructions that the man who is caught smoking goes out of the hold immediately.

89. Do you find that difficult of enforcement?—Yes, it is something like the coal-trimmers in coal-boats in that respect.

90. It has been suggested that legislation should be brought to bear upon offenders of that sort. But do you not think it would be possible to provide that before any men go on board a ship they should give up their matches and pipes?—I see no great difficulty in that. It is a little bit humiliating to the men if we told them they were not to have their pipes down the ship, that they should be searched.

91. Not necessarily, probably it might be worked without that; but as to the humiliation, I do not see exactly where that comes in. It would be humiliating that a class of men should be required to be searched, but if the necessity was there I do not see where the humiliation is?—That is the only feeling I have that if a man will give his bond that he will not smoke in a ship and then you enforce it by turning out his pockets, that is the difficulty. Of course, there are black sheep in every flock, but from what I know of the Lyttelton stevedores they are careful; but, of course, there are some black sheep who would break through any law.

92. But protection against the black sheep should not be humiliating to the white sheep in a flock?—No, if they take it that way.

93. But serious accidents have happened from this?—Oh, yes.

94. And in the case of ammunition-factories that is rigidly insisted upon?—And also in the case of coal-pits in the Old Country—they are not supposed to have matches, but they sometimes break the safety-lamps.

95. Is there not a regulation in coal-mines to give up everything?—Yes, there is a strict law, but sometimes they get a little lax, and not long ago I read of them breaking their safety-lamps in order to light their pipes.

96. If it is the opinion of a good many—and I have heard a good many expressions of opinion about it—do you think it is necessary to legislate to make it a punishable offence?—I think it should be so.

97. If that is necessary in the opinion of many, do you not think it would be very much more necessary that owners should be interested in carrying out the rules to protect themselves?—Oh, yes, I think so; but the men understand that no smoking is allowed, but we have not that inspection that every man should be told that he should leave his matches outside or take off his clothing.

98. What I mean is this, that a man who goes on board a ship should be required to leave his

pipe or matches on some part of the ship or on the wharf. It is done in the ammunition-factories, and they never have any trouble; but the greatest danger is carrying loose matches in the pocket, and that a man might do although he never dreams of smoking, and that may be more dangerous than even smoking?—We do not work our men as in an ammunition-factory: we have, say, fifty men working one ship to-day, and to-morrow have other fifty men working another, and it is not exactly the same.

99. I was not comparing the two employments in any way, but as a method of managing the work. What I want to point out is that in one case it may be insisted upon and there is no offence to the employees, and I do not see why it should not be provided for in this case?—I quite agree with you. I have not the least doubt that wax matches especially are the cause of some fires.

100. When you detect a man smoking, of course, he knows it is against orders?—Oh, yes, he does.

101. What do you tell him?—Tell him to go on shore.

102. You do not prosecute him?—No, we have not done so in the past—we think it is a minor offence.

103. And yet it has been thought worthy of special legislation?—Oh, yes, in special trades—it depends on the trade.

104. Many people think special legislation should be brought in in regard to it?—I have no objection.

105. What is the good of legislation if you do not punish the men—you can now?—Oh, yes, we can now, but we have never done so.

106. *Captain Blackburne.*] Would that man be employed again?—Not if we knew it—that is a sort of black mark against that man's name. As a rule we have no trouble with the ordinary stevedore men in that respect.

JOHN HERBERT SQUIRES recalled and resworn. (No. 66.)

107. *The Chairman.*] I understand you were to-day to bring your log-book with reference to the state of the weather in Wellington when the "Rimutaka" was loading?—Yes.

108. Have you got it?—Yes.

109. What was the first date of loading?—The first day of loading was on the 4th May; we started loading general cargo in No. 5 hold, which means flax or tow or anything of that sort. At 8 o'clock that morning there was a moderate breeze, overcast, and fair weather; at 12 o'clock there was a fresh breeze, overcast, and showery. The men knocked off from 12 o'clock to 1 o'clock for dinner, and resumed loading at 1 o'clock in No. 5 hold, and at 3.30 they finished loading Nos. 4 and 5 holds. At 4 o'clock there was a strong wind, overcast, and showery.

110. That was on the 4th May?—Yes. On the 5th May we started loading into No. 5 at 8 o'clock, and there was a light breeze and fine clear weather. At 12 o'clock the weather was the same, and then from 12 to 1 o'clock the stevedores again knocked off for dinner, and at 4 o'clock the wind was just light, with fine clear weather.

111. Any more rain?—No, no rain the whole of that day. On the 7th May—the Monday—we finished No. 5 hold at 5 o'clock in the afternoon, and the next morning at 8 o'clock there was a moderate breeze, overcast, and light continuous rain. At 8.30 the rain stopped, and the stevedores resumed loading Nos. 1 and 5 holds. At 12 o'clock there was a moderate breeze, with overcast, and occasional showers. Of course they stopped work at 12 o'clock, and at 12.30 the rain stopped during the luncheon hour. At 1 o'clock the stevedores commenced loading again into Nos. 1 and 5 holds. At 4 o'clock there was a fresh wind, overcast, with occasional rain-squalls. At 5 o'clock the hold was finished for good.

112. Finished altogether?—Yes. We sailed a couple of days after that.

113. Was that the finish of your loading in Wellington?—No, we were loading afterwards in other holds, but not in No. 5, and No. 5 was where the fire took place.

114. Was that the only hold where a fire took place?—Yes.

115. And that hold was not opened again after the 7th?—No.

116. What custom do you follow when you have that showery weather?—Well, the same as I told you in Wellington about putting a tarpaulin down the centre of the hatch—that is, if we work through it. If it is very bad we do not work through it.

117. You put some hatches on and then the tarpaulin across it?—It is down in the hold on top of the stuff itself. If we put some hatches on it would interfere with the work, so that when it is raining too hard we cannot work that way.

118. Well, assuming that some of the water does get on to these tarpaulins, how does the water run off?—We hoist the tarpaulin up by the four corners, and it is emptied on to the deck into the scuppers.

119. And not allowed to escape into the hold?—No, we are very particular about that. In fact, where the fire started there could not have been any water got to it—the wool was dry when it was put in.

120. Did you see any wool get damp when going aboard during the showers?—The wool will not get damp going from the shed to the ship's hold; there would be hardly enough time to notice it, because I have seen a bale of wool when loading in Waitara on one occasion either in the "Rakaia" or "Waikato" under trying conditions, I have seen a bale go down into the water and then be hoisted up again, and after being cut open we found the water had not penetrated more than half an inch inside the cover. I think it is because the wool is pressed so hard that the water does not penetrate.

121. *Mr. Foster.*] And, of course, the outside edges of the wool are freer to soak up the water than when you get further in?—Yes. Of course, there is a tremendous pressure on these bales, and when the bands cut into them they keep them in that position all the time.

122. There is a greater pressure in the ship?—There is not that pressure. On the outside of the bales themselves there is not a greater pressure.

123. The extra weight does not compare with the weight applied to the dumping?—No.

124. *Captain Blackburne.*] We had evidence yesterday to the effect that a witness had seen wool taken in sometimes in pouring rain—that has never been your practice?—No.

125. You have not seen it with other ships?—No, I have never noticed, and I have been running out here for close on six years, and have never seen anything like that happen.

126. Do you think it is possible a fire could have originated by the men leaving a pipe on top of the cargo?—No; that is impossible, because in the hold in which the fire started the bales were stowed on the top tier of the lower hold, and there was no room between them and the deck, and if a man happened to get down there he could not have crawled up very well. I do not think there was much chance of a man leaving a spark on the wool. If a spark dropped on to flax or tow it would make a difference, but not on the wool.

127. *The Chairman.*] It would fall on the pack and go out?—Yes.

128. But if it fell on to flax or tow it would blaze up?—Yes, instantly.

129. *Captain Blackburne.*] There was no flax or tow near the hold?—There was flax and tow in the hold, but a long way from the wool.

130. Who is responsible for the stowage in the ships of the New Zealand Shipping Company?—The second officer is responsible for the stowing. Our marine superintendent tells him where he wants the cargo stowed, and he is responsible for seeing it stowed properly.

131. He has sufficient instructions?—As far as where the wool is stowed; but as far as seeing the wool matted and kept clear of other cargo, he has his own instructions.

132. Are there any other instructions he receives from the marine superintendent?—I suppose he tells them occasionally by word of mouth that he wants certain things done; but occasionally we have instructions, especially if there is certain damage done on the way Home, and we get letters down how the cargo is to go. Of course, the second officer of our ship has foremen stevedores under him. If the cargo is not stowed to his satisfaction, he has the power to make them restow it again.

133. The stevedore has not a free hand?—No, he is under the instructions of the officer of the ship as far as that goes.

134. Is that the same in London?—Of course, in London it is a little different. We have a superintendent discharging there, Captain Nooks, and, of course, the officers have to be about just the same and see the cargo handled properly.

135. Is there an officer in the hold all the time?—Yes, he is up and down the hold all the time supervising generally.

136. Are there officers for all the holds?—No. In London sometimes we have three or four officers for the holds, seeing that it is turned up properly.

137. We heard of a case of rolls of oiled and tarred tarpaulins stowed next to kegs of spirits and cases of matches—would you consider that a dangerous way of stowing cargo?—It is dangerous from this point of view, that if the matches happened to ignite, of course, everything else would go; but so long as there was no combustion first there would be no danger.

138. *The Chairman.*] But would not the tarpaulins be subject to spontaneous combustion?—No, I have never had a case of that sort.

139. *Captain Blackburne.*] It is surprising that the whole of the officers should not have been made aware of it. It is not many years ago, and it was stated that the fire originated in these tarpaulins from spontaneous combustion in the "Waikato"?—I have heard of it. I was in the "Waikato" for some time, but it could not have been during the time I was in her. I have never heard of tarpaulins if rolled up together starting spontaneous combustion. I have seen tarpaulins rolled up and left in a place during the whole voyage, and in sailing-ships I have seen them stowed away for 180 days, and there was no sign of spontaneous combustion.

140. We have had evidence of an oilskin being rolled up and forgotten for some time, and when taken up again it was found to be almost burnt inside—it had begun to burn, and was charred?—Yes, of course, that is very probable. I have never met a case of that sort; I am only speaking of what I have seen myself.

141. There is a case where a fire originated in oily tarpaulins about 8 ft. from the side of the ship?—Yes.

142. Of course, the damp may have got to it, and also there is cotton in it—canvas?—It is jute, is it not? In American sailing-ships they use cotton canvas.

143. *Mr. Foster.*] Your canvas is made of hemp?—Hemp or jute. I do not think it is cotton.

144. *Captain Blackburne.*] Oily waste will very often heat?—Well, that is cotton again.

145. *Mr. Foster.*] Do you happen to remember the brands of that wool that was burning?—No.

146. Do you think it would assist your memory if I showed you a list of wool damaged in the "Rimutaka"?—Yes. I think I remember some brands, but I would rather not say—I am not certain of it. [List handed to witness.]

147. If Mr. Gibbs said you could give that information, would you do so?—Yes, I would.

148. Well, that list is from the office?—[Witness indicated to Mr. Foster the brands he remembered seeing.]

149. *Captain Blackburne.*] The officers do not tally the cargo?—In certain ports we do.

150. I mean in New Zealand?—Not wool, except in a place like the Bluff, Wanganui, and Waitara, where we do tally it.

151. Which officer would have charge of that special hold?—In loading?

152. Yes?—The second officer who was on the ship last voyage. He would probably see that everything was stowed all right.

153. But he would not have the marks and numbers of the particular cargo that was stowed in that hold?—He might have. Of course, he would get it from his receipts that he signed in Wellington—he keeps a duplicate.

154. He gives a receipt?—Yes, for everything that goes into the ship. The tally-clerks hand him a list of what they have tallied, and he signs for it. Sometimes the juniors sign for what they have tallied themselves.

155. Could he let us know what cargo was in that special hold?—Yes, he would know where each tally-clerk had put his cargo in.

156. Just as if he had tallied the hatch himself?—Yes.

157. *Mr. Foster.*] I understood previously that the officers did not tally the cargo?—They do not.

158. But they give a receipt for what they have not seen?—That is so.

159. How do they know it is there?—They have the tally-clerk's word for it.

160. The tally-clerk is under the direction of the officer?—He is under the instructions of the company.

161. If the tally-clerk makes a mistake, is the officer responsible?—They cannot say the officer is responsible. Before the bills of lading are made out they must have the officer's receipt. We must sign for it and take the people's word. I have been second officer in this ship for two years, and I have done a good deal of that sort of thing myself.

162. *Captain Blackburne.*] That is not the case in London: the officer does not sign for it there?—Yes, he has to sign the Customs notes of transshipment cargo, and all this sort of thing comes down at the last moment. The Customs officers bring it in big sheets, and it takes two or three hours to sign sometimes, and he does not know what he is signing half the time. If he did not sign it there would be a row. Of course, we know the company would take any responsibility in a case of that kind if there was any trouble.

SIDNEY JAMES PLUMMER sworn and examined. (No. 67.)

163. *The Chairman.*] What is your name?—Sidney James Plummer.

164. You are the second officer on board the "Rimutaka"?—Yes.

165. Were you second officer when she went Home last trip?—No; I joined her at Home after the cargo was out.

166. You were an officer on board the "Waimate" at the time of the fire in Napier?—No, going Home last voyage.

167. Where did you join her?—I was in her two voyages before that.

168. Were you on board at Napier when the fire took place?—No, I was not.

169. We were given to understand that you knew a good deal about the fire?—Not the Napier fire, only going Home last voyage.

170. And that had nothing to do with the Napier fire?—No.

171. Was not the cargo afire going Home?—Yes, in the wool.

172. Can you tell us something about that?—Well, we found we were on fire two days before we got to Teneriffe, and, of course, we were fitted with the Clayton fire-extinguisher. We started it going and kept it running for fifteen hours, and the smoke stopped, and all we could smell was the sulphur, and we plugged everything up and then stopped running it. We then ran into Teneriffe but did not open up the hatches at all, and after we left again and got about opposite Vigo we saw smoke coming out of the ventilators.

173. How long after?—About two days after leaving Teneriffe. It was stronger this time than before, and we started the engine again and ran it for about two hours, and it stopped. We kept the engine going for four hours and then stopped it for six, and we went into Plymouth only because we wanted more sulphur.

174. When you arrived and the cargo was broken out, was any of it still showing signs of fire?—Yes, in the centre of the bales. There was one bale there that, so far as the outside was concerned, was intact, but as soon as we cut the bands smoke and steam issued from it, and you could see the thing smouldering in the centre of the bale.

175. Was there any fire?—No, no fire, just smouldering black—it was like cinder inside.

176. Any smoke coming from it?—Yes, when we opened it from the hold.

177. What sort of smoke was it? Might it have been vapour, or was it black smoke?—No, it was not black smoke—it might have been steam; but when we opened the bale there was the black centre.

178. Did it give you the impression of being cinder, or was it merely blackened from excessive heat?—Oh, heat, I should say.

179. I want to distinguish between burning and mere blackening, the process of decomposition in the wool?—It is hard to say. I should say, judging from the look it had, it was fire.

180. The smoke that was coming from the ventilators in the hold, did you judge that to be smoke or vapour?—Smoke.

181. Would it leave lamp-black on the ventilator?—There was no mistaking it if you got your nose against it.

182. You are satisfied it was smoke from the fire?—Yes.

183. Do you happen to remember the brand on a bale or two of the wool that was in such a condition?—No.

184. If you had a list could you pick it out?—No. I was only third officer on the "Waimate," and it had really nothing to do with me.

185. Had you not sufficient interest to look at the brands?—Yes—that is, in London. [Witness marked certain brands which were on board, but he could not state whether they were in the hold where the fire was.]

186. Could you say whether they were amongst the affected?—I could not say. I remember that mark on board, but I could not state whether it was in that hold.

187. *Captain Blackburne.*] You actually saw the wool put out from the "Waimate" on that occasion?—Yes, in London.

188. You did not see it burning?—Some of it was burning on that occasion.
189. No flame?—No. There was in one case where the bale was like a large cinder, and in the centre it was red-hot.
190. Captain Jaggard, in his evidence, said he had seen it burning?—Yes, the bale of wool was simply one large cinder, and red-hot.
191. *Mr. Foster.*] Had the bands come off?—Yes.
192. It was simply a lump of red char?—Yes, a large clinker.
193. Was that knocked to pieces?—They knocked it to pieces to get it up.
194. Was it a mass of cinder right through when they broke it?—Yes, when broken it was a mass of cinders or clinkers.
195. It was not like wool?—You would not recognise it as wool unless you were told.
196. It had gone right through?—Yes, you would not trace it as a bale of wool.
197. Do you think that fire may have originated from matches dropped on the bales by lumpers?—No.
198. Whatever you think caused the mischief, you think it originated in the centre of the bale?—Yes, I am almost certain.
199. When you have taken bales on board have you noticed any dampness?—No. Even if we see the cover a little damp we are not supposed to take it in, and we do not take it in.
200. Do you remember what the weather was like when you were loading in Wellington, or at any other ports?—I cannot distinctly remember. I do not remember it being wet when we were here then. I cannot state for certain.
201. The log-book would give it?—Yes, but I have not got that.
202. *Captain Blackburne.*] Were there any other bales burnt through?—Some of them half-way through.
203. Originating in the centre apparently?—That is hard to say, because we traced the fire back to the centre where it was all a cinder. That was under No. 4 lower hold, about three tiers down, just above the tunnel and in the port after corner.
204. Was it far from the hatchway?—Yes, clear of the hatchway, on the port side in the after wing, and you could see the stanchion had been burned by fire.
205. Was it of wood?—No, of iron. The beam had been buckled, and the 'tween-hatches were burned right out, and that caused the flame. The wooden hatches were burned right clean out. The fire would naturally draw up from the wing, and when one hatch goes they soon all go.
206. *Mr. Foster.*] You did not happen to take the temperature of that hold during the fire?—Yes, we had thermometers down all the time. We could not get right down at the fire, but we got 104° down one of the ventilators, that was the highest; and when we got the machine going it varied from 72° to 82°. The temperatures were all put in the log-book.
207. *Captain Blackburne.*] Have you any system of taking the temperatures of the holds?—Not unless we think there is any likelihood of anything. We have no pipes for it; but, of course, we can always test it down the ventilator.
208. How do you keep your ventilators trimmed?—We keep one back to the wind and one to the wind—the after one to the wind—but if there is any likelihood of bad weather, they are turned from the wind, and also in bad weather plugs are put into them.
209. Do you know whether any inquiry was held at Home about that fire?—Oh, yes.
210. Do you know the nature of the inquiry?—No.
211. Were any of the officers called?—No.
212. Do you know if the log-book was produced?—I left the ship, and do not really know anything about the inquiry. I only know that Captain Oakes had an idea that it was the sheep-dip, caused from the chemical in the sheep-dip when the wool was pressed. Whether they held to that opinion I do not know.
213. Would you think the inquiry would be likely to be an exhaustive one?—The “Waimate” fire was not much thought about.

WILLIAM HENRY CLARK sworn and examined. (No. 68.)

214. *The Chairman.*] What is your name?—William Henry Clark.
215. What are you?—I have retired—I had a business.
216. What were you before you retired?—I was a wool-merchant.
217. You had to deal with the shipping of wool?—I bought wool in the colonies and shipped it to London.
218. And you know something of the condition of the wool when you buy it, of course?—I have had about twenty-five years' experience.
219. Could you give the Commission some information as to the condition of the wool, or varying conditions, in which you received it?—Of course, wool is all wet more or less, or damp, and always carries a certain amount of moisture, and it is a question how much it will carry without injury.
220. Without what injury—to the wool or setting up heat?—Injury to the wool. If it sets up heat the wool deteriorates. Of course, every year in nearly every ship there is a certain amount of wet wool; you have only to look over the London catalogue and you will see the wool marked “C.D.”—country damaged—which really means packed damp and heated on the voyage.
221. *Mr. Foster.*] Might that not be a case of, for instance, wetting on the way and discoloration?—In “country damaged” it always arises from the centre of the bale. Any external moisture from the outside of the bale will evaporate without doing any damage, or very small; but moisture in the centre of the wool, especially when it is dumped, generates heat. My opinion is that all wool should be skirted—that is to say, all the skirts, bellies, pieces, and locks should be taken out.

222. *The Chairman.*] Do you think that they should be cleaned separately?—Taken from the fleece wool, because on the bellies and pieces, which is the bottom part of the sheep, when they commence to shear it is frequently damp, and if that is baled and dumped in that condition it comes into the sales in a damp state. That is where you would get damp wool or the wool would get very hot. I think all trimmings should be treated here and shipped undumped. I hold that all slipes and scoured wool should be shipped undumped, because for years I have known that if there is any doubt about the wool, and it is shipped undumped, it practically arrives all right because any moisture can evaporate; but if it is dumped it will not evaporate, and the tighter wool gets together the hotter it will get.

223. *Mr. Foster.*] Whatever heat is generated is imprisoned by the dumping?—Yes, the tighter the dumping the worse it is. I have seen it stacked, for instance, in order to get up heat. We have got it as tight together as possible, and if we pull it out it evaporates at once. I have also seen samples sent from London from the centre of bales showing that heat had got up. It was always inside, and never from the outside, which, to my mind, proves that it is the dumping which keeps it in.

224. Take two wet bales, or one with a considerable amount of moisture on the outside coming flat against one another, what would you consider might be the result of that?—I do not think it would hurt at all, because the bands could not get perfectly tight, and a certain amount of air would get through. I do not think any external dampness would do any damage.

225. *The Chairman.*] You do not think that bale would take in a sufficient amount of moisture to cause any harm?—No, I do not think so.

226. *Mr. Foster.*] We have had evidence of a case where a number of bales of low-grade wool, low-quality stuff, was put together; they had not been dumped, but they heated spontaneously to such a degree that when the tarpaulin was opened, and they were pulled apart, they burst into flame?—That would be low-quality wool containing a lot of vegetable matter.

227. But in that case the flame burst out between the bales and burnt the woolpacks first?—That would be the woolpacks that burst out.

228. My idea in asking you what might happen if there was wet wool between two bales was this: I wanted to get at your opinion as to whether that wet wool would set up heat?—I do not think so—not externally, because I think the space between, which there is in all bales stacked together like that, prevents it—it allows the air to get between them.

229. But supposing that, instead of the sides of bales, the end of one was very wet and came butt alongside the other one, would they not be packed sufficiently close to set up heat?—I do not think so, not to do any damage, or very little damage, because the air would get around it.

230. The bales are not quite flat and not quite round, and possibly the flat surfaces might come together, but, of course, the bands might cut in more or less?—Yes. I have always found that if you allow a space for air to get around it or among it it will be all right. I have seen wet wool stacked for months, and through allowing the air to get to it it was all right.

231. It is the evaporation that keeps it cool more than getting the air in?—It remains wet all the time—you do not allow it to dry.

232. If you allow the air in it means that the increased temperature is allowed to get off in the nature of steam?—If you keep it cool by allowing the air to get amongst it and it remains wet.

233. The evaporation is simply throwing off the heat?—Yes, it is keeping it cool.

234. The effect is the same?—Yes. Sheep-skins are practically the same thing; they contain a good deal of moisture. Now and again quantities of these are shipped, and they should not be dumped. Sheep-skins are the same as locks and pieces.

235. *The Chairman.*] Because they have extraneous matter amongst them?—Yes, and there would be dampness amongst them which would pass the eye and not be seen, and you would have to be very, very careful.

236. *Mr. Foster.*] Do you mean that to apply to skins dumped flat—skins in bales?—I mean that skins packed up in bales ready for shipment should not be dumped—that is, two bales dumped into one.

237. Would you consider that necessary with regard to the sheep-skins as they dump them in Wellington—they spread them out and dump them in bundles?—It is practically a pressure of 800 cwt., and they would generate heat in the centre.

238. I suppose you have noticed that a great many skins have a considerable amount of fat about the neck and tail end?—Yes. I do not think that would hurt.

239. You do not think that would have any effect?—It is water that the danger comes from.

240. Would you think it was not dangerous to have fat amongst wool as it would be amongst waste, which spontaneously combusts?—I have no experience that way. I think the water in the sheep-skins leads to the greatest trouble I ever saw. Of course, that applies to low-quality wools, where the water properly dries.

241. Of course, when you say there is moisture in all wools, and it is a question how much it will carry, you refer to the natural moisture?—Yes, and water.

242. Well, the water that is ascertained, for instance, on analysis, that is the water you refer to which the wool contains?—It is a question of judgment whether it is suitable.

243. But when you said it is a question of moisture, you mean how much more than the natural proportion?—Yes, the question is what is the natural proportion.

244. *The Chairman.*] They say 18 per cent., and you might find 35 or 40 per cent., so that the difference between 18 and 35 or 40 would be the moisture that would be obtained from the atmosphere—not one of the constituent elements of the wool itself. Have you any idea of the proportion of water which would be necessary to bring wool to a point of combustion under circumstances favourable to it?—Certain qualities of wool will carry less than others. I should say wool carrying about 10 per cent. of water and dumped would not arrive in London in a safe condition—anything may happen before it got there.

245. Do you mean to say 10 per cent. more than the natural moisture?—I do not know what is the natural condition—what the scientists would say. Say we ship wool from here to London—there is always a loss or gain—and in a bale of wool weighing 3 cwt., if that lost three or four pounds between here and London we should say it is all right; but if that wool was to lose 30 lb. it would not be right, and you would have a lot of damaged wool.

246. But the 10 per cent. of water you speak of is practically what we understand as being in excess of the condition under which it would be found according to the atmospheric conditions?—Yes. The tighter wool is packed the quicker it gets hot. For a number of years I have known that if wool is likely to be damaged it is because of the dumping and on account of carrying moisture—wool put up in damp seasons or in the winter. I have always had those qualities shipped undumped, and I have never had any bad reports, only having them slightly caked.

247. *Captain Blackburne.*] You consider the danger of dumped wool is that the moisture and heat is compressed into half the space?—Yes, and cannot evaporate, whilst if not dumped the moisture would get out.

248. *Mr. Foster.*] Of course, you have had a very considerable amount of wool received at your fellmongery, and you have also sent a considerable amount from there to Lyttelton for shipment?—Yes.

249. Have you had any reason for complaining as to the provision made by the Railway Department as to carriage?—No, not for dampness—nor covers. The complaints I had were in regard to supplying dirty trucks, which affects the wool.

250. Do you mean dirty or wet?—Coal-trucks for wool.

251. By "dirty" what do you mean?—Coal-trucks for wool. You order trucks for wool, and they send you coal-trucks.

252. Have you ever noticed where those trucks came from—might they have come from Christchurch?—I do not know.

253. Did you make complaints?—Yes.

254. In writing?—Yes.

255. And to whom did you make your complaints?—Say, for instance, at Ohoku, when I ran a business there, I would complain through the people I was ordering from.

256. Would that be a verbal or written complaint?—I think usually verbal complaints.

257. Would that be likely to get through to the responsible officers?—I do not know.

258. So that if the senior officers said they were not aware of any serious complaints, you would imagine the complaints had not reached them?—I did not think about it—they seem not to have attended to it. Now, we used to order a truck from the Traffic Manager at the Department, and where we ordered a number of trucks and they are not in good condition, we would ring up the office and tell them they were dirty trucks, and sometimes they were attended to and sometimes they were not.

259. In regard to the carriage of wool, you have had very little to complain of either in sheeting or anything else?—I have never had anything to complain of.

260. And in regard to dirty trucks, you refer mostly to coal-trucks?—Yes.

261. Not in regard to any water or mud?—No.

262. Had you any wool in the "Gothic"?—No.

263. Nor the "Rimutaka"?—I have been out of business for a year.

264. Then I suppose, not being interested, you did not hear much about it?—I heard a few things.

265. I mean in the way of facts that you could impart to us?—The whole of those particular shipments?

266. Yes?—I heard all sorts of things in the street. I do not know anything about those shipments.

267. *Captain Blackburne.*] Have you ever seen a bale of wool on fire?—No, not on fire; but heated very much.

268. Charred on the inside?—Yes. I have seen it very black—wool which was shipped away from here. I have seen a lot of charred wool in two ships that put in here from Australia, one at Lyttelton and one at Dunedin—they were very much charred.

269. Can you make any suggestion as to how the general public and the shippers could be protected in this direction?—Yes, by all the skirtings and a certain percentage taken from the fleece wool being shipped undumped, or treated locally and shipped undumped—all skirtings and slipe wool.

270. Do you think they should prohibit them from being dumped?—Yes, because in New Zealand we have a lot of people in business who are not as well off as other people are, and in order to finance the thing they often have to hurry their wool away to get it on board the ship and get the money, and in doing so a man may let wool go away a little different from what it ought to be.

271. In what way could that be prevented?—This wool if it was not dumped would go fairly safe—you would have no danger—that is to say, if it got hot it would not ignite like a dumped bale would, because the moisture could get out of it. I have had bales in my shed which have been hot, say, for weeks and longer, and I have had no danger from that; it only injured the wool.

272. In what way are we to prevent people dumping such bales?—By prohibiting the scoured or slipe wool being shipped dumped.

273. *Mr. Foster.*] Would you say if those wools are properly dried that there is any risk then?—If they are properly dry it is a different thing.

274. Would you not rather legislate that the man who does not know his business should be legislated out of it than that the people who deal with their wool in a proper manner should be so treated?—An employer cannot always rely on his packers being so careful as they might be.

275. Would you say that every fellmonger should undergo an examination?—Yes; but when he has got a banking account to square up he might be blind and let the wool go away as it suits him.

276. Would you suggest Government aid?—It would be a very good thing.

277. I fancy that the suggestion of yours to restrict the export of inferior wool or wools of the class you mentioned because of the danger of putting them up improperly would be hardly likely to be carried out. Would you think that proper inspection at the port of shipment, with power to the Inspector to prosecute in the event of their packing damp wool or in the event of wilful neglect or wilful packing, by making it punishable, do you not think that would have a good effect?—It would do a lot of good. You see, with scoured and slipe wool there are certain times in the year when it dries externally, and yet it is a most difficult matter to tell when it is dry or not, then to see it on certain days you will examine it and pass it and it is all right; but two or three days afterwards the weather changes and you will find it does not dry. If a man has packed that wool up in the meantime and sent it away, he does it quite honestly in the first place and yet the wool is not dry.

278. Would you think that wool is dangerous?—Yes.

279. When it was at the point that you could hardly tell whether it was moist?—There is always a certain class of wool, and you have to use your judgment to say whether it is not too moist.

280. Have you ever had any trouble with your wool—any serious heating?—Not shipped. I suppose about fifteen years ago I had wool arrive in London marked “Country damaged,” and since then I have not had this class of wool dumped—always shipped it undumped, certain qualities, and paid the extra freight on it.

281. Did you know anything about the “Beltana” wool?—Yes, I had a considerable quantity of it.

282. Of the damaged wool?—Yes.

283. But you were not a shipper in that boat?—No, it was shipped in South Australia.

284. Did she not carry the wool away again?—She put into Lyttelton on fire, and after they got the fire out they discharged a lot of the wool. Some three or four hundred bales had been sold, and I bought it. They took some of it for treatment, and it was reshipped on the “Beltana.”

285. You did not scour any of the wool that was reshipped?—Not by the “Beltana.”

286. Can you tell us the condition the wool was in that you bought?—Very much charred and burned.

287. Inside or outside the bales?—I think it was chiefly outside.

288. Then you would consider the fire originated from some extraneous cause—not in the bale?—Yes. The bales I had were charred all round on the outside from the fire.

289. If the fire originated in the centre of a bale, then the others were damaged as a result of that?—Yes, of course, there was a large quantity of that burned.

290. Was the wool you bought charred on the outside deeply in?—You could hardly say. A lot of the bands were off, and the bales thrown loose in large stacks.

291. Still there were some inches burned all round probably?—Yes, burned all round.

292. The fire was out when you got the wool?—Oh, yes.

293. Would you say that wool will flame under any conditions?—I have never seen it flame.

294. Would you suppose it would?—I do not think it would. I have seen it very hot, but I have never seen it flame.

295. Have you ever seen molten iron run, and have you ever noticed whether there was any flame apparently over that?—I cannot recollect.

296. Would you think it likely that if a bale was sufficiently hot to become a mass of coke on the outside and also to become red-hot, do you think that would cause flame?—Yes, if it was as wet as that.

297. Because one wool expert has told us that wool will not flame?—Yes.

298. Well, I saw sheep on fire in a grass-fire. You have to have a certain temperature, and it will flame?—It must do. It would have to be very hot to do it. Of course, the pack around the wool would flame.

WILLIAM DRUMMOND STEWART SWORN and examined. (No. 69.)

299. *The Chairman.*] What are you, Mr. Stewart?—I am an auctioneer.

300. For what firm?—Dalgety and Company (Limited).

301. You have had considerable experience in the wool business?—Yes, in different departments.

302. Will you give us some information respecting the conditions under which wool comes under your care, either for sale or otherwise?—I can only really speak of wool with any feeling of authority as far as it is received in the stores for sale. I have very little to do with the shipment of wool, and am very seldom at the shipping port. During the wool season, I have, in my capacity as auctioneer, to be in the wool-stores pretty well the whole of the season to supervise the opening-up of the wool for sale, and it is under my notice during the time it is in store here. After that it passes out of my hands.

303. You observe the condition of it as it comes in?—Yes.

304. You have, at times, all classes of wool coming in?—Although the principal portion of it here is greasy wool, we handle a limited quantity of scoured wool, and about the same quantity of slipe wools, but very few lots of the latter pass through the local markets here at auction.

305. About the lower qualities, such as pieces, dags, and locks?—Yes, we receive these qualities for sale locally, and, as a rule, they are sold for manipulation by the scourers and subsequent export.

306. And some quantities of these qualities go Home in the grease?—Yes, but the great bulk of it is manipulated by the local scourers.

307. Have you observed if there has been any larger proportion of low qualities passing through the sales this last season in comparison with former seasons?—I can say that I did notice it during last season. I noticed since then larger quantities of very inferior wools going forward which are sold at the present time locally. In fact, owing to the very high prices which wool has been fetching, they have been sending in some qualities which in an ordinary season would not be picked up to send in.

308. There has been a certain inducement?—Yes.

309. *Mr. Foster.*] Would you be likely to have any knowledge of the wools that were shipped by your stores from the local sales?—Yes.

310. Then you would know whether there were larger quantities of locks and pieces shipped this year than in previous years?—Speaking from my experience, I do not think there was a larger proportion taken for shipment than is usual.

311. There would be a larger proportion scoured?—I did not notice a larger quantity.

312. We have had evidence of the fact that there has been a larger proportion of locks and pieces shipped last year, and that is attributed by some people to the increase in prices; and the number of fires which have taken place have been attributed to those qualities of wool?—Yes.

313. Have you had under your notice any low qualities wet and heated?—Yes, I have. I have had one or two instances of low-class wools being forwarded into store which would not have been in a fit condition for shipment.

314. Did you notice if it was heated to a high degree?—In some cases, yes, it was heated. There was no trouble in detecting that it was hot.

315. And was there evidence of considerable moisture?—Yes, I should say there was considerable heat and moisture.

316. So you think if the heat had not been arrested at that point it would have gone higher?—Yes.

317. Do you know what became of the wools?—Two instances I have in my mind of wools which were sent into our company for sale, and which we withdrew from sale on account of the buyers having observed that it was not in a fit condition for shipment. We had it opened up and dried and put up again, and reoffered when dry.

318. Have you been long with your present company?—Yes, five years.

319. So you can compare this year with previous years?—Yes.

320. Previous to your coming here you were in Wellington?—Yes.

321. Had you at that time anything to do with the shipping of wool?—Not in my official capacity. I have seen the wool passing through the sheds and the dumping.

322. In regard to wool arriving for local sales, have you noticed any in a wet condition that you would imagine would heat in transit?—Yes, repeatedly.

323. To any extent?—Not to any serious extent. I understand you mean wool that has become wet in transit, such as in the trucks or steamers? Yes, I have noticed that repeatedly.

324. Have you noticed whether a larger proportion of it would be through rail carriage or water carriage?—I would attribute it to the system they have of covering the trucks, and the system they have of loading the trucks with a flat top. The system might, perhaps, be improved upon by allowing the trucks to be loaded in such a manner as to form a ridge.

325. Is it sufficiently in your memory to say whether the wool arrived from a flag station, or from a station where there was a goods-shed and Stationmaster?—No, it is not. It is more a question of the weather. If we get a tropical downpour of rain it is almost impossible for the tarpaulins to keep it out.

326. Would you think, from what you have seen of wool becoming wet in transit, that it would be likely to be a danger to a vessel if shipped for a voyage?—I do not think so, as far as it has come under my notice. The system we have is that we receive trucks of wool, and if any of the bales are wet we open it up in the store, and put the wool in such a position that it can dry before going out of our store again. As far as I am aware, we have never sent any out wet.

327. In respect to the wool coming forward, have you noticed any heating in fleece wool?—Not in fleece wool. I cannot say that I have noticed it in greasy fleece wools.

328. Have you in scoured wool?—Yes, but not very much.

329. Would it be sufficient to cause you to open up the bales?—No.

330. And as to slipe wools, you sometimes have some to sell at auction?—Yes; but, as I said, it is a very limited quantity, and I have never had it arrive in a wet condition.

331. Wool bought by Home buyers for shipment in the grease—what measure of inspection would be sufficient to detect moisture in that wool?—I do not think there is any. It is left to the wool-buyers, or perhaps ourselves, as wool brokers and valuers. The wool-buyer, as a rule, would be able to detect any moisture in wool if it came under his notice.

332. And would not take it?—Or values it lower in proportion.

333. To what extent does he inspect the wool generally?—For his purpose, if he buys a line of, say, twenty bales, he might open a portion of them to see that they were in good condition, and to gauge their condition and quality.

334. In addition to those bales which were previously opened?—That lies with the buyer; some are more particular than others.

335. What proportion of scoured do you generally open?—With a small farmer's clip we practically open every bale. If a station line, we open according to the size of the line. We might open one-third or one-fourth of the bales if it were a fairly large line.

336. *The Chairman.*] Your experience of the same lines in previous years would guide you to a great extent in the proportion you would open?—Yes, we open up to suit the buyers. They are often satisfied with the station's classing, which, of course, is different from the small farmer's clip.

THOMAS WERRY sworn and examined. (No. 70.)

337. *The Chairman.*] What are you?—I am storeman for the New Zealand Farmers' Co-operative Association, at their grain-stores, on the South Belt.

338. You have had some experience with wool?—Yes, nine years now.

339. Is the wool under your supervision there?—Yes, for the past four years, it has been; previous to that I was second in charge.

340. Can you give the Commission some information as to the condition of wool passing through your stores, such as Mr. Stewart has just been giving us?—I can bear out pretty well all Mr. Stewart has told you, as far as my knowledge is concerned. I have seen nothing extraordinary in greasy wool, except through getting wet in transit. We have often received it wet through transit, and more especially coming from round the coast.

341. Have the bales been wet?—Yes, soaking—gone right inside the bales, through their having gone into the sea and been fished out again. We would open that up at once, and spread it out.

342. And if it were very bad you would not bother about drying it?—We have a very good place on the roof where we can spread it out to dry.

343. You would not rebale it until it was perfectly dry?—Of course, if a bale was slightly damp on the outside we would not take it out; we would slit the side of the bale and give it a chance to recondition.

344. If that had arrived by rail, would the wet be caused through a faulty tarpaulin?—Yes, it often occurs in that way.

345. You understand the system of loading the trucks?—Yes, and two tarpaulins overlap on the top, which is flat. In heavy rain the wind drives underneath the overlap. We have often had it in that condition.

346. Could that be prevented by a better system of stacking?—Yes.

347. Say, if the centre row of bales was higher than the others?—Yes, the trouble last season was that we had to put twenty-four bales in L wagons and twenty-seven bales in LA wagons. You have to put one row along the bottom and two full rows on top of that; that leaves a perfectly flat top.

348. So, if you had only two rows and one single row on top that would leave you the roof you require?—Yes, that would be a great improvement, and the wet could not so easily get in, and there would be less wet wool.

349. That would reduce the number per truck to about twenty and twenty-two?—Yes. It would depend upon how the bales are packed.

350. And that would give you the shed you want for the top?—Yes.

351. *Captain Blackburne.*] Have you ever found bales heated through being wet in the way you speak of?—Yes, I have in one or two cases. We had some from Cheviot which was hot—in fact, so hot that you could not bear your hand in it.

352. And that was a case of where the moisture was mainly on the outside and had not penetrated far into the bale?—It was pretty well saturated.

353. *The Chairman.*] Was it packed damp?—No, wet with salt-water.

354. That would have come from Port Robinson, not by rail?—That is so. It came to us on the trucks, but it was wet with sea-water.

355. *Mr. Foster.*] You heard the evidence which Mr. Stewart has given. You say you can corroborate all he has said?—He said he noticed a lot of low-grade wools heated.

356. He said "some"?—That has not been my experience, not unless through rain-water or salt-water. That is the only time I have noticed a heated bale.

357. What do you mean by "rain"—do you mean prior to packing?—No, wool perfectly dry when packed but wet in transit. I have not noticed any difference in the low-grade wools this season. It seems that the local men have put through the same quantity of pieces and locks.

358. Do you handle any flax in your stores?—No. We dump about a thousand bales of wool for shipment on owners' account without going through the local sales, and in some cases we have had that wool there for some two months, and I have never noticed any sign of heat.

359. *The Chairman.*] These have always appeared satisfactory from the outside?—Yes, and we have never had any complaints from London about heated wool. I should have heard it if there had been any complaints.

360. *Captain Blackburne.*] March and April were fairly wet months. Several of the ships that caught fire nearing London, or after arrival in London, loaded in the latter part of April, and I should like to know whether the probability is that the weather was wetter than usual?—I should not like to say whether it was or not. If the wool was shipped in April it would have been a considerable time in store at Lyttelton, and if not dumped it would have shown any moisture. Our last sales are in February here.

361. Then, it would remain in store for some time?—Yes. If not loaded until March or April it would have had plenty of time to heat, and would have been discovered.

362. *The Chairman.*] But a lot of that wool might not have passed through the sales. It might have been shipped right away?—Yes, or through the local scouring-works, and we should know nothing about it. I suppose the scouring-works are always sending wool away—by almost every ship. We handle very little scoured or slipe wools—practically none.

363. Do these people ship on their own?—Yes, it goes direct from the scouring-works to the vessel.

364. Who dumps it?—The Shaw-Savill Company and the New Zealand Shipping Company.

365. *Mr. Foster.*] Those are the only two companies dumping?—Yes, shipping companies. We have a big plant at our store. I remember one line of scoured wool which we shipped for a client. That is the only line I remember.

WILLIAM MURRAY SWORN and examined. (No. 71.)

366. *The Chairman.*] What are you?—I am manager of the Christchurch Meat Company.

367. *Mr. Foster.*] Would you give us any information within your knowledge with respect to the condition of the wool that has been stated to be the cause of the recent fires? I understand you are quite prepared to give the Commission any information you have at your disposal?—That is so. Well, we, of course, have been shipping slipe wool the same as any other export company for many years. The conditions last year under which the wool was treated were, as far as I am aware, practically the same as for many years past. There has been no alteration in the methods, and as far as I am aware, there has been no alteration in the condition of the wool. It is a matter of great difficulty to understand why, during this particular year, there should have been so many wool fires. We have no information about what has taken place.

368. Had you any wool burned on any of these ships?—We do not know exactly yet. We have reports from London to say that a good deal of damage was caused by smoke and water, and what we have heard of specifically only refers to two bales. I wish to make no secret of this fact that there were two bales bearing our brand, which, on being opened, were found to be charred in the centre. I have never seen it char; I have seen it heated and discoloured into something like the condition which would appear in the centre of a silo, but I have never seen it char to such an extent as we might expect if it flamed.

369. Do you know the description of that wool?—That has been sent out to us, but only since the Commission has been sitting here. I have had forwarded to me an expert report by an analyst in London—I cannot say at whose request obtained, but it was upon the condition of the wools on the "Gothic."

370. Yes, I have seen a copy of that report?—That came to me yesterday. We found that they described the bales as Nos. 149 and 750. Well, as a matter of fact, there was no such number as 149 in our lot on board the "Gothic."

371. You think that is a mistake?—It would be most improbable that we would ship No. 149 on the same steamer as No. 750, unless we made an enormous shipment. I assume that most probably it would be 749.

372. Owing to the uncertainty of the numbers you cannot say what the contents of the bales was?—We had no No. 149 as far as we can trace. We know that No. 750 was an inferior quality of pelt-washings.

373. Can you give us a description of that wool?—It is rough wool saved from the pelts in the process of treatment—saved from the pelt as apart from the skin-wool. A certain amount comes away in the process—any little wool that might be left on the pelt.

374. Probably called the "frills"?—Yes.

375. It was not the wool from the pieces that are trimmed off the skins before washing?—No; pelt-washings are what are recovered off the pelt in the process of pelt-airing.

376. What would you imagine the constituents of that to be?—I should say rather greasy; but, of course, that particular bale could not have been the cause of the fire.

377. Now, what could be the component parts that would be likely to take fire?—Short low-quality wools, probably with a fair percentage of fatty matter in it. I do not know whether you would be interested to hear it, but we have had one or two experiments made since this matter has been under discussion. We have had one or two experiments conducted at the laboratory, and I might read you one or two remarks regarding the ordinary slipe wool as reported on by our chemist: "Samples of various classes of wool analysed during the past week show the following percentage of moisture and fat: Half-bred greasy, 15.92 moisture, 25.98 fat; half-bred slipe, 9.58 moisture, 18.45 fat; three-quarter-bred slipe, 9.70 moisture, 15.50 fat; pieces, washed, 9.70 moisture, 15.55 fat; thirds, washed, 9.52 moisture, 8.68 fat.

378. *The Chairman.*] That 15.92 per cent. of moisture is very high?—I cannot say from my own experience, but I remember reading in the *Australasian Pastoralists' Review* an article dealing with the question of moisture in wool, and I think it was stated that the percentage of moisture as allowed by the trade is considerably over 15 per cent. I think there is a standard, and if it exceeds it the seller has to meet the purchaser. In this case the amount of fatty matter was 25.98 per cent., that is about what is recognised as often being reached. The temperature of various bales, taken with a specially adapted thermometer to reach the centre of the bale, showed as follows: Outside temperature, 76° Fahr.; temperature of interior of bales, 78°, 80°, 81°, 82°, 82°, 78°, 76° Fahr. The higher temperature in the bales does not indicate that the wool is heated, but merely that the wool does not readily give up its heat after being dried. Further experiments showed that if wool is perfectly dry down to no percent of moisture it will, if exposed to the air, readily absorb from 6.84 per cent. up to 11 per cent. and 11½ per cent.—that is, wool that is as nearly as possible chemically dry.

379. It will absorb 10 per cent. to get into its normal state?—Yes. I might say that during last year we sold many parcels of wool in the colony to buyers, or representatives of wool houses who were present in the colony, and on more than one occasion questions arose as to the quality of and condition of this wool—not on the question of its dryness—and when it was reweighed we were informed that the wool had gained weight as between the works and the port prior to shipment. Probably there would be a period of two weeks elapse between that time, so that wool prepared in the ordinary way would take up moisture from the atmosphere. Invariably we look for higher weights in our account sales from Home than appear in our colonial weights. I heard from a captain of a vessel, who has had considerable experience, that he considered a considerable source of danger was in the rubbing of one bale or more not against another, but against the iron stanchions, and no matter how tightly it may be screwed into ships, before the vessel reaches Home the cargo would have settled and leave certain spaces for movement, and unless precautions were taken it is practically possible that a set of bales might get sufficient play and rub against these iron stanchions, and thus be more likely to cause fire than the interior of a bale.

380. *Mr. Foster.*] Then, how do you account for the fact that some of these bales have been charred inside and the outside packing intact?—That would lead one to believe that there was something approaching spontaneous combustion setting up in the centre of the bale, if not actually spontaneous combustion.

381. The question of friction has been put forth, and, so far as the Commission is concerned, they think there is absolutely nothing in it?—Well, I am not a seafaring man, but one told me that, and I thought there might be something in it.

382. I can understand that, other conditions being favourable, that might be the trigger, as it were, to touch it off. You see, the bands are deeply imbedded into the bales, and the effect of the bales rubbing against the stanchions would not be likely to set up much heat?—Still, if a hardly pressed bale was continually rubbing against an iron stanchion I could conceive that, sufficient air not being able to reach it, these bales might become heated in time.

383. Would you think that, if there was sufficient heat inside to make it in a state of incandescence though not actually flaming, it might assist?—It might be, but I should not think so. I have never seen wool on fire, although I have seen it at all stages.

384. Unfortunately very few have?—I have never seen it on fire, although I have always known that it has been considered that spontaneous combustion would be set up in the centre of a bale, but have never met a wool-man who has seen it in that state. I have seen great heat in station wool of a quality which is so-called wool, and I believe a large quantity of that has been offering for sale during the past year—I cannot say though that it was shipped.

385. A larger quantity of low qualities?—I have been told that in Christchurch wool has been sent down under the designation of some fancy name—locks, pieces, or suchlike—which was so solid with vegetable matter that although the bags have incurred charges of 1s. each, yet the contents were only saleable at 1s. 6d. per bag.

386. You would not lead us to infer that anything of that class was shipped?—I think it is highly probable that some one did.

387. *The Chairman.*] Would it not consume itself in expenses?—I do not think the wool of the average farmer has been so heavily skirted this year; it would not be human nature if it were so. I think, therefore, that as little as possible has been taken off the fleece.

388. You have heard that there have been considerably more low qualities brought forward?—Yes, it has come down here—so much so, as my informant told me, that it would be a disgrace to call it wool.

389. Did they give it a name?—Yes, they had to give it a name.

390. *Captain Blackburne.*] Mr. Barcas, the manager in Wellington of the New Zealand Loan and Mercantile Agency Company, told us that in every case except one during the February and March sales of this year the weights were less than the Wellington shipping weights, and they often varied from two or three to as much as ten pounds. Has that been your experience?—I am not in a position to say anything as to that. We do not ship greasy wool. Our wool is passed through the same mechanical process whether it is a wet or good season, and is mechanically dried.

391. Have you heard other people in Christchurch having any experience of that sort—those who deal with greasy wool?—No, I cannot say that I have. I saw that that evidence was given, but I cannot recollect having had any experience of a like nature.

392. *The Chairman.*] Of course, the condition of the wool coming down in the railway-trucks does not affect you at all?—As between the works and the port it does. I think in that respect there is a possibility of considerable improvement. It is quite possible that wool may be sent away from the works in good condition and may, unfortunately, through some carelessness, either on the part of our own employees or others, get exposed to considerable wet before shipment.

393. You draw your Timaru shipments to Lyttelton?—No, never. It is all shipped there.

394. So there is no railage on it except there?—From Burnside we ship to Port Chalmers, from Oamaru we ship from there; practically all Timaru wool is shipped from Timaru. Picton wool is shipped from Picton.

395. So the longest railage is from Islington?—Yes, but about the same from Burnside.

396. Are you compelled by the Railway Department to load a certain number of bales in a truck?—I believe there is a certain standard. I know it was years ago, although I have not loaded many trucks myself.

397. We have had it in evidence that by regulation you must put so many bales in a truck, and that causes a flat top to form: Do you consider that mischievous?—I think it should be avoided if possible.

398. Do you go so far as to say it should be abolished?—I think it would be wise in view of what has taken place this year that no precautions should be neglected. But I think we should have greater supervision at the port.

399. It is an appreciable factor?—Yes. And I would have greater supervision at the port, for in many cases it is left to the dictum of the storeman, more or less irresponsible, to say whether it is fit for shipment or not.

400. Do you think it is desirable that there should be some one to whom the storeman should refer, and who should have authority to say that the wool will or will not go?—Yes. I know of a case which happened this year where wool was wet in transit, and an auctioneer who was a wool expert happened to be at Lyttelton that particular afternoon. It was not his duty to go through the sheds, but the storeman happened to mention to him that some wool got wet. "I think this is all right," he said, "and we will let it go." The auctioneer said, "There must be no doubt about it," and the storeman replied, "Oh, it is all right. Let it go." But the auctioneer was not satisfied, and asked to see it, and the result was that that wool was stopped, for it was not fit for shipment.

401. You think that should be the universal system?—I think there should be some one in authority whose dictum would be accepted without question.

402. Even if he could not refer to every bale, you think he should be there so as to be referred to if necessary?—I think it would be impossible to go through every bale, yet his presence there would be beneficial.

403. As a large shipper of wool, do you think that an amount should be levied per bale to pay the expense of that supervision or inspection?—Well, if it was nothing very much it might do.

404. I suppose that, roughly, from 2d. to 3d. per bale would cover the expense?—If it could be a fixed sum and the onus then be cast upon such officer instead of the individual shipper, in that case I should be pleased to see it.

405. As a matter of fact, the wool was inspected up to about June last year, and it was then knocked off. Do you think it was wise to knock off the inspection—never mind the reason?—I think, in view of what has taken place, there is room for doubt as to the wisdom of knocking it off.

406. And a return to that system would be a step in the right direction?—I think so, provided always that the burden of responsibility would thereby be shifted on to the responsible officer.

407. There would be no use in having a show man?—We are shipping at five different centres, and if the Act was amended in the direction which one witness suggested, one would not know where one stood, or upon whom the legislation would seek to settle the responsibility. It is obvious that no one large shipper could be held criminally responsible for a possible negligent act of others after taking all reasonable precautions.

408. *Mr. Foster.*] Yes, if all reasonable precautions are taken there is no neglect, and to my mind the punishment should be for wilful neglect or wilful carelessness and that might be carried to the author of it?—That would be fair; but if it were altered by the excision of “knowingly,” it would be a stringent regulation.

409. *The Chairman.*] By keeping in “knowingly” and “wilfully” the burden of proof is placed upon the prosecution. If you excise these two words the burden of proof of showing that he has taken sufficient care is on the person prosecuted. If you leave in “wilfully” and “knowingly” the burden of proof that he has not taken the necessary precautions rests with the prosecution; but if you take them out the prosecution then takes the stand and the man has to assert himself and endeavour to show that he has used every reasonable endeavour to ship his wool dry. That is the difference it makes?—Well, if such inspection were appointed, I take it that, provided every reasonable precaution were taken both in packing and preparation of wool, and such wool appeared to be in fit and proper order, if found to be not so there could be no getting past the inspection.

The Chairman: Yes, it will relieve the shipper or owner when this officer takes it over.

410. *Captain Blackburne.*] Do you consider that dumped wool will heat quicker than undumped wool?—I know that dumped wool of a certain nature will heat more readily than undumped. Dumped wool of a certain class becomes very heated, because it is difficult to allow sufficient air to penetrate it and cause anything like a conflagration to the actual wool itself.

411. Would not the small amount of air in the wool become compressed to such an extent that it would increase the temperature? If you compress a cubic foot of air into half that capacity you will increase the temperature to, I believe, about double?—I have never had anything to do with that. I have never considered those conditions.

412. And the same might be said of moisture. It has been said by witnesses of experience that wool does increase the temperature?—I should think so, but what we might call low-grade wools would be safe for shipment undumped.

413. *Mr. Foster.*] Would you say that they should be only shipped undumped as a measure of precaution against careless drying?—Well, not exactly.

414. Or insufficient drying?—It is difficult to know when it would be insufficiently dried. It seems there are certain combinations of moisture and fat.

415. Yes, but you want moisture?—Yes, there must be a certain amount of it. Take, for instance, this experiment showing that while apparently in splendid shipping condition, half-bred wool contained 15·92 per cent. of moisture and 25·98 per cent. of fat. I think I would personally ship that as far as risk of fire is concerned, without any insurance policy upon it; still, there is a maximum of moisture and a maximum of fat.

416. Natural moisture?—Yes.

417. The absence of fires for so many years before would indicate that the natural moisture is not dangerous even if it is present in excessive quantities. It is moisture in excess of the fat apparently which is necessary to create fermentation?—Yes, of course, that is a difficult thing to say. I doubt if any of our slipped wools get away with 15 per cent. or 16 per cent. of moisture after that process.

418. Not if the process is carried out according to instructions?—It passes through a temperature of from 190° to 200° in the driers.

419. It turns upon time in that?—It cannot but be in for a certain time.

420. Are you satisfied with the drying-machines you have?—No, because they are not quick enough.

421. Because I was aware you contemplated a change?—Yes, because they are not quick enough: we get an accumulation of wool.

422. Might that not have led to somewhat hasty dealing with the wool if your instructions were not carried out?—No doubt that is so; but the only result would be an accumulation of wool.

423. Last season you had a large accumulation?—Yes.

424. As much as 600 bales at one time?—Yes, we had a lot of wool on hand. The drier is automatic in its action, and the wool, once it is in, would not come out until a specified time. We cannot dry more than a certain amount per hour per day.

425. Do you sun-dry any?—Yes, all we can. We do so, and would then finish it in the driers.

426. Your process is somewhat the same as most places: you wring it with the hydro., then it goes through the drier, and is then finished through a drier of a different type?—Yes. We finish most of our wool with the drier. It receives a cold blast. All our wool as it comes out of the drier is warm. We do not altogether believe it is possible to tell if it is dry when warm, and it is therefore exposed to a cold blast of air.

427. From what source do you draw the air?—From the outside atmosphere.

428. And if it happened to be a moist day, would it take in more moisture than on a dry day?—Yes, a little more. It gets an ordinary cool blast as against the heat of the drier.

429. And that passing of the cool air through it is to avoid piling it in the bins?—Yes, to prevent it going into the bins in a heated state, and it opens up the wool and makes it look freer.

430. And practically brings it back to the former condition?—To something like it.

The Commission adjourned till to-morrow (Friday), the 7th September, 1906, at 10.30 a.m.

CHRISTCHURCH, FRIDAY, 7TH SEPTEMBER, 1906.

The Commission met in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

JOHN McARTHUR sworn and examined. (No. 72.)

1. *The Chairman.*] What is your name?—John McArthur.
2. Of St. James?—Yes.
3. You have for many years been a flock and station owner?—Yes, thirty-six years.
4. In what parts of New Zealand have you been in business?—In the Canterbury District—the back country.
5. Do you know of the conditions under which wool is grown and shorn?—Yes.
6. With reference to the shearing of sheep, according to your experience has there ever been or is there now any wet sheep shorn?—Well, not to my knowledge so far as I am concerned. I have not known of any sheep being shorn wet for the last five or six years. Canterbury shearers will not touch the sheep until they are dry, and I know of none in the district.
7. It has come to the knowledge of the Commissioners that sometimes shearers are forced against their wish to shear wet sheep. Has that come under your notice?—Not so far as I know. Well, I do not say I do not know it happening: it may be possible to shear a ewe with lamb, the ewe may go out into the open and get wet with the rain.
8. But I mean shearing has been late on account of the rain, and the men have been told that if they did not shear they could go. Is such a thing possible?—So far as I know I do not know of any case of the kind.
9. How is it settled as to when the sheep shall be shorn, where there is any doubt as to whether or not the sheep are dry?—The shearers appoint a representative, and he, together with the shed-manager, inspect the sheep. If both agree that they are fit to shear, then they shear them. If they say they are possibly a bit damp then they are turned out for five or six hours, and if one of them thinks they are too damp then they put an umpire on and he decides it.
10. Is there not a ballot of the shearers taken?—Well, I think last year they tried that principle, but usually the representative arranged the matter with the shed-manager as far as I have been concerned.
11. Where would that umpire come from?—I allowed them to pick a shearer, and that would give them another chance to pick one of themselves.
12. So that they virtually had two chances against one of the shed's?—Yes.
13. Have you had any experience at all of wool heating?—No, I have never known of any wool heating. We scoured a good deal of wool when I was at St. Helens, where there were about 65,000 sheep. I was there eleven years, and we scoured about seven hundred bales a year.
14. And all those bales would be sun-dried after being scoured?—Yes, sun-dried. I very often went down at 10 or 11 o'clock in the morning and saw them pressing, but I never found them pressing damp wool.
15. Would it be to the advantage of the wool-scourer to put in damp wool if he was paid by weight?—Yes, he would gain the weight of it, he would be paid by the pound of the scoured wool.
16. Have you any complaint whatever of scoured wool having arrived Home damp?—No.
17. No complaints whatever?—No, no complaints whatever.
18. There has been something said about wool getting wet in transit. You have had no experience, first of all, about wool in transit by boat?—No.
19. Then the other transit would be by wagons from the station itself, and afterwards by train?—Yes.
20. What means do you take to protect your wool coming down from St. James or St. Helens?—We always keep good tilts and wagon-covers. We get new tilts every year, and a large piece projects over the front. I have never heard of any wool getting damp on the way to Culverden.
21. That is before it reaches the railway, but you know nothing whatever about the covering in the trucks themselves?—Well, no, I could not say beyond the fact that they keep first-class tarpaulins, and what I have seen is well covered on the railways.
22. As far as you have seen during the season you are satisfied with the coverings applied by the Railway Department?—Yes.
23. Your experience would be limited to a station where there are men to look after it?—Yes, exactly.
24. You have no experience of flag stations?—No.
25. *Mr. Foster.*] While on that subject, has any of your wool after it has left Culverden been found to be wet from exposure in any way?—I have never heard of it. I have heard of wool from St. James before I went there being damp, and being sent back again to Woolston to be dried—that was before my time.

26. At that time you had to cart it to Amberley: the line would not be very far up at that time?—No. I only know that from hearing it said.

27. How do you pay for the wool-scouring, is it by contract or do you employ men?—We pay by contract.

28. Per pound?—One penny per pound, and find the plant, and the contractor finds the soap and presses the wool.

29. So that there is just as much inducement to your contractor to hurry through as there is for anybody else who scours it per pound?—Yes, the same.

30. Have you any special supervision yourself of the scouring, drying, and packing?—I am there every day. I am very seldom away from the station—I always go through the station to see how they are getting on.

31. Do you employ the contractor every year?—Yes, he has been there for fifteen years.

32. And you consider, apart from your own supervision, he would be a man to be trusted?—Oh, yes, I can trust him.

33. In regard to the shearing of sheep, does the shearers' award apply in your district?—Yes.

34. Under that award the conditions you referred to as to appointing a representative of the shearers to confer with the shed-manager are the conditions of that award?—Yes.

35. Was there any occasion last year when a difference of opinion arose as to the condition?—Oh, yes, and the year before too.

36. And it was settled satisfactorily?—Yes. In many cases we had to give way to the shearers, when I found the wool was dry.

37. In regard to wool in that condition, where it was just on the dividing-line, do you think that if that had been shorn and packed there would have been any danger from it?—I do not think so.

38. I am not speaking of that special occasion, but assuming such a condition, do you feel satisfied that there would not be enough moisture to cause sufficient heat to spoil the wool?—I think not; this goes back thirty-six years, and I have had no complaint.

39. And is it within your knowledge in respect to other places that supposing you had come to the last few days of the shearing, with one shed left, and the shearers were anxious to get away and you were anxious to close, is there any part of the district where you have known shearers to shear wet or damp sheep?—I could not say except from hearsay—I could not say from my own knowledge.

40. Would you mind telling us the station you heard of?—I would rather not.

41. Would you mind giving it to the Chairman in confidence?—Oh, well, I do not know; there may have been several, but—

42. We can only ask you of what you heard. You see if we heard that it might enable us to follow the thing up, because at present it has been most emphatically stated in evidence that such things have not happened, and we only want to get a guide in order to express an opinion as to what may be done?—I would rather not mention that matter. I have heard of these things being done. It is only just hearsay, and I would rather not say.

43. Do you think such an occurrence as that is likely to come under the notice of the Sheep Inspector of the District—would it be sufficiently talked about to come under his notice?—No, I think not; it is only a matter for the shearers. It would not be taken much notice of; but the Sheep Inspector of the district would have nothing much to do with it.

44. Except that he has got ears?—Yes.

45. He would have no authority in the matter?—No.

46. But under these extreme conditions, the shearers wanting to get away and the owners wanting to close up, would you regard that as bad management on the part of the owners?—No.

47. But if they were wet?—Yes, if they were wet.

48. But amongst your neighbouring farmers you do not know any one who would be so unwise?—No, I would not do it myself. When sheep are on the border-line of being dry or the least damp it is very difficult to tell. In a case of that kind I would shear if it was near the finish of the shearing.

49. You said that even if such was the case you would think there would be no danger or even spoiling the wool?—No, I think not.

50. Do you dump your wool on the station?—No.

51. Send it down to get pressed?—Yes.

52. In regard to belly wool and breech wool of ewes, which, of course, is at all times damp, do you separate that from the rest of the wool at shearing-time?—We always scour it.

53. So that you do not need to pick it out at that time?—We take it in the fleeces and it is scoured.

54. Have you ever had any quantity of those pieces together?—"Daggy" wool we have.

55. But these stained pizzle-pieces and breech-pieces?—No, it goes straight away to the scourer.

56. Working close up to it?—Scoured at the same time. I have seen dags with a considerable amount of wool on them put outside, and they heated.

57. In the case of your "daggy" wool, I assume there would be a larger proportion of wool-fibre in the dags than there would be in a crossbred flock?—Yes, I think there would be—the wool is closer. The wool is denser than in merino sheep.

58. That being so, and the dags being moist, you would expect them to heat up more readily than longwool dags?—I could not say, but possibly they would.

59. After it leaves Culverden, at any rate, you really know nothing more about the wool—it does not come under your notice at all?—No.

60. Had you any wool in either of those ships that caught fire?—I really could not say.

61. At any rate, you have no return?—No. I sold wool here, and I could not say what happened to it. The Loan Company would probably have some word, but I have not got any return.

62. *Captain Blackburne.*] Do you think there is any danger of small farmers who do not employ labour, but who, together with their sons, shear the sheep—do you think there is any danger of their sometimes shearing the sheep wet?—Well, I have not had much experience: we have not got them in our district; they are all large stations in our district, very few farmers. I could scarcely say what would happen under such circumstances as that. I should say very possibly it might happen, but I really do not know.

63. *The Chairman.*] Is there anything else you would like to say?—I might say that perhaps you will have evidence before you to-day of a case of spontaneous combustion that I think occurred some twenty years ago under peculiar circumstances, and possibly you have not heard of a case of the same kind before. I have asked the witnesses to come here who can give that evidence; but I know nothing of wool heating in my experience of the last thirty-six years, or any of my neighbours'. With regard to the scoured wool, I have never heard of any complaint, and we scour about seven hundred bales very year; but I have been very careful and always superintend the work. I have seen wool stacked away ready to be pressed, but I would not allow it to be pressed and put away; but possibly it would only be patches of wet here and there, and I have been very careful in pressing either greasy or scoured wool.

64. *Mr. Foster.*] It has been considered by a very large proportion of our witnesses that inspection at the port of shipment would be a very desirable thing and to a great extent effective. At the same time, we have endeavoured to obtain opinions from the producer as to whether it would be regarded as reasonable that, if such an inspection was brought about, a small charge of, say, 3d. a bale on the export of wool should be borne by the owners for the time being—that is to say, if the owner was shipping, he would pay, and if it was the purchaser of the wool, he would pay for the inspection at the port of shipment. Do you think that would in any way be considered unfair to the grower or owner? I should suppose in all probability it might not exceed 3d. per bale, as there would be an enormous amount?—I should think it would be a very fair thing. In regard to inspection at the port, I would rather prefer to have an inspector visiting the scouring-places and see the wool and how it is dealt with. It is difficult for a man at the port to find whether wool is damp in the centre by looking at the outside.

65. But supposing the inspector had power to prosecute if the wool was wet?—I should say so—I should be inclined to recommend that myself—it would be a very small amount.

66. Whereas, if, as you suggested, an inspector had to visit the fellmongeries, that would be a very costly job?—He could make trips occasionally. He may hit upon it occasionally without being there constantly.

67. Take the case of a fellmonger who wanted to ship some wet stuff away, he might know where the inspector was?—Yes, he might. Last season was very wet, and the season before, and it is very hard to dry wool outside.

68. *Captain Blackburne.*] Is your wool sun-dried—the scoured wool?—Yes, but we get through easily. It is when we get late in the season, April or May, that we should have difficulty. We finish our scouring early in March, so that we get a lot of warmth and west wind.

69. What were the weather-conditions in February and March of this year?—It was showery.

70. Unusually wet?—Usually a drizzle—sufficient to keep the sheep wet, but not in any quantity. While the wool was being scoured the wool-scourer was getting fine weather. He would have a lot to put out when the sun shone.

71. Would you say that the conditions in your somewhat hilly country would be different from those in Lyttelton at any time—your conditions are not the same as the conditions of weather down here?—No, I could not say. We have a good deal of north-west weather, which is drying. It would be difficult to get wool dry sometimes.

ROBERT WILSON HOOD sworn and examined. (No. 73.)

72. *The Chairman.*] What is your name?—Robert Wilson Hood.

73. You are proprietor of the Lodge, Hanmer Springs?—Yes.

74. You have had considerable experience, I understand, not only with wool itself, but also in regard to carting wool?—Yes.

75. You have also had an experience in regard to wool catching fire?—Yes.

76. What is called spontaneous combustion in wool?—Yes.

77. Will you tell us the facts of that case?—Yes. It is a long time ago, and I do not know that I remember the date.

78. It does not matter about the exact date so long as we get the facts?—Well, some time in 1876 I was carting wool in Central Otago from about Cromwell to Lawrence, which was then the railway terminus. That year was very wet, the Molyneux was in flood, and some stations had finished shearing before they got all their wool away on account of not being able to cross the river. In this case it was the Argour Station, belonging to Dalgety and Nichol. The manager was Mr. Dewar, and the clerk Mr. Sams, now at Timaru managing the Balmoral Station. This was the last load of wool that was on the station, and the manager and Mr. Sams and myself loaded the wool. As they could not get their wool away, and they had not room in the sheds, it had to be stacked outside, and covered up until such times as the shearing was finished, and when the river went down it was taken away. We loaded this wool of mine on the Saturday, and on the Sunday I went across the river, and some miles below Cromwell I camped for the night. It was not an ordinary wagon, but just four wheels and planks, and the wool was exposed all round. We used to sleep on the wool at nights, and this night when I got on the wool I could not sleep—it was too hot, and I blamed it on to the weather and dust. I then put my rug on the ground and slept there. Next morning, after I had gone along the road some distance, I found smoke coming out from between the bales of wool. I stopped and examined it, and got a hard stick and put between the bales and prized them apart, and I could see it was smoke and not dust. It was blowing very hard this morning, and I examined the load, and thought to myself that in throwing up

things on top of the load some match had possibly got amongst it, but I could not find anything like that. There was a dam a little way along, and I hurried there to get some water, but when I got there I found it had been let off. I examined the load again, and thought the best thing to do was to get it off the wagon. I pulled the horses to one side by a hill, so that when I cut the ropes it would scatter. I cut the ropes quickly and there were seven bales on top, and when I gave it a push the rest scattered. By this time the load was flaming. There was a publican across the road named Fulton cutting his crop, and he was very excited and gave me a hand; he thought his place would be on fire, so he took the horses out as they were getting uneasy. I took the leaders out as the flames were getting to them, and my intention was to pull the wagon backwards and tip it over to prevent the wagon from getting burnt. The publican was taking the shafters out, but before getting any good done the front wheels were burned down. I think the whole thing happened in less than forty minutes from the time I started—it flamed at a terrible rate. Well, there was a lot of inquiry made about it by insurance men and police, and several people thought I must have had something inflammable about—some kerosene or something like that spilt on it, but it was an easy matter to prove there was no chance of my carrying anything like that, and I was not supposed to be a careless sort of fellow. Some of those bales were burned lightly off and singed round, and others were burnt to dust.

79. The whole bale?—Yes, burned to dust like ashes, and very quickly. I never saw anything burn like it. The insurance people took charge of them and gathered them up, but in the meantime there were a lot of people trying to burn this wool to see if it would burn; they put scrub round it and it would not burn, it would smoulder and singe. The wool was afterwards gathered up, and I think they got about seven bales hand-pressed.

80. *Mr. Foster.*] Not dumped?—Oh, no, pressed in with the hand and trampled down. There were seven bales they got out of about thirty bales in the first place. It is a long time ago, and I do not remember everything. The front wheels were completely burned down, and the high wheels were the only things saved out of it. They kept me there three days to see if they could find out any trace of it being my fault.

81. That is to say, they thought you were carrying something else with the wool?—Yes, but it was decided that the wool had heated through being wet. This wool was said to be cold-water washed. The Lindsay River runs past this shed, and it is spoken of as being very fine water for washing wool, almost like hot water, and they washed the wool on the sheep's back.

82. Had you noticed this wool stacked outside the shed?—No; I had not been there for any wool that year previously.

83. They were not able to cart any away during the time standing out?—No.

84. You were not employed on the station?—No, I was simply carting wool.

85. Did you hear at all as to whether it was indifferently covered, or whether it was shorn and packed wet?—We had a lot of talk about that with one another, but it was only casual.

86. Do you happen to know the name of the insurance company that was affected?—No. Dalgety and Co. and Nichol were the people it belonged to.

87. Could we get any records of it?—Yes, you could get all the records from Mr. Sams, the clerk, who is now at Balmoral Station, and Mr. Dewar, who was the manager.

88. About what year would that be?—1876.

89. The shearing of 1876?—Yes. I wired to several of my old acquaintances to get the information, and they replied that they would let me know later on—I wanted the exact date.

90. *The Chairman.*] You only got about twenty per cent. of the wool?—Yes.

91. Did you see the wool itself burning?—Yes, everything I had was burned under it. I will tell you a remarkable thing that happened: I used to be very fond of a black-opossum rug, and in the mornings I used to roll it up and put the straps round it tight, and put it and the horse-covers on the bales, and when these seven bales turned over it was underneath them. Well, when I came back the following trip, a fortnight later, the publican's children had been raking out the ashes and they raked out my opossum rug, and it was not burnt except in patches. I do not know whether the man Fulton, who was present at the fire, is alive to-day; he was an elderly man then.

92. *Mr. Foster.*] He was the only man who saw the actual fire besides yourself?—Yes.

93. *The Chairman.*] And when you went to camp that night on the wool it was too hot, and you put it down to the sultry weather?—Yes.

94. It was evidently considerably warm then?—Yes, but I did not take any notice of that.

95. You did not begin to examine it then?—No.

96. And not until you were some time on the road the next morning?—Yes, and when I saw the fire it made me think of it being hot the night before.

97. Did you hear of any fire in the wool that was carted previous to yours?—It was all unshipped, I believe, and examined, from that station, and it was found all right. There were other carriers on the road, and they got very frightened—it went off like an explosion, and only took about an hour from the time it flamed till it was in ashes.

98. You could not say how long after it had been packed in the shed and remained there before being put outside in the open under the influence of the rain?—No.

99. Probably the first put in and the last taken out?—It might have been.

100. And the longest in the shed compared with any other portion?—It might have been. I remember calling the attention of the manager, when loading this wool, to some rubbish that was burning—some dags.

101. Had that started by itself?—I think it had started on its own. These men only came down to help load on this station. There would be nobody living at the place at the time.

102. *Mr. Foster.*] That would be merino wool?—I could not tell you.

103. I do not suppose they kept any crossbred sheep up there?—I believe it was first combing from what I remember of the marks on the bales. I know there are some careless fellows who use a bale as a candlestick, but if the wool caught it would only burn as long as the candle burned.

104. What position is that station in regard to Campbell Station?—That is Argour Station.
 105. Where is that compared with Campbell's Station?—That is what was called the "Nobby"—you mean Galloway's?
 106. Yes?—It is further away up country.
 107. Galloway's is away to the right from Cromwell?—No, on the Dunedin side, about fifty miles from Cromwell on the old mountain-road. It is on the Dunedin side of Manureka.
 108. *The Chairman.*] Was this load fleece wool or locks and pieces?—I fancy it was the best class of wool.

WILLIAM HENRY ATKINS sworn and examined. (No. 74.)

109. *The Chairman.*] What are you?—A fellmonger.
 110. In whose employ?—Foreman fellmonger for the Christchurch Meat Company, at Islington.
 111. *Mr. Foster.*] Have you heard of any of your company's wool being damaged in the ships that caught fire?—Yes, sir.
 112. Do you know the nature of it?—I believe it heated in the centre.
 113. And, following that, did it burn or merely heat?—That I could not say.
 114. You have had no information yet?—No.
 115. What was the quality of the wool—could you tell us that?—From the information I have received it was pieces and pelt-washings.
 116. Will you describe to us what the pieces and pelt-washings were?—Pieces are what we call the neck and tail.
 117. That is from the raw skins—you sweat the fleece?—Yes; the wool is taken off, scoured dry, and baled.
 118. And the pelt-washings?—Of course, it is not possible to paint the whole of the skin-shanks. For instance, they run out where it is not possible to get the paint into them, and consequently that does not leave when the pullers are pulling the wool, and there may be an odd bit of wool adhering to the skin.
 119. On the edges?—Yes, on the edges; but these pelts are washed through dollies with a save-all behind, and the water as it escapes drops into this save-all, and consequently any wool that may happen to go through is detained, and that is taken, scoured, dried, and baled.
 120. Is there any chemical in that wool?—Yes.
 121. Does it wash completely out in the process?—The chemical washes completely out, but there is lime with the chemical, and the lime does not wash out always.
 122. Of course, it is mixed?—Sodium and lime, we call that the chemical.
 123. You say the sodium disappears but some lime remains?—Yes.
 124. Is that lime thoroughly slaked?—Yes.
 125. There is no possible chance of it remaining in the wool?—No earthly chance. The lime is slaked in the tanks prior to mixing the chemical, and next day it is painted on to the skin. While it is in the state of chemical it is continually wet, and when it is painted on to the skin it is continually wet. The wool is taken from the pelt and the pelt put into the pelt department, and put into water and washed. The wool is taken from the save-all and washed again and then dried, so I think there is really no chance of any of that lime remaining alive through the whole of those processes.
 126. You slake the lime by itself?—Yes.
 127. You also slake the sulphide of sodium by itself?—Yes.
 128. And then mix them?—Yes, mix the two with water.
 129. In taking your solution of lime are you apt to take any particles—do you take the sediment particularly?—Not particularly. The mixture is well stirred. We have to stir it well to get the mixture to adhere to the pelt.
 130. You do not for the purpose of mixing take out the sediment?—No.
 131. So that any lime that would dissolve the sodium must be thoroughly slaked?—Yes, must be thoroughly slaked. To give you an instance that all lime is not actually taken out to put on skins, we have at night to clean the tank out before we can put another mixture in next morning with the sediment that has dropped—that is, of course, lime.
 132. And then to paint the skins you do that with a brush?—Yes, made of a piece of sacking.
 133. Which, from the mere dipping-in, I suppose, you still keep it stirred with the brush?—Not with the brush; with a stick.
 134. But, would that brush lift out any pieces of lime?—No; any small pieces that might adhere would brush off as in the process of whitewashing.
 135. And no more would adhere in the process of lime as in the case of whitewashing?—Yes.
 136. Notwithstanding that one is a whitewash-brush and yours is a sacking brush?—Yes.
 137. What is the subsequent process of pulling skins?—Do you mean before pulling or after?
 138. After pulling?—The wool is classed, and it is classed at the same time that it is pulled—the firsts—that is, the best wool—and the seconds are put immediately through the drier.
 139. What is the nature of the drier?—It is hot air.
 140. Do you wring it first?—The wool is not wrung after pulling.
 141. And what is the nature of the drier?—There are various kinds; there are the drying-tables, and then there are other driers. Mr. Hill has another kind of drier, and, I believe, the Canterbury Frozen Meat Company have even another description. Our drier is constructed of wood and wire mattresses.
 142. Travelling?—Yes, travelling mattresses—five of them.
 143. And how is your wool delivered on to them?—It is fed through an aperture at the top by hand.
 144. And what is the temperature and the time that that wool takes to get through?—The temperature of the air going in stands at about 190°; the outlet stands at between 115° and 125°, and the time from when the wool commenced till it goes out again is forty-five minutes.

145. Have you any means of circulating the air by fans?—Yes, the air is driven in by fans and taken out by fans.

146. Did you mention the temperature at which the wool comes out of your drier?—The wool comes out at the opposite end where there is 190° of heating going in.

147. Then it travels and returns before it is delivered out dry—it is delivered at the same end that it goes in?—No, sir. The wool is delivered at the end where the air is going in.

148. Then, your fan delivers the hot air?—Yes, heated air.

149. Does the wool come out, in your opinion, thoroughly dry—drier than in its natural condition?—Yes, sir.

150. And, that being so, what steps do you take to bring it back to its normal temperature?—Put it by in the bin and allow it to cool down. Of course, the wool as it comes out of the machine falls into the hopper on the bottom of the floor; it is caught then by a cold-air blast and taken up to the second floor, consequently I suppose half of the heat would be blown out by this cold-air blast. In fact, it is taken up to the third floor.

151. But, in the case of your wool, do you consider it all super-dried—that is, that it would come back to a greater weight—it would absorb the moisture from the air?—Yes, it would absorb the moisture in every case.

152. Do you think that, coming out hot from the drier, supposing it were immediately packed, there would be any danger of heating or firing?—I do not think there would be the slightest.

153. Do you consider, then, that moisture is necessary to the heating of wool?—I do.

154. And without that it would not heat?—Yes.

155. Notwithstanding it may be packed at a temperature of 190°?—Yes.

156. It would be all the time going back?—Yes, all the time going back very slowly.

157. Then you have said that some of your wool became heated in some of the ships—to what do you attribute that?—Well, my manager informs me that these bales are heated in the centre; he said there were two bales taken out of the “Gothic.” Well, I do not know whether those two bales were taken out as one dump and whether the heat was in the centre of them.

158. You have no advise as to that?—Of course, it is possible two bales standing in a damp railway-truck, the two damp ends dumped together, or leaky tarpaulins.

159. But would you consider it probable that a leaky tarpaulin would very much wet the end of a bale whilst it was in transit from your place? You see, you do not stow your bales in the truck on end?—Yes, sir, stowed on end.

160. I thought they all had to go on the flat. We have been told that the Department requires the truck to carry a certain number of bales, and in order to get that number in you would have to stow them flat?—Yes. I have been instructed by my manager that the Railway Department has been complaining that I have not put sufficient bales in a truck. Since then I think I have stacked in more with the bales lying on their sides—that is, in an L truck—and in an LA truck I always stack them standing. Previous to the last two trucks they have been stacked in railway-trucks standing on end.

161. Are your bales three-quarter bales?—Full-size bales.

162. So that practically you put only two tiers?—Standing up or lying down?

163. The height of the full-sized pack is the same as two bales on the flat?—Quite so.

164. You only fill the truck on the flat?—I can stand eighteen bales in a LA truck, and three twos on top.

165. It is the bottom row that is on the end and the others on the flat?—Yes.

166. That is for the purpose of giving a tent top to the cover?—It does give partly a tent shape and partly not. Of course, the two bales give a flat top, but from the others there is a gradual slope.

167. And that being so, would you not think they are all covered?—They are all covered.

168. I mean the top bales would cover the ends of the bottom bales?—With the exception of the outside.

169. The sheet would still cover it?—Yes.

170. Would you not think that the probability of the ends of the bales getting wet under those circumstances would be rather remote?—Unless through leaky tarpaulins.

171. The only wet that would get down would be where the tarpaulins sloped, and it would have to be a big hole?—I think those tarpaulins are subject to leaks, but I do not say that new ones would.

172. You say that tarpaulins, even though apparently sound, leak?—Yes.

173. Would you consider that in the time of transit from your works to the ship there were any delays: do you think that with a sloping tarpaulin sufficient could go through to cause heat?—If there was a sag in a tarpaulin, where it would hold water.

174. I can hardly conceive the condition of a sag where two top bales would provide a slope?—I do not suppose it would—it may be probable.

175. If the whole top of the lower bale was exposed—I mean to say, was not covered by the other wool above it—the angle of the tarpaulin would be 45°?—Yes.

176. If the half of that bale is covered it is at a greater angle, and do you think it likely that that would leak?—Providing it was a good tarpaulin it would not leak—it would be impossible.

177. I cannot conceive but that it would have to be a big hole?—There are any amount of those tarpaulins. Of course, they are oiled and the oil wears off them, and leaves them to all appearances good, although in reality they are not. It is not necessary for a tarpaulin to have a hole in it to leak.

178. The quantity of water that would get through would be infinitesimal?—It would not be much.

179. Would the water that could get in be sufficient to set up heat to a point of combustion—at all events, to spoil the wool?—I have never seen heated wool in a bale.

180. Assuming that it does heat, would you think there could be enough water to start that process—falling off a bale in that way and protected as I have said?—I think so.

181. But you have really never seen it to judge?—I have never. When I say I have not seen it, I have had my attention called to wool getting wet in transit.

182. And had you the opportunity of seeing the nature of that wetting?—I saw the actual bales.

183. And where were they wet principally?—On the sides principally. They were laid exactly as I was telling you. It was an "L" truck, and it was the first truck that I have loaded with the bales lying on the flat. I believe the rope gave way on the tarpaulin; there was a south-west wind, and it rained very heavily that night.

184. And did you ascertain that was the only part that took in the water?—At the sides?

185. Where it had given way?—Yes.

186. The rest of the tarpaulin showed no leakages?—The rest of the tarpaulin would be showing no leakages.

187. Then I understand you to say that you have not had any experience of any heated wool?—Not in bales.

188. In what direction have you seen any?—Well, for instance, that we have stacked outside—wet wool.

189. Have you noticed the rapidity with which the heating commences and continues?—My experience of heat is about this far: for instance, if I put wool outside, we will say, now, it is thinned out to about a foot thick; the next morning the first thing we do is to feel that wool to see if it is setting up heat, and if so it is turned, and if not it is turned next day. The wool is kept continually turned to prevent heat and discoloration.

190. Do you think it would be dangerous to leave a large body of wet wool in a building uncared-for and entirely without being watched?—My experience does not take me so far as that.

191. I thought probably you might have a theory?—Well, wool will get very hot if it is stacked wet.

192. But what temperature do you think it might get up to?—That I could not say.

193. I think you are at Islington?—Yes.

194. You deal entirely with freezing-skins?—Yes, entirely. I do not receive more than thirty or forty skins outside of freezing-skins for clients.

195. *Captain Blackburne.*] Do you think it is at all likely that statements would have been made that the heating was in the centre of the bale if it was simply between the two dumped bales?—Well, I take it that they would call a dump of wool a bale of wool. For instance, if I went into a shed and saw bales of wool and dumps of wool, I would not class them as bales of wool, but probably the ordinary layman would do so.

196. When dumps are discharged in London are not the bands burst and the bales at once separated?—That I could not say. I should say they were for sale purposes unless they dump two bales of one quality together. I do not know whether they do that.

197. Do you think there is no possibility of those particular bales that you have information about having heated in the centre through having been baled damp or wet?—I do not think there is. I am very careful as regards the packing of my wool and the supervision of the drying part of the business.

198. And that no chemicals could have been left inside—no sodium or lime?—Perhaps there may be a small bit of lime get amongst the wool, that is quite possible, and it cannot be avoided.

199. You believe that it would have been so far slaked that it was impossible to generate heat?—I think it is absolutely impossible for that lime to generate the slightest bit of heat.

200. *Mr. Foster.*] Do you know of a brand C F M. in an oblong?—No, sir. Of course, I have seen C F M. in an oblong in the sale catalogues. I should presume it is the Canterbury Frozen Meat Company's mark—it is not the Christchurch Meat Company's.

201. Did you have any wool returned to you for reconditioning not long since from Lyttelton?—No. I will tell you what I have had returned: Last September I dried some skins for shipment, and they were shipped out in October.

202. What were they?—Dry skins—twenty-five bales of frozen skins, and about a week after I received word to say that one of the bales was coming back. I had no instructions as to the why and wherefore, but they told me it would arrive next day. It never arrived, and I made inquiries, and the bale did not arrive at Islington till the following February.

203. What was the date you forwarded it?—In October, and it was returned to me in February.

204. What was the condition of it in February?—They opened up in perfect condition.

205. And you never heard why it was rejected?—No, never heard why.

206. Could you ascertain why from your office?—I think so. I should assume it was returned on account of being damp, but there was no heat generated in that bale.

207. Would you be good enough to find out the cause of its rejection at Lyttelton?—Yes, sir.

208. Do you consider there is any possibility of risk from the sulphide of sodium used on the skins?—Not in my opinion—I do not think so.

209. You think, when you dissolve that and take the heat out it is done with?—Yes, it is done with. That is all dissolved—there are no particles of that remaining.

WILLIAM NICHOLLS sworn and examined. (No. 75.)

210. *The Chairman.*] What is your name?—William Nicholls.

211. What are you?—A wool-buyer, wool-scourer, and fellmonger.

212. You have had considerable experience with regard to wool?—Yes, I have been in the business now for thirty-nine years.

213. *Mr. Foster.*] You heard the evidence of the previous witness?—Yes, most of it, I think.

214. Do you corroborate all that he said, or do you differ on any points, or have you anything to add?—I think it was fairly correct. Of course, he does not seem to have had much experience so far as I can see. Take the loading of trucks, we are compelled now by the Railway to put so many bales on an L truck, and so many on an LA truck, so having to put a number of bales on these trucks it makes a flat top, and if two tarpaulins are not enough we have three, and if there is a hole on the side we cover it with another tarpaulin, so that if the wool is covered up there is no fear of any trouble, because if it does take a little wet it will not hurt. If you take a bucketful of wool and put water on it, the wool will float after it is scoured. The shipping companies are getting scared at taking wool after these fires, and I had seven or eight bales returned to me. The tarpaulin had been pulled off at Lyttelton, and the water got on the bales and it was sent back, but it only had to be put into fresh packs.

215. Who do you hold responsible for sending it back?—I do not know. If they had put that wool on board it would not have taken any damage.

216. Do you think two or three hours' exposure to the sun would have dried it?—Oh, yes, it would have dried in the ship.

217. You heard what the last witness said in regard to wetting the ends of bales—do you think there is much in that?—I do not think so.

218. Have you ever had any experience of wool heating seriously?—No. All the years I have been shipping wool I have never had any returned to me except those about two months ago that I spoke of. About fourteen years ago we erected a kiln at Belfast, when Mr. Watt was alive, and we dried some wool in it; but through not being accustomed to drying in that way, we took the wool out before it was dry and stacked it away for a length of time. We packed that wool and shipped it, and there were about two hundred bales reported as country damaged, and that wool lost 30 lb. on the way Home, but it did not catch fire. The report we received was that it was caked.

219. What proportion of a bale would 30 lb. be—what percentage on the weight of the wool?—On the wool itself?

220. On the weight of the bale itself—how much would that be per cent.?—The bales would run 350 lb. net.

221. What wool was it?—Sliped wool—this particular lot was skin wool.

222. That is, roughly, 10 per cent.?—Yes.

223. We are told that wool contains in its normal condition anything from 10 to 18 per cent. of moisture?—Before it is scoured.

224. In the condition to which the atmosphere will bring it?—If exposed: if scoured wool is exposed it would take up that moisture.

225. Not so much with scoured wool, but that is the water element in wool?—I do not know.

226. What I want to point out is that your wool only lost 10 per cent.?—Yes.

227. Probably a portion of that 10 per cent. may have been the evaporation of the natural moisture in addition to what you put into it, so that it might have been very wet in the beginning?—I think it was the water we left in and had not taken out.

228. Do you not think it would have taken more than that: the fermentation of heat would take out more and some of the original moisture?—Why I mentioned it losing 30 lb. a bale was because I hardly thought it possible to take up that quantity without firing.

229. If you took out 30 lb. it was only 20 lb. more than was left in?—Yes.

230. I know you have made a study of wool, and I thought possibly you had considered that?—No, I have not. I have just shown that wool will carry 30 lb. of moisture, and the report was that it was badly caked. Since that I have not had any cases—I have been very careful, and I take it that if a fellmonger or wool-scourer is careful there is no need whatever to have any damaged wool.

231. But if you have not had the experience, as a matter of theory or opinion, do you think that wool will heat spontaneously to the point of burning?—Not to catch fire, you mean?

232. Well, to get hot enough to bring about the same effect: if it does not catch will it accumulate sufficiently to fire anything else?—It would to the packs.

233. You think so?—Yes, I am sure of it.

234. So that a sufficient amount of moisture in a bale endangers a ship to fire?—Yes.

235. *Captain Blackburne.*] Do you say you have tested that?—Yes. I have seen wool so hot that it would scorch—it will not blaze.

236. *Mr. Foster.*] Were you present when Mr. Hood gave his evidence?—I did not hear what he was saying.

237. Mr. Hood was a carrier, and he gave an instance of wool firing almost to total destruction—only seven out of the thirty bales were saved. That fire broke out on his wagon, and within forty minutes, he told us, the wool was burning and the wagon was almost entirely consumed?—I cannot understand it.

238. *The Chairman.*] Assuming that it caught extraneously, there is the fact that he only got seven out of thirty bales?—I should not think it possible.

239. *Mr. Foster.*] Then, as regards the manipulation of skins, you deal in wool and skins of every kind?—Yes.

240. You heard the evidence of the previous witness as to the method in which they deal with them. Is there anything in your opinion which is defective or which might be improved upon as likely to lead to anything?—I do not think so. Of course, you see the chemical—that is, sulphide of sodium—comes in drums, and if you covered that with bales they would catch fire. Directly it is used it is mixed with lime and put on the pelt and takes the wool off in about thirty-six hours. That is all it is, and they then dry the wool, and the lime and the chemical is dead.

241. Do I understand you to mean that the sulphide of sodium in a drum, if it is covered with a bale and no other moisture that it would fire the woolpack?—Yes, I have done that myself.

242. Would it be absolutely necessary for the bale to be actually in contact with the chemical itself, or merely thrown over the sulphide?—It is merely thrown over the sulphide.

243. Touching the sulphide?—Yes.

244. Then it absorbs the moisture from the air?—Yes.

245. Well, your business being different from that of the Christchurch Meat Company, could you give us any other information as to your process?—Well, I will give you an instance: I have been shipping a large quantity of greasy wool this last three or four years, and I have not been scouring all the wool I purchased. I have shipped on an average 13,000 bales a year, and I have been in the habit of sending it to Lyttelton. Two seasons ago I purchased a line of fleece wool in Christchurch, and the ship was in a hurry to get away, and I wanted to get the wool away to Lyttelton, and I did not get the invoice till next day, and I wanted to ship some bales of pieces with it. I got the invoice, and the weight of the bales of pieces was 7 cwt., and I thought there was something wrong. I went to Lyttelton and examined the bales of pieces and found good wool at each end and dags in the centre. I cut the bale, and these dags were just getting warm. If I had not discovered that it would have gone on board, and perhaps the ship would have caught fire. That was caused through false packing, and wool people do some funny things to get a living. However, I ordered the wool back, and in the meantime I made inquiries, and I brought it before the Wool-buyers' Association, and found out that the seller of the wool had been false-packing wool at other times. It shows it is difficult to get at these lines of wool, and that if I had not noticed the invoice and seen the weights it would have gone on board the ship.

246. And did you or any one else take steps to follow that man up?—Yes, we did.

247. By legal process?—No, we did not go so far as that.

248. Was there no publication of such misconduct as that?—No, we did not publish it at the time.

249. Do you not think, considering the risks involved, that prosecution ought to follow such a thing as that?—Yes, it ought to.

250. Have you a Wool-brokers' Association here?—Wool-brokers and Wool-buyers' Association.

251. Do you not think it would be the duty of such a body to follow such a thing as that up?—We did follow it up to a certain point, but it is a very difficult matter to get a conviction.

252. *The Chairman.*] But if you did not get a conviction, would not the fact of publishing it and bringing it before the Court be a warning to others not to do it?—I think they got a warning—it became public.

253. Did the papers say anything about it?—I do not think they knew much about it; but, of course, they did not publish any one's name.

254. Were they aware of the person's name?—I am not sure about it.

255. Was there any inquiry held?—Yes, with the wool-brokers and wool-buyers.

256. What was the nature of the inquiry—was any evidence taken?—No, no evidence taken. They stipulated that there should be a certain amount of money put down to cover any expense that might be incurred.

257. Who took the matter up—the Association?—Yes.

258. And I suppose they threatened this man?—Yes; but being the first case of the kind they did no wish to push the case too far.

259. Would it be recognised by the buyer and seller that it was a punishable offence?—Oh, yes, certainly.

260. Was it not in the nature of a felony when the thing was patched up?—Not that far.

261. You would not call it a felony?—It was the Association, and we did not care about taking it up because we were not very clear on the matter.

262. There was not sufficient proof?—No, not quite.

263. Although when you found good wool at either end and dangerous wool in the centre, you did not think that conclusive enough?—The owner of the wool blamed his men for it. They thought it better to settle the matter. He gave us all the brands he was selling, and it proved that most of them had been returned to the brokers who had sold to the different buyers.

264. Then you did not take delivery?—I rejected it.

265. Those bales?—Yes, I rejected two or three lines. It appears that the mistake the buyer made was to pay for it first and then reject it afterwards. If a buyer wishes to prosecute for false packing he must pay for the wool, not reject it, and then enter a conviction.

266. They did not reject it before paying for it?—The buyer has no claim on the seller for false packing.

267. *The Chairman.*] You mean he has not completed this contract until he has paid for it?—Yes.

268. *Mr. Foster.*] I do not see how that covers the point of false packing; the fact still remains that if the false packer had not taken you in, you would have taken some one else in?—Yes.

269. *The Chairman.*] False packing is a fraud, and it does not matter whether he had entered into a contract or absolutely paid?—Yes.

270. *Mr. Foster.*] Well, is there any other point that you can throw any light upon in reference to the handling of wool. You know the process it goes through after it leaves your hands—is there anything you can suggest in that direction?—You want thorough experts at Lyttelton to reject the wool if necessary, and who are able to say that it is wrong before it is rejected—it wants to be well examined.

271. Have you thought of the difficulties in connection with a thorough examination with wool coming in in the busy season?—I know there are difficulties in the way. I think slippe wool ought to be more closely examined than greasy—that is, greasy pieces—and a lot of locks should be prohibited from being shipped; people ought to be debarred from shipping wool in dags.

272. Supposing the inspector at the port had the right to say whether wool should be shipped, such as dags, would that be sufficient?—Yes.

273. A witness has suggested that no slipe wool should be allowed to be dumped for shipment: what is your opinion?—I have never had any complaints. I have written about it many times to my London brokers, because you have to pay a farthing more for undumped wool; but I never had any trouble in that direction.

274. As wool-buyers, I assume that you have a considerable measure of risk on your own shoulders if the wool goes wrong?—Yes.

275. And in view of that, would you regard a regulation preventing the shipment of dumped slipe as interfering seriously with your business—it imposes $\frac{1}{4}$ d. a pound?—Yes.

276. You would consider that interfering with the trade generally?—Oh, yes, I think so.

277. As a matter of fact it comes to this: that you would have to give $\frac{1}{4}$ d. a pound less to the farmer?—There is no danger in dumping slipe wool.

278. And $\frac{1}{4}$ d. a pound would not affect you, you would pay less to the producer?—You cannot reckon $\frac{1}{4}$ d. a pound very well—we should reckon that we should have to buy our wool at $\frac{1}{4}$ d. a pound less.

279. It would have to go into your valuation?—Yes.

280. And you would value accordingly?—Yes.

281. I understood the recommendation as to not dumping wool was in order to prevent those who do not conduct their business properly from sending any wet slipe wool?—Yes.

282. Would you consider that a prevention against bad tradesmen or wilful mischievous tradesmen—the imposition of $\frac{1}{4}$ d. per pound on the man who produces?—No. I think the shipping companies should be warned about some fellmongers. There are some in a very small way who are anxious to get the wool away in a hurry in order to get an advance on it so as to purchase skins—there is that danger about it.

283. But would it not be somewhat dangerous to warn shipping companies against individuals—might not trouble arise from that?—That is rather hard.

284. It is dangerous if it is not somewhat unfair?—It would be unfair. I mean to say an expert in Lyttelton should be informed, and if he is amongst the shipping people who are shipping wool he would soon find it out.

285. You think the appointment of an inspector at the port of shipment would have very beneficial results?—Yes, I think so.

286. And as the owner of the wool at the time of shipment, you would not grudge a few pence for the inspection?—I would not grudge it. It would be a benefit to the wool-buyers, and especially the farmers ought to be protected. I know in regard to damp wool and greasy wool that my first shipment of greasy wool last November lost 6 lb. in weight. We had a damp time last October and November, and since then it has gained 4 lb. The slipe wools have not gained what they should have done during the last six months.

287. That would indicate an unusual amount of moisture?—I do not think they have been drying the wool as well as previously.

288. I suppose in pretty well every case it has been more or less to catch the market while the prices are high?—Yes, I think so. I have done so myself, but I have always taken care to see that the wool is dry.

289. But throughout there has been an extra effort to get the earliest possible boats?—Yes.

290. And that, in your opinion, has in some cases led to the wool not being sufficiently dry?—Yes.

291. *Captain Blackburne.*] Did you find February and March at all extra wet?—Well, of course, we have had a very catchy season; but I have not found any damp wool throughout the sales, only the first November sales in Christchurch we found the wool damp, not enough to cause it to heat, but we could say that a bale would lose 5 lb. or 6 lb. in weight; but if there were any we thought were not fit for shipment we would reject them.

292. Do you think there is any danger in loading in rainy weather?—No danger whatever. You mean in loading a ship?

293. Yes, the hatchway being open, and it is a rainy day?—No, there is no danger in loading a ship. The bales are mostly dumped and the rain will not penetrate—it will take a long time. It would take five or six hours to penetrate to any extent. I had a thousand bales stacked out for six weeks, and it never took any damage.

294. Uncovered?—Yes. It was scoured. As long as the air gets round the bale I do not care.

295. *Mr. Foster.*] You mentioned some wool in Lyttelton shed being stopped because damp got on: would you consider that loading in wet weather—I do not mean a downpour—would put as much on a bale as was on that?—No.

296. That you say would dry in the hold?—Yes.

297. You do not regard light wet weather as serious?—It does not take any harm. There is one thing I might mention: about four or five years ago I was complaining to my agents at Home about the loss in weight, and the grease it would lose, and I got an answer stating that several of the clips were stowed near the boilers. Well, of course, in that case the wool would be liable to lose a little more—I have never inquired into that here.

298. Would that not likely be reconditioned when sold?—If sold in the summer it would not gain, but in the winter it would.

299. *Captain Blackburne.*] If a pressed bale of wool got soaked when it was on a wagon, and then the packs are dry outside and a certain amount of wet inside, and the bales are dumped, do you think there is any danger from that?—Well, of course, if a wagon got much rain, sufficient to let the fleeces get damp, it would not improve the wool if it was dumped—it would cake.

300. You do not think there would be any danger?—No, I think the wool would cake.

FULBERT ASTLEY ARCHER sworn and examined. (No. 76.)

301. *The Chairman.*] What are you, Mr. Archer?—I am manager of the firm of Dalgety and Co. (Limited), and local representative of the Shaw, Savill, and Albion Company.

302. You have placed at the disposal of the Commission your storeman and other officers who have given evidence before the Commission. You have probably read what they have said. Have you anything further you wish to add to the evidence already given by those officers?—I do not know that there is anything I can add. They and other expert men have told you all that is within their knowledge, and I cannot enlarge upon it.

303. Otherwise you can confirm what your officers have told us?—I do not think I can tell you anything more.

ISAAC GIBBS sworn and examined. (No. 77.)

304. *The Chairman.*] You are general manager of the New Zealand Shipping Company?—Yes.

305. The Commission had an interview with you when in Wellington, and you have since placed at the disposal of the Commission your officers under your control: have you anything further which you would like to communicate to the Commission?—No, I think our expert storeman in Lyttelton is in a better position than any one I know to give you evidence as to the conditions under which the wool is handled and shipped.

306. Have you ever had reason to find fault with their methods of handling and shipping, or anything that would be a possible source of danger accruing from those methods?—No, none whatever. Our storeman is an excellent officer, and very satisfactory in every way.

307. And there is nothing which you wish to add?—If there should be any further reports coming to hand I will be very pleased to hand the information to the Commission.

308. You have already supplied us with valuable information, and we may take it that you will render any further assistance which might be in your power?—That is so. Anything I have will be placed at the disposal of the Commission.

JOSEPH JAMES KINSEY sworn and examined. (No. 78.)

309. *The Chairman.*] What are you, Mr. Kinsey?—I am agent for the Federal-Houlder-Shire line of steamers.

310. We have already had evidence from those under you, and who have to do with shipping and handling of wool. Probably you have read that evidence. Have you anything to say in addition to that?—No, I have not.

311. Have you had any complaints to make, by reports or otherwise, as to their methods of handling and their supervision of the wool passing through their hands?—No.

312. *Mr. Foster.*] There is only one question I have to ask—or rather a remark—and perhaps the other gentlemen will also take it to apply to them: Will you, if you receive any information which you consider may be of value to the Commission during the course of this investigation, either here or elsewhere, place that information at the disposal of the Commission?—I shall be very pleased to place at the disposal of the Commission any information which I may possess bearing on the subject-matter of the investigation.

WILLIAM HENRY ATKINS, already sworn, was recalled and further examined. (No. 79.)

313. *The Chairman.*] You were to bring some results of your search?—Yes. That particular bale of wool was sent to the vessel's side on the 21st September from Islington, and about a week afterwards Mr. Pitcaithly received information that it was coming back, as it had been wet in transit, and it was being returned to Islington. It was returned on the 16th January, 1906.

314. Have you any explanation as to the cause of the delay?—None whatever.

315. It was a long time in coming up?—Yes, four months. I asked Mr. Pitcaithly if he had information about why there was such delay, and he said he had none.

316. In whose custody was it during this time?—In the New Zealand Shipping Company's.

317. And one might presume that the wetting was so slight as to be easily dried?—Probably.

318. Do you think it had been overlooked?—Probably it was overlooked. I kept their memory jogged about it, and they said from time to time that it would come along to-morrow, and that to-morrow did not come for four months.

WILLIAM DEVENISH MEARS sworn and examined. (No. 80.)

319. *The Chairman.*] What is your position?—I represent the Alliance Insurance Companies in New Zealand, and I happen to be president of the Marine Underwriters' Association, but I do not suppose I appear in that capacity.

320. In every capacity?—Very well.

321. You know what the Commission is inquiring into?—Yes. I have certain information which I should like to hand in, and particularly of the special committee appointed by Lloyd's in London, and which reported on the 29th June, 1904, on the subject of fires on ships. [Report of special committee of Lloyd's on fires on ships, dated 29th June, 1904, put in, and marked "Exhibit No. 22."] There is one paragraph in that report which I would like to draw your particular attention to: it reads "In view of the number and importance of these fires, of the vast size and great value of the cargoes now carried, and of the increasing carrying-capacity of merchant vessels, the special committee is strongly of opinion that the means ordinarily available for the extinction of fires on board ship are inadequate and obsolete. . . . The special committee recommends that the committee of Lloyd's should represent to the London and India Docks Company the urgent necessity for the adoption of appliances for the chemical extinction of fires on ships in the company's docks." In that connection I might say that I have for the past twenty years been advocating the adoption of chemical appliances aboard ships for the extinction of fires. Some sixteen or seventeen years ago, after many interviews I had with a gentleman who has now passed away, I thought these appliances would have been installed in the line with which he was connected. However, within the last couple of years the New Zealand Shipping Company has decided to go

in for the chemical appliances, and from the evidence you have had before, you will have seen how very successfully these appliances have stood the test in the fires recently reported. The question of fires has only been prominently brought before us within the past few months—

322. Yes, and might I add to that, that we have had evidence that the question of fires was never taken into their calculation in the past; only that of heating, and as having an ill effect upon the quality of the wool when arriving Home?—Yes. My point was in the direction of advocating that there should be appliances aboard that would put out a fire by chemical means, from whatever cause it started. I have gone into the question of these fires, and find that there have been forty-eight fires within the last ten years, all on vessels trading from New Zealand, United Kingdom, and America.

323. You have America in as well?—Yes.

324. Have you any means of saying how many of those would be eliminated if you left America out?—Yes, I will leave America out. I will go into that matter again and supply you with the figures.

325. Have you compiled that from the *Australasian Banking and Insurance Record*?—Yes, and checked it. I see now that six of those fires have occurred upon vessels to or from America, and that will bring the number down to forty-two. Of course, you will remember that all these were not serious; but the fact remains that there were those fires. With regard to flax fires, that is a question which has engaged the attention of the Commission. I find that during the last ten years there have been ten fires in flax vessels, or vessels carrying flax.

326. That is so, but the evidence we have had has gone almost universally to show that flax itself will not spontaneously combust—it cannot do so; and, although there might have been fires originated in flax, it has been clearly shown that these fires have arisen from extraneous sources, but not through the flax itself?—That matter is one that I have taken a good deal of interest in, and I have inquired as closely as I could into the subject, and have never come across a case that has led me to suppose that there was spontaneous combustion in the flax. I have heard of one case only, and that appeared to be due to a small quantity of tow which, I understand, was badly oiled, and that had spontaneously ignited. It seems to me there is considerable danger with flax and a great deal more with tow, because it is more likely to ignite should a match be applied or it come in contact with a naked light. In almost every case that I have had under my notice the cause has been attributed to smoking or the presence of matches.

327. Extraneous?—Yes. There was a case of fire on one of the steamers not long ago in the tow cargo in Wellington. In that case a man struck a match in order to endeavour to find his dog-hook, and instantly the whole of the place was on fire. I hope, therefore, that the members of the Commission when making their report will consider the suggestion that I have to make, and that is that they will recommend that both tow and flax should be covered before shipment. Flax, of course, is not covered now at all, but a certain amount of tow is, but only a small proportion. Curiously enough that from Auckland is covered. I do not suppose the suggestion I make will commend itself to the flax-growers, but the shipping companies prefer to have both flax and tow covered before shipment, as is evidenced by the fact that they are prepared to carry it at a less rate than if uncovered. Then, of course, we get back to the main question of the risk of life—

328. *Mr. Foster.*] That is also a serious consideration?—Yes. When you consider the number of crew and passengers who have risked their lives unwillingly it is serious. In the case of the "Pitcairn Island" I understand that one of the boats is still missing with some valuable lives on board. Then, in the case of the large passenger-steamers and the fire which was recently discovered in port; if that had occurred before arrival with that large number of passengers on board—six hundred, I believe, she is licensed to carry—what a very serious state of things would have resulted! If the Commission can see its way to report to the effect that the installation of chemical appliances would minimise the risk of serious fires, then I shall feel that my time and that of the Commission has not been wasted to-day, and a great deal of good will have been done. I have some further information here which I shall be pleased to hand in to the Commission; and, following the remark which *Mr. Foster* made to us, I can say for my part that I shall be only too pleased to place at the disposal of the Commission any evidence or information which I now have or which may come to my hands while the Commission is conducting its investigations.

329. *The Chairman.*] Our position is this: we have to inquire first into the fires which have taken place and as to a measure of precaution against a recurrence of such fires. In that direction also we must see what measure of supervision or inspection might be given to the wool before it goes into the vessels to prevent the risk of fire. Secondly, we take it that should a fire occur we have to deal with the means by which it might be kept in check and to extinguish it; and thirdly, we might consider the life-saving appliances which are available should they be necessarily resorted to?—Yes.

330. *Mr. Foster.*] You met the members of the Commission in a semi-official capacity the other day, and we mentioned that the High Commissioner had been communicated with by cable, requesting that the fullest possible information with regard to the fires that have occurred might be forwarded out to us. You were at that time in doubt as to whether we had struck the direction in which we could get the best information. I myself had in my mind that you inferred that you could suggest to the Commission a channel through which this information might be more readily forthcoming?—Yes. I really think that what you want to get at is the marks and numbers of the bales which have been—if not the cause of the fires—at any rate the seat of the fires.

331. What we cabled for was the marks and numbers and description of the contents of the bales?—Well, if you would like me to do so, I would cable to the London Institute of Underwriters and ask them to co-operate with the High Commissioner in obtaining the information which I conceive to be the desire of the Commission to obtain.

Mr. Foster: Thank you. If you would do that it might be of assistance in procuring the information we require.

332. *Captain Blackburne.*] Have you formed any opinion as to the cause of the fires on these forty-two ships that have been on fire?—I have some information about that, and I will hand that information in with the other papers.

EDMUND GEORGE STAVELEY sworn and examined. (No. 81.)

333. *The Chairman.*] What are you?—I am manager of the New Zealand Loan and Mercantile Agency Company (Limited).

334. The company, and yourself here, have placed at the disposal of the Commission your officers who have given us considerable assistance. Is there anything you would like to add to the evidence which has already been given by those officers, both here and in Wellington? I think you have had an opportunity of looking through the evidence which has already been given?—I do not think I can give you any information apart from that which has already been given by our officers here and in Wellington, and those who are particularly employed in handling the wool.

335. You think the evidence those officers have given has been based upon their practical experience?—Yes.

336. And you will be willing to place at the disposal of the Commission any fresh facts which may come to your knowledge?—Anything in which I can assist the Commission will freely be placed at its disposal. There is one point that struck me: I think that the appointment of at least one inspector at the big ports might be a slight check upon the shipping of wet wool or damp wool. They could not, however, inspect the wool sufficiently—

337. Do you not think it would be, at least, a moral deterrent?—It might be a deterrent.

338. Do you think it would be an additional hardship on the shippers if a small charge per bale—perhaps amounting to 2d. or 3d. per bale—were levied for this inspection? Do you think that it would be rather welcomed than otherwise?—I do not think the grower would appreciate any additional charges.

339. Do you not think there is a prospect of their having to pay it, or something approaching it, in higher rates of insurance if something of the sort is not done?—Yes.

340. The underwriters are slow to move in the direction of increase, and in the same light would they not be equally slow to retract?—Yes.

341. That would be an additional cost to the New Zealand grower, and if once placed upon him it would require some weight to get it off again?—Yes.

342. Prevention, then, is better than cure, even in insurance increase?—Yes.

343. *Mr. Foster.*] One witness yesterday said he thought the dumping of slipe wool and low-quality wools should be prohibited, on the ground that a considerable danger arose through the shipping of that class of wool: do you think it would be a hardship, or would there be a serious objection to the prohibition of the shipping of dumped slipe wool? Of course, it would mean $\frac{1}{4}$ d. per pound additional freight, and in that case would not the purchaser value the wool in proportion?—I think they could make allowance for it.

344. Would you think it a reasonable embargo to lay upon the shipment of certain conditions, merely because there might be a few careless or negligent persons?—No, I should not.

345. You would not prohibit that class of wool?—No, I should not.

346. *The Chairman.*] I understand you have no complaint to make against the wool coming from the larger stations?—No; when we come across instances of damp wool in the warehouse, I might say it is from the small grower, or ordinary farmer.

347. And do you think it is due to his desire to make as speedy a return as possible that the wool is sent in in a damp condition at times?—I think they are more careless than the larger growers as they are not so well organized or equipped, and have not the same advantages.

348. And buyers are more particular to examine the clip of the small farmer than that of a large station?—Yes, undoubtedly.

349. Is that particularly as to the dampness of the wool?—Or the careless manner in which it is classed or put up. I do not think any grower would knowingly put up his wool wet.

350. In his ignorance?—He might.

351. You admit that the buyers would be more careful in buying wool of a clip they do not know than one they have had experience of?—They certainly make a closer inspection of a small lot than of a large one.

352. The big clips have a reputation to keep up while the small man has to make his?—Yes; yet I have seen some small ones as carefully got up as the largest ones.

353. *Mr. Foster.*] In the event of their coming to any damp wool in these parcels they would mark it wet and pass it?—Yes.

354. What would be done with it?—It would probably be opened up for drying, and possibly offered again or shipped.

355. As representing a considerable *clientèle* of growers, would you say that it would be acceptable to them that a rate per bale should be levied for the examination of the wool before shipment?—I could hardly answer that. That is a question that would be better answered by the chairman of the Farmers' Union than by me.

356. *Captain Blackburne.*] I should like to know whether your experience has been similar to that Mr. Barkas had. He said in his evidence, "I have just been through the specifications of wool shipped by us during February and March of this year, and in every case except one consignment, the London weights for the May sales are less than the Wellington shipping weights, which to me is very clear evidence that the season was an unusual one." Has your experience been the same?—Yes, speaking generally, although I have not examined it.

357. He said there was a difference of from 1 lb. to 2 lb. per bale and up to 10 lb. a bale?—It was an undoubtedly wet season, and wool will absorb considerable quantities of water.

358. *Mr. Foster.*] You know that the weight of a bale of wool will vary from day to day according to the state of the weather?—I know that.

THOMAS SPEED SIBBALD sworn and examined. (No. 82.)

359. *The Chairman.*] What are you?—I have been a fellmonger and a wool-scourer for thirty-five years.

360. In and around Christchurch?—Dunedin and Christchurch. I have heard the evidence of Mr. Hill—

361. Do you corroborate it?—As far as he states that wool goes into a jelly, I fancy he failed at that point. It certainly generates a gas that smells like oxygen, and it goes to an intense heat, and that with other inflammable material is the cause of fire. Our method of detecting heat in bales was to have an iron rod and insert it into a woolpack.

362. Did you find it answer to try it with an iron rod?—Baling slipe wool in the winter-time would lead to more moisture than at other times.

363. How would that wool be dried?—We always have a suspicion of slipe wool. We always kept it for three days in the shed.

364. Are you speaking only of the sun-dried?—Yes, we had no steam driers then. We always put it on the floor for two or three days before packing it. We would never ship it until it had been out for three days.

365. And the risk of fire was a consideration you always had present?—Yes, always. Clean wool will attract moisture itself, and will lose it again under certain conditions.

366. *Mr. Foster.*] You agree with Mr. Staveley that it will gain and lose weight according to the temperature?—Yes, there is no doubt about that.

367. *The Chairman.*] Have you ever been shearing?—Yes.

368. Have you ever done shearing on stations where you have been forced to shear wet sheep?—No. I have been on stations where they have refused to shear them if wet.

369. Have you had any experience in shearing?—I have been wool-classing since 1885, and have seen a deal of shearing. I can tell you that low-class wools are more liable to heat than clean fleece wools.

370. Have you ever seen wool on fire?—Yes.

371. Actually on fire?—Not actually on fire, but with such heat that you could not touch it.

372. Have you seen wool flame at all?—No, but I have seen a bluish odour exuding from it [*sic*]. I have seen the same thing in the sweathouse where we have been sweating the skins. There would be such heat that it was almost aflame, and the gases have been so strong that it would overcome a man if he went into it. I have had to pull a man out myself.

373. *Mr. Foster.*] Have you heard of sweathouses being burned down?—No, never. I cannot remember any instance of such a thing. The sweathouses we used to build we used to cover with soil to keep the temperature down—to keep the temperature even.

The Commission adjourned till to-morrow (Saturday), the 8th September, 1906, at 10.30 a.m.

CHRISTCHURCH, SATURDAY, 8TH SEPTEMBER, 1906.

The Commission met in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

JOHN WEIR sworn and examined. (No. 83.)

1. *The Chairman.*] What is your name?—John Weir.

2. What are you?—I have been flax-milling for a considerable portion of the last twenty-eight years, and I am doing a little spinning now. I have gone from the cutting in the flax business to the spinning of the usual commodities. I have exported flax, but on no occasion was there any heating or firing, and as far as my observations have gone even with it in a damp state, such a thing as fire appeared to be impossible; it is a slow process of combustion which is considered rotting combustion. All materials, particularly under the influence of wet, are subject to slow combustion, and more particularly when in contact with grease. I thought it was a maxim of science well established that any fibrous material in contact with grease lying in a dead heap would spontaneously ignite. I have studied physical science myself as an amateur for a period of sixty years. I was greatly impressed with some observations made yesterday, particularly those by Mr. Sibbald. I think the danger he referred to is not generally known, and no reasons why are given; but I think the reasons are very obvious in regard to wool. Solar heat is more powerful than heat second-hand. There is a similar distinction between solar heat and what I would call artificial heat, as there is between an old article and a new article. The rays of the moon, then, we receive second-hand, and in some cases they are said to be highly deleterious; but I think that arises more particularly from climatic conditions. The sanitary conditions under which the moon's rays are received are the chief cause.

3. You do not think that bales of wool would in any way receive any heat from the rays of the moon?—The observations made by Mr. Sibbald yesterday would be subject to the rays of the sun.

4. We can eliminate the moon altogether?—Yes, exclude the influence of the moon. So far as my experience goes, and so far as scientific theories show, the direct rays of the sun on a scorching summer day must absorb moisture and the carbonic material which the wool contains. In these small fellmongeries the bales are packed up in a short time—

5. You are speaking of the fellmongeries which depend entirely on sun-drying?—Yes. Moisture contains one of the most inflammable gases known, hydrogen, and that in conjunction with some of the fat and the chemical acting upon it must set up a process of distillation inside a bale of flax or wool. There is no fat in a bale of flax, but there is in wool, and you never find active combustion in flax except when it is in a loose condition.

6. You consider that when it is baled there is no chance of combustion?—Yes, it rots.

7. And that can only result in decay?—Yes, that I think is the only possibility, and it is according to my experience. Even flax lying on the surface of the ground gradually decays, but I call that a process of slow combustion.

8. You would mean green flx lying on the ground?—No, flax bleaching.
9. *Mr. Foster.*] I suppose you wish to convey this: that any process of fermentation is a process of slow combustion?—Yes, that is exactly what I mean.
10. *The Chairman.*] You want to come to this point: Have you ever had under your observation an ignited bale of flax?—No, except by the application of fire.
11. Extraneous cause?—Yes.
12. And have you had any experience of wool being ignited?—No experience, merely by making observations—I have often marked the danger.
13. It is admitted by a number of witnesses that it will heat?—Yes.
14. But the point at issue and the one which we are seeking to find out, is does it ignite?—It must of necessity ignite in the internal portion of the bales.
15. That is your opinion?—Yes. I thought it was an established maxim that the hydrogen or the water itself first acting on fatty matter in a confined state would most certainly lead to slow combustion.
16. Do you know whether it will actually flame?—Certainly. I have burnt wool myself in order to get quit of it, as you will find if you take a small quantity of wool with grease in it.
17. It will burn?—Yes, it will flame up to an active state of combustion, but not to the state that flax will. You cannot burn flax quickly unless you admit air: you must have a fork, and lift it up.

JOHN EAST NEWLYN sworn and examined. (No. 84.)

18. *The Chairman.*] What are you?—I am not a wool expert.
19. You have some information you would like to give the Commission?—Yes. It occurred to me some years ago that a large waste of money took place in sending so much greasy wool Home. I think the Government could influence the scouring of wool scientifically just as in modern times they have influenced the dairying industry. The wool would be sent away in a safer condition as regards the wool itself.
20. Would you suggest that no greasy wool should be shipped Home at all?—You could not do that at once—it would have to be gradual.
21. Pushing your argument to its logical conclusion, you would advocate the absolute prohibition of greasy wool?—Except under some State inspection just as we have inspection for our meat.
22. You would advocate State inspection?—Yes, certainly.
23. *Mr. Foster.*] Have you come to any conclusion as to whether there is a greater measure of danger in scoured or greasy wool or *vice versa*?—I have no expert knowledge of that except from reading and judging from what has occurred. Taking the year 1884, when I began to take an interest in the matter, there were several ships mysteriously lost, but they were not only wool-ships but grain-ships as well.
24. There is no means of locating it?—No.
25. But, as you apparently do not know whether the danger is greater in greasy than in scoured wool, I think that should be ascertained first?—Yes. We know at present that wool sent Home has to be rescoured.
26. You mean that, as for manufacturing purposes wool has to undergo a scouring process, then why not do it at this end?—Yes, that is so.
27. But the condition which it is put into for manufacturing at Home is the condition that it would probably go back to if they scoured it at Home—they have to mix other oils with it?—Yes.
28. Would you suppose that it would be desirable to scour to that point and then mix oils with it to retain it in that condition and send it Home?—The question is whether the oils would be likely to cause heat on the voyage.
29. If you studied the matter no doubt good might result from your studies; but I think you have not as yet got hold of the first principle?—The first principle is the safety of the people on the ships and the safety of the cargo.
30. The question is how to deal with it?—I do not know that. I believe that in Canada they do send wool Home in such a condition that it can be more readily used than ours.
31. Do they export much wool?—I do not think so—not a great deal.

STEWART HENRY WILLIS sworn and examined. (No. 85.)

32. *The Chairman.*] Do you wish to make any remarks?—I do not wish to say for one moment that the points I am going to bring before you now have had anything to do with the fires that have occurred lately, but I think that under certain circumstances perhaps they might accentuate the danger. A witness stated the other day that the lighting of cargo-holds was done entirely from the deck electric connections by means of portable lamps. That is the case with the generality of cases, but I would also point this out—mind you, I am not sufficient of an electrician to know absolutely the danger—but it strikes me that there must be a certain element of danger in this. I notice that in a very large number of steamers the electric wires run along underneath what is called the shelter-deck. This is a steel deck; and these wires—bunches of them—I have counted perhaps eight or ten wires—go up close to the steel deck and pass through holes pierced in the beams. These are generally connections for side lights, masthead light, and, I presume, also for lights in the forward part of the ship. These wires are no doubt insulated, but insulated to a very small extent, and in these shelter-decks cargoes of all descriptions are carried. Now, if the return circuit is carried amongst that bunch, and you squeeze a bale of wool or case up against these wires and destroy the insulation there is quite possibly a risk of danger there.
33. *Captain Blackburne.*] And they might fuse?—Yes, that is the point. I would strongly advocate that wires leading under a deck like that should in every case be encased. The objection to that is this: that you cannot always get at your wires.
34. *Mr. Foster.*] But would that be so: would it not be possible that that case could just simply screw on?—You could do that, but the general means of encasing wires is to carry them through pipes. The best protection you could have would be a pipe that would resist any pressure from a wool-bale or case.

35. Except that a pipe is a conductor?—Yes.

36. In the event of a fuse in contact with the pipe the pipe is nearly as active and perhaps would be more dangerous?—I think so. I think it is a matter that is worth looking into. It is not so very long since vessels engaged in this trade had insulated wires carried down into their holds, and I think the cause of that being discontinued was on account of two fires that occurred in the "Buteshire." I am subject to correction, but I think that in that particular instance the fire was traced to a wire that led down through the steel deck.

37. Well, would not this be the case: that except when they were loading and discharging, those wires would be absolutely cut off?—No, not in the shelter-decks.

38. Is that a deck closed by hatches?—Undoubtedly.

39. When the hatches are on the wires are cut off?—They stow cargo in there.

40. But would not that be cut off from the generator?—These wires are not for supplying lights to the hold, but to the crews' quarters, &c.

41. Then you would recommend that they should be carried through holds in cases?—Yes, properly cased in. I do not say I can trace fire to that, but I say it is a possible source of danger.

42. It is an element of risk?—Yes.

43. *Captain Blackburne.*] All the nautical men we have examined stated that no wires went through their holds?—I would suggest that the Commissioners come down and look at some ships with the shelter-decks and decide for themselves. Then there is another matter: insulated chambers are very often used for the carriage of wool. An insulated chamber that is carrying meat is tested to find the condition of its insulation, and I have come across instances where the insulation has been in an unsatisfactory state, caused perhaps by the leakage of a soil-pipe, defective riveting, or a defective side port; and I have come across instances where the insulation was in such a condition that if a ship was not going to be full of frozen meat, in order to avoid the extra expense, owners have decided to reinsulate that chamber on arrival at the Home port. In such a case I have always objected to the carriage of wool in a chamber of that description. My experience is that wool draws moisture very readily, and I think it is quite possible that wool stowed in a chamber with the insulation in the condition which I referred to, if it is inclined to heat or already moist, the damp drawn from this insulation would increase the possible danger. I may be wrong, but that is my idea. In the regular liners from here and in the instances I have pointed out, the superintendents have always met me, and the wool has not been stowed in them at this port.

44. *The Chairman.*] Would you have any knowledge of what they might do at Wellington after leaving?—It strikes me that they would do the same thing there, but with vessels loaded at ports where there was no supervision, it might be a different matter. There is no doubt about the possibility of the damp insulation affecting the wool, and I think Mr. Foster will recollect the case of the "Waikato," in which there was a very big action.

45. She went from Queensland, I think?—I forget the exact circumstances of the case. Then, another instance as regards the stowage of wool: There are plenty of vessels coming here in which the engine-room bulkhead is not insulated, and I myself have often found the engine-room bulkhead very hot. Where the wool is inclined to heat and is stowed in close proximity to that, I think it would probably tend to make it worse. I will not say the bulkhead gets hot, but I have found it very warm.

46. *Mr. Foster.*] Does it not occur to you that assuming wool will ignite spontaneously, the cause is set up in the centre of a bale?—Undoubtedly.

47. Is the engine-room bulkhead ever so hot that you could not bear your hand on it?—No, but there is a large amount of heat generated, and my point is that these things may encourage the heating of the wool.

48. That is to say, that any ventilation the hold may have is somewhat discounted through the heat retained from other directions?—Yes, that is what I am driving at.

49. *Captain Blackburne.*] The engine-room bulkhead is very different from the stokehold bulkhead?—Yes, there is generally a cross bulkhead, and that forward bulkhead is generally insulated, sometimes on both sides.

50. I have been asked to put this question to you: Do the iron bands act as ready conductors of heat where the fires occur in wool?—Heat will generate in the wool first, and if it communicates to the iron it makes it heat. I think a bale would get hotter than the iron.

51. I should imagine that this might apply perhaps, supposing that the bands were connected to something else?—Yes.

52. Well, I do not suppose that the two bands of any bales ever touch?—Very seldom. The only place where they do touch is where they cross diagonally.

53. They seem to me to be fairly well imbedded?—Yes.

54. *The Chairman.*] They would only touch one another?—Yes.

55. *Mr. Foster.*] They would not touch the next bale?—No; as a rule you will find the bands well parted—it is very rare that they come together.

56. Would the bands be greater conductors of heat than the bales themselves?—There is a greater heat on the inside of the bale. A bale may be very hot inside and you could not tell from the outside.

57. *Captain Blackburne.*] I think, Captain Willis, you have had experience of an oil-locker becoming on fire—a case of spontaneous combustion?—That was an old matter. Years ago I was in command of a vessel when going Home from India. They had been oiling the deck with a wad which was made of an old blanket, and this blanket was wrung out very tight and then tied up with some sail-twine and put into the oil-room or paint-locker. We had a very unpleasant fire from that. The paint-room was found to be ablaze, and unfortunately the man who was in charge had left the top of the kerosene-tank off, and there was a big blaze. We traced it to the fact that this woollen rag had fired.

ALEXANDER AUGUSTUS BICKERTON SWORN and examined. (No. 86.)

58. *The Chairman.*] What are you?—I am Government Analyst for Canterbury.

59. Have you made some experiments relative to the presence of heat or moisture in wool?—No, I have made no experiments. I came before the Commission relative to the letter which I wrote to the Commission in Wellington. If the Commission could give me samples of wool from the vessels that caught fire I might be able to help you.

60. Our position with regard to that is that we have had four gentlemen placed at our disposal by the Government for the purpose of carrying out certain experiments?—Yes, I saw that after I had written to the Commission. One point that might be of value to the Commission is as follows: It might be very difficult in one bale to imitate the conditions that would occur in a large mass. For example, supposing one bale contained 10 to 20 per cent. of water, the heat due to the chemical action would be expended in evaporation, and so cause the temperature to go down. But in the case of a number of bales the vapour will be condensed in the cooler bales, and so increase the percentage of moisture, and consequently the probability of fire. Of course, it depends upon the size of the mass and the non-conductivity of the wool.

61. *Mr. Foster.*] Before you get away from that—have you ever seen dumped wool?—No, I have no experience with wool.

62. The shape of a bale of wool before being dumped is practically a cube, but when it is dumped under a pressure of 90 tons iron bands are fastened round it. As the pressure of the dump is released the bale expands so far as the bands will allow it, and it is no longer a cube. Having undergone that pressure, and while it remains, there is very little room for the escape of heat from it once it is set up?—But if water can get into wool, steam can more rapidly get out. Heating in the centre of a bale of wool will cause evaporation of the water; but converting it into steam and the steam being driven from the heated surface on to the cool surface will condense and cause concentration of moisture.

63. But if any water goes in it would not go far?—I think it would penetrate into a bale if the bale is put into water.

64. Supposing the water got on to a bale it would be detected?—Well, yes, it might; but if water could get in steam could get out.

65. Have you any idea of how long it would take it to get in?—It might take any time.

66. Would it surprise you to hear that wool which has been under water—dumped—for three weeks has not become more than moist in the centre?—No, it might not be at the centre, but it would penetrate for a certain distance. The point is this: If you had moisture, and sufficient heat generated in the centre of the bale, the bale would be blown up if that steam could not escape. The result, therefore, would be to drive the water outside of the bale in the shape of steam, and on reaching the cooler parts it would condense. If you have a mass of bales the moisture driven out of one bale by the generation of heat will be there to penetrate and increase the percentage of water in the other bales.

67. I think you assume that the bales are packed close so that there can be no possibility of air-spaces between?—It does not matter; if you have heat and moisture you must have steam.

68. If there was a space between the bales, how would the moisture communicate from one bale which was damp to the other bales?—If you put a heating bale containing a certain amount of moisture on the floor, that moisture will escape all round the bale, although it shows only on the floor; therefore vapour from heating bales would condense in the cooler bales although there might be some spaces between, and the heat which will be set up by the chemical action in those bales which contain the increased amount of moisture will be more likely to cause fire.

69. I am afraid there is a deal of this which I cannot follow, because I cannot make it clear to you what are the conditions under which wool is when aboard ship. You must remember that there is sufficient room round the bales to allow of the presence of air. There is sufficient space between each bale to allow almost of a small boy crawling in between.

Captain Willis: You could certainly get your arm in between them.

70. *Mr. Foster.*] Yes. There would be sufficient room for gases to escape without necessarily penetrating the adjoining bales. I suppose that would be correctly termed "ventilation," although there would not be a current of air circulating?—Without a current of air, if water came from any heated bale in the form of steam, it would lodge somewhere, and when it reached the cooler air on the outside of the bale it would condense into water.

71. Yes, we have had the matter of ventilation gone into very thoroughly?—Yes; I only thought there might not be sufficient ventilation to carry away the moisture.

72. Well, in connection with the possibility of the escape of steam from the centre of a bale, I might tell you that, in the case of a bale of wool taken out of the "Gothic," the interior of the bale, to within two inches of the outside, was absolutely charred black—yes, to a cinder—still the next bale was unaffected?—That shows that, provided the non-conductivity of the surrounding bales is sufficient, it could cause fire in a single bale. I have spoken to people, and they have never known wool to catch fire in single bales, except when the bales were in masses.

73. Did you read the evidence which was given by Hood yesterday? He told us of a case where he had thirty bales of wool on a wagon: he observed smoke issuing from the pile and immediately it burst into flames, and it was consumed to such an extent that out of the thirty bales he was only able to gather together sufficient wool to fill seven bales. That wool had just been packed at the station, and the wool had merely been cold-water-washed on the backs of the sheep. There is no question, from that evidence, as to the possibility of wool spontaneously igniting and consuming?—I know all those possibilities, and, considering the bacterial aspect, you will find that where there is decomposition of wool you have all the elements necessary to assist in bringing about this result. The possibilities of change of state are so many. My opinion is that the spontaneous combustion of wool is due to bacteriological causes resulting from the dampness of the season.

which provides suitable conditions for the growth of fungi—many of which are bacteria—and where the higher fungi can grow so, as a rule, can the lower ones grow more rapidly. You know, if you pack up small bundles of grass such as would be usually collected from mowing a lawn, it will decompose and become hot, but the heat will escape into the air owing to the small amount of the grass. If, however, large masses of grass are taken—

74. Ensilage?—Yes, and with about 70 to 80 per cent. of water in it, and pressed down in large stacks of about 10 ft. by 20 ft. by 10 ft. high, and left for a few days, it will be turned to hay through the heat produced; but if the stack be not now opened up it will take fire. So that shows you that if in a small quantity thermo-action can set up, so it will more so in a larger bulk. I thought that might be a point which had not been considered. It might be considered in connection with questions of tight packing and ventilation, and the possibility of allowing the steam and gases to escape, and thus prevent the causes of the greater heating-action going on which I have spoken of. I suppose you have heard of spontaneous combustion in cotton-waste, and you know that it has a tendency to heat. These conditions are due to the presence of bacteria which, by their vital energy, grow and produce decomposition of the cotton, converting it into compounds, and the chemical affinity for one another causes the fire.

75. Do you know anything of the component parts of sheep-dip?—Yes. There is nothing in them as far as I can see likely to have any effect upon this question of fires. They are nearly all arsenic and sulphur. There is no need to go to the sheep-dips for chemicals to cause fire, for in wool you have pretty nearly every one of the elements required: sulphur, nitrogen, oxygen, carbon, hydrogen are all present in the wool itself, so that if the wool is damp enough to start the bacterial growth chemical action is set up at once. You see, the possibilities are legion—

76. I was about to ask you, supposing that arsenic and sulphur are present from the sheep-dip, they would be in the direction of preventing the operation of bacteria?—Yes. If arsenic and sulphur were present in sufficient quantities they would have that tendency. But the wool that takes fire is, I understand, greasy wool not scoured, and the chemicals may not penetrate into its fibres sufficiently to sterilise it.

77. If the presence of arsenic and sulphur did not prevent the action of bacteria, at any rate, it would not help it?—No, sulphur might, but I do not think there would be sufficient left from the sheep-dip. Sulphur, owing to its low ignition-power, might be a cause of what you refer to. It might, as it were, act as the trigger to start the fire in the wool altered by decomposition.

78. Still the other factor must be there first?—You do not need to go to sheep-dip for that; you could get it from the decomposition of the wool in the form of sulphuretted hydrogen and reduction of the sulphuretted hydrogen to sulphur as a result of the action of reducing-bacteria.

79. Would an increased quantity of sulphur be a better trigger than the natural proportion of sulphur in the wool?—No. The natural proportion in wool is about 2 per cent. There is about 1 per cent. in a mixed solution of sheep-dip and a liability of, say, one thousandth part of the mixed dip being left in the wool shows that it is so infinitesimal compared with the amount already in the wool that it is not worth considering in that way.

80. You think there would not be the slightest cause for fear?—No, not from that.

81. Do you know what chemicals are used in the process of fellmongering wool?—Yes, sulphide of lime.

82. Sulphide of sodium and lime?—Yes, it is of the greatest value when it is fresh.

83. Is there anything in that which would be likely to increase the temperature in wool?—No.

84. Would you consider there would be any danger through the presence of any small particles of unslaked lime remaining amongst the wool?—None at all.

85. You would consider that the generating-power of heat in lime is a measurable quantity?—Yes, that is so; but with bacterial it is different. As long as the bacteria can grow and produce movement, the increased motion means increased heat. If you have movement of molecules of matter you have heat at once.

86. Have you heard of lime setting fire to wood through the application of moisture?—Yes; but, of course, in the case of a sack or more of lime and a certain amount of water the rise of the temperature is proportional to the whole mass; but in the case of wool only a particle of lime might be present in one spot, and you have not the same quantity of heat produced that would result from the operation of slaking a large quantity of lime in a few minutes.

87. Sulphide of sodium is practically the same in its action?—Yes, it is a reducing agent.

88. The questions which have been asked you relative to the chemicals have been suggested from various people in London, who think that the cause might be looked for in that direction. You give an unqualified No to that?—Yes, unless it could be shown that certain chemicals that I am not aware of were present. So far as I know there is nothing in it, and I think it will be found to be in the opposite direction. It would necessitate the presence of more chemicals than any one would be likely to put in the wool.

89. Supposing a man sent you a list of every dip in use in the colony, and also a list of every one of the chemicals used throughout the various fellmongery-works for the depilation of wool, would you be able to give a Yes or No answer to that?—Yes, I think so—that is, if I had the right to analyse them in any cases where the oxidizing and reducing action of the component parts were nearly equal.

90. *Captain Blackburne.*] I would like to have your opinion about the ventilation of ships. I think it was Sir James Hector who gave it as his opinion that if wool was carried in an insulated hold, or something like it, where they carry frozen meat, there would be absolutely no danger of fire?—If a single bale of wool can take fire all the ventilation in the world would do no good, but if it will not take fire you can take the heat away from the surrounding bales by ventilation. That is the point. Of course, the refrigerator-chambers could keep the temperature down. The object of ventilation would be to carry away the vapours and prevent bacteria growing. If there is no moisture present the bacteria cannot grow, and you could then have neither spontaneous combustion or any other decomposition.

91. *Mr. Foster.*] Would you suggest, then, that it would be possible, if wool were carried in a vessel's freezing-chambers, to freeze a fire out?—Yes, provided the heat was not sufficient to overcome the refrigeration.

92. You think it would be possible to freeze it right through and through and so prevent the fire?—Yes, if you could get the cold into the wool.

93. It would imprison the heat?—It might prevent any spread of heat beyond the bales already heated.

94. We might get that tested, too, by heating a bale up to a certain point and seeing if it could be frozen out?—Yes, quite easily. The question would be the expense of keeping down such an intense amount of heat as there would be in a mass of bales on board a ship.

95. At all events, it would be possible by that means to ascertain the presence of heat if it were frozen down and a rise in temperature was to take place?—Provided the cost of so doing would not be prohibitive. However, it is an engineering question, not one for analysts. It seems to me to be a step in the right direction to consider the whole question of freezing more fully.

96. *Captain Blackburne.*] Do you think it possible for a bale to take four or five months to get into a state of heat?—Yes. That would depend largely upon the amount of moisture present in the first instance; it might take weeks or months before the bacteria would grow and the bale show heat, and at the same time it might cool down before it is sufficient to show. Of course, this depends upon other conditions also.

97. Would you think there would be any danger through the amount of water that would collect on the bales through the hatchway being open in wet weather? Three of the ships that have taken fire were loading through some wet weather, and a certain amount of moisture may have got into the bales?—It might be sterilised water and would have no effect at all; at the same time it might have the very bacteria you want least, and communicate them to the whole cargo.

98. *Mr. Foster.*] You understand that Captain Blackburne refers to rain-water which has fallen on the bales during the loading of the ship. It would hardly penetrate more than an inch or two into the bales, and that would be hardly sufficient to create any fire?—I think not; it would soon dry out again. You require the temperature at which the bacteria will commence to grow. It is like a greenhouse or a hothouse. You must have a certain amount of water and the right temperature, and until you have these present the bacteria will not grow; but given the necessary moisture and temperature they will grow and multiply.

The Commission adjourned till Tuesday, the 11th September, 1906, at 10.30 a.m.

CHRISTCHURCH, TUESDAY, 11TH SEPTEMBER, 1906.

The Commission sat in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

ABISHI PRESSNEY FARROW sworn and examined. (No. 87.)

1. *The Chairman.*] What are you?—I am store clerk for the Shaw, Savill, and Albion Company at Lyttelton, and have had twenty-two years' experience in the wool trade.

2. Have you had any experience of wool in a heated condition?—As regards greasy wool, I have never had any experience of it having been packed wet, except on one occasion only, and that was some seven or eight years ago when it was packed wet in the country.

3. Did that come from the large stations or from the small growers?—I could not say; I fancy from the large station. When we dumped the wool which I am speaking about the water was squeezed out of it in the dump. I reported the matter, and instructions were given to have it sent back to be reconditioned.

4. Was there any heat?—We did not open it out. We had dumped four bales, and we had the line sent back again. We had instructions that should any wool show signs of damp it was to be sent back.

5. Were there only four bales?—There would probably be twenty bales of that line in the store at the time. I have known of other cases of dampness through defective sheeting of the wool on the railway.

6. Could you say whether that was trucked at side or flag stations, or a station where there was a Stationmaster where the trucks are loaded by the officers of the Railway Department?—As often as not it comes from stations where the Railway officers load the trucks. We get a fair amount of slipe wool from the fellmongers, which becomes wet in transit owing to the foolish method of loading, which causes a flat top to form.

7. Is that the only cause of its getting damp?—The principal reason of the wool we get being wet.

8. *Captain Blackburne.*] The loading with flat top seems to be universally complained of?—When one tarpaulin is spread on a load with a flat surface it will not keep the water out. We now look through the tarpaulins to see if they are in good condition, for we will not trust them. It is principally from Belfast that we get the wool which gets damp in transit. We have complained about the system, and the answer we get is to the effect that it is the regulations.

9. *The Chairman.*] If you were permitted to put five or six less into the trucks and form a single row on the top you would get the proper ridge, and there would be little fear of wet?—Yes.

10. *Captain Blackburne.*] Do you often find tarpaulins with holes in them?—Yes; unless they are absolutely new you cannot rely upon them. When we load wool to stand overnight we always endeavour to put two tarpaulins over them, and put a ridge on it.

11. Does the Department not double-sheet them?—Not often. Of course, the big loads require two and sometimes three tarpaulins to cover them. Another cause of wet wool is this: If the

Railway Department supply dirty trucks, the men loading them at the side stations will put a tarpaulin in the bottom of the truck to protect the wool; but, the top sheeting being insufficient, if any rain comes on it will lodge in the bottom of the truck, and the bales are standing in water. In that way we get wool damaged. If we can dry it we do so, but if it is serious we have it sent away to be reconditioned.

12. *The Chairman.*] There would be no chance of your shipping it?—No, never.

13. You might sun-dry it yourselves?—Yes, or we send for the agent's instructions, and it is usually sent to the fellmongers. In all my experience I have never come across greasy wool heated.

14. Not if damp?—It might have been, but I have never come across it. A good many years ago we had some slipe wool in very bad condition in the winter-time, but not of late years.

15. How did you account for that?—I think it was not dried properly. It was largely sun-dried then, but now it is almost exclusively done by machinery. But some of the best dried wool we get in the store is sun-dried.

16. *Captain Blackburne.*] Have you had any cases of badly heated wool?—Yes, a good many years ago; the latest case I remember was about five years ago.

17. Up to what temperature?—Very warm to the hands, and a cloud of steam would rise from it when the bale was opened. Of course, dumped wool will heat quicker than undumped.

18. *The Chairman.*] Do you know anything about the proportion of low-class wools which have passed through last season as compared with former seasons?—I have not seen a great deal of low-conditioned wool passing through. Not an unusual proportion. There might have been a larger quantity, but not an increase out of proportion. Several of the best clips seem to have shipped everything and scoured nothing.

19. Have the larger growers, from any reason whatever—whether owing to the increased prices or otherwise—been sending larger quantities of low-conditioned wools forward?—If anything they have been scouring a few bales more than they have done in former years.

20. They would sun-dry that scoured wool. Would there be any necessity to pack that up before being dried?—They usually send it to the fellmongers. They themselves do not scour. Some of the back-country stations probably scour all their wool, but those wools are always in excellent condition.

21. They do the scouring while the shearing is going on, too?—Yes—that is, the wool to which I refer as being so well sun-dried. It comes in excellent condition.

22. Have you ever seen wool actually on fire?—No.

23. Have you formed any theory as to whether it will fire?—My impression has always been that greasy wool would not fire.

24. We have sufficient evidence to show that it will do so under certain conditions?—I have noticed that some witnesses spoke about friction; if there was anything in the friction theory there would be ample opportunity for the wool to take fire in that way while travelling on the trucks, for in many cases the friction has been sufficient to wear away the outside of the pack, and cause a fine fluff to form all along the bale through rubbing against the sides of the truck. I am sure there is nothing in the friction theory.

25. *Captain Blackburne.*] Some of the sale-wool goes direct to the ship?—Sale-wool is nearly all dumped at the stores. It must go through the stores.

26. Nearly everything goes through the stores except that which arrives by the small coast boats?—Even that, too, unless it comes from a place where they dump. We occasionally receive it a little wet through the sea-water, but in that case we report to the agents, and they send it to the scour. We are very particular about passing any damp wool. That has been the rule ever since I have been there, and I have been there since the store opened.

27. Have you found much wet wool arriving from the small steamers?—Probably two or three bales in two or three hundred.

28. *The Chairman.*] Is there anything you would like to add?—There are patents in the air, and some of the witnesses have been speaking about getting to the centre of a bale of wool to test the temperature, and others have spoken about inserting tubes into the bales. Well, I wanted to say that those tubes would require to be pretty substantial or we should crush them in the dump.

29. Yes, we had one in Wellington, and, although it was pretty strong, it came out smaller than it was before it was dumped?—Even Captain Willis's method of testing the centre of a bale with a steel bar was not successful, for the force that would be required to insert the bar would cause sufficient friction to heat the rod, and the little bit of wool he could take out of a bale would not satisfy you as to whether it was from the centre or anywhere else.

30. Have you had anything to do with flax?—No. I believe there is little chance of that passing wet owing to the system of grading.

31. *Captain Blackburne.*] Tow might?—We have had it damp but it would not heat. It would only rot and dry.

CHARLES RAY sworn and examined. (No. 88.)

32. *The Chairman.*] What are you?—I am storeman at Pyne and Co.'s.

33. Have you had considerable experience of wool?—I have had about ten years at it, in charge of the store.

34. Do you do any dumping there?—No, we do not dump. We have had wool come in in a pretty wet condition, and have had to open it up.

35. Could you say what the wet arose from? Was it at the place where it was grown?—No, coming in on the trucks. It got wet in transit on the railway, or perhaps in transit to the railway. The outside of the bales would be damp, but I could not say to what extent it would penetrate. We would open it up to dry if it was very slight, but if it was serious we would have it sent to the fellmongery.

36. Have you had any experience of wool on fire?—No; I have seen it pretty warm but never on fire. I have had dags come in in bags steaming from the heat and wet. That was due to their having been left lying outside the sheds before being packed up. I doubt if they would have fired; they were too wet to burn.

37. Could you say if you have observed a greater proportion of low-conditioned wools passing through this season than in former seasons?—I think it has been pretty good this season.

38. You heard Mr. Farrow's evidence. Has your experience been similar to his?—Yes; but I would see more of the wool than he does, because it is sewn up when it reaches him; but I have a better chance of examining the wool and its interior.

39. Is there any difference between the condition and quality of the wool coming to you from the small farms as compared with that from the large growers?—No difference as far as the quality of the wool is concerned. The station wool is pressed better and tighter, and has the fleece better classed and skirted; with the small farmers there would be more low-class wool left on the fleece.

40. They would send in a similar proportion of low-quality wools, the only difference being that it would be on the fleece?—Yes.

41. Have you had any experience of skins?—Yes.

42. Have you ever seen any heat in them?—No; we do not dump them.

43. Do you think the skins coming forward are in any worse condition than they used to be? We understand they leave more fat and shank-pieces on than they used to?—Some trim them and some do not, but it does not matter, for when they come into the store we trim them. We take the damp pieces and shanks off—everything that is not dry—before we can sell them by weight.

44. We were led to understand the buyers would take anything?—That is true to a certain extent, still we do not believe in that. They must be trimmed or sold by the skin, and not by weight. It does not do to trim them too close, for it is liable to spoil the pelt.

45. *Captain Blackburne.*] Do you find that the wool from the small farmers is more often liable to be received wet than the wool from the large stations?—No, the wool is equally dry unless it becomes wet in transit.

46. *The Chairman.*] The Railway Department's officials who have been before us have denied that the tarpaulins, are as a rule, in bad condition?—Well, I can show you a good few. In the trucking it is necessary to load them with flat tops, and there is greater opportunity for the rain to beat in between the sheeting, and any water lodging on the top will be liable to soak through the sheeting.

47. Do you think, if a less number of bales were required to be placed in each truck, thus allowing for a ridge, that there would be less complaints of wet wool?—Yes, there would be less chance.

The Commission adjourned till to-morrow (Wednesday), the 12th September, 1906, at 10.30 a.m.

CHRISTCHURCH, WEDNESDAY, 12TH SEPTEMBER, 1906.

The Commission sat in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

GEORGE BISSET sworn and examined. (No. 89.)

1. *The Chairman.*] What is your position?—I am at present agricultural editor of the *Canterbury Times*, and have been for the past fourteen or fifteen years. I was apprenticed to the wool trade when a boy, and remained in the wool trade continuously until I took up my present appointment. I have been closely identified with the trade, more or less, until within the past three or four years, and I am still in touch with the trade and its operations. I was apprenticed to the trade in Edinburgh and Leith, and before leaving England I had about twelve years' experience of the Home, colonial, and foreign wool trade. My experience on the whole has extended over a period of something like thirty-five years, of which twenty-one or twenty-two years has been spent in the colonies.

2. Your experience has covered not only the business as conducted at sales, and shows, and stations, but also in the shipping branch of the trade?—And receiving it in London on its arrival there. I have classed wool upon some of the largest stations.

3. And have had personal charge of the sheds while so doing?—Yes, of the wool-classing in the shed. I classed at St. John Hall's station, Balmoral (Dalgety's), and several other stations, and during all my experience there I have never seen anything which I considered in the least dangerous.

4. By that you mean damp wool and damp sheep?—Yes, and I have formed a very decided opinion on the question of wet sheep. If the sheep is dry enough to be shorn the wool is dry enough to be shipped.

5. Have you ever seen any indication of pressure having been brought to bear upon the shearers to induce them to shear wet sheep?—No.

6. I believe they strongly object to shear wet sheep?—Yes.

7. In such cases as the cutting-out of a shed, when the shearers are anxious to get away to take up another shed, if the sheep should be a little wet they might be induced to shear the final shedful in order to get away. In that case, it being the last of the wool, would the wool-grower be likely to look after that wool?—He would, most assuredly.

8. Because it would be the last to go away?—Yes. I have been asked my opinion as to whether certain sheep were wet or dry enough to be shorn, and on one occasion in a small shed at Hurunui—the Lakes Station—I did say they were too wet to be shorn, and they did not shear them. Nothing more was said about them. I can speak very strongly regarding the farmers' clips. My business was largely in connection with the buying of small clips and reclassing them.

9. The small farmer himself does not class his wool?—No. I reclassified them and either sold them or shipped them to London to be sold in “straight” lines—parcels of considerable size of uniform quality. In opening some of the farmers’ clips I have on several occasions found heated matter rolled-up in the fleece itself—to put it plainly, dung.

10. That would mean that it had not been properly skirted?—That is so—left it on the fleece, and when the fleece was rolled this foreign matter has been rolled up in it. I have found rolled up in a fleece similar matter which did not belong to the fleece at all.

11. That which may have been picked off the floor?—It may have been lying in the shed from the previous year. I have found this matter as hard as a boulder, and so hot that you could not hold it in your hand. There is not much of that sort of thing now, and I think there will be less still since the Wool-buyers’ Association has taken such a firm stand against false packing. I remember—in connection with the subject of false packing—when I was apprenticed one of the Irish wool-buyers went so far as to print on the top of his account-form an extract from the Act showing that a penalty of £1 per fleece might be inflicted where fleece was found to contain matter which did not belong to it. That was the law, but I do not know if it still exists. The only thing I have seen which, to my mind, would be likely to cause fire, has been the inclusion in the fleece of this matter and wet pieces, either belonging to the fleece itself or other material which would be rolled up with it.

12. Would you advocate restriction on the export of such pieces as those without being scoured?—I think, when anything of that sort is discovered the man should be prosecuted.

13. But should the shipment of those pieces in that state be forbidden?—I certainly think so. I cannot think that any honest man would ship them.

14. I asked that question in Wellington, and the answer was something to the effect, “Liberty of the subject.” Liberty to the subject to put other persons’ lives in danger, it is?—I think the action which the Wool-buyers’ Association is taking is calculated to put a stop to this. I think a few prosecutions will stop it, and if the offender were sent to gaol so much the better. With regard to wet wool: One of my earliest experiences with it was a case of fire that occurred at Perth or Dundee. The wool was brought into our store and left there. It was looked upon as being dangerous, and was turned out in piles all round the place. Some of it was saturated with water and the men inspected it frequently; the head of the firm himself went and examined it occasionally—several times a day—in order to see if it was heating dangerously, but no heating took place during the week or ten days that it was there awaiting sale.

15. It was not under any pressure?—No. Another case I remember was about 1878, a wool-ship was run down in the Thames, and sunk. That wool was fished out and sold at the London Docks, and there was no sign of heat in it. I saw it not only opened out but lying there all the time. I was with the man who bought a portion of that wool, and it was completely saturated.

16. Was it dumped, or pressed?—It was dumped; single dumps.

17. How far had that wool come?—From Cheviot Hills, New Zealand, and it had got Home so far all right.

18. How long had it been under water?—I suppose they would fish it up in a week or so. The firm I was engaged with in London for three or four years from 1870, during the course of their business bought and sold lots of wool which had been damaged—thousands of bales every year—damaged by sea-water. The custom was to bring it into store, take the damaged portion off and repack it and either sell the sound portion to the manufacturers or through the London sales.

19. If sold through the London sales that wool would be immediately used for manufacturing purposes?—They might keep it for some time, but there was never the slightest sign of spontaneous combustion or heat that would lead to combustion. With the change from sailing-vessels to steamers there has not been the same quantity of damaged wool as in the former days. The firm of G. R. Herron and Son, of Bermondsey, London, with whom I served—and they are carrying on business to this day—could probably supply you with valuable information on the subject, as they handled a considerable quantity of wools of various class and condition.

20. Yes. We have gone rather a big jump from the little colonial farmer. What do you know about the transit here, by wagons from the stations to the railway and by train to the centres?—I have seen wool taken from the wagons in a very wet condition, perhaps owing to a leakage in the tarpaulins, and the bales at the bottom of the wagons would get the full drenching just as though they were in the bottom of a boat.

21. Can you distinguish between that which has been wet in transit by teams to the railway and that which has been damaged on the railway-trucks?—I think it is more likely to have been caused in the railway-wagons for those trucks are watertight at the bottom, whereas the carts are not, and would allow no accumulation of water on the floor.

22. Most of the station wagons have covers?—Most probably they have. However, there is little likelihood of the damage being caused in that way.

23. Not through crossing rivers in flood?—I have known them to be damaged in that way, and so much so that the wool has been sent to be scoured. I might say that when I have been classing we have now and then come across a wet fleece, caused probably by the sheep having tipped into a creek when nearing the shed; but that fleece has been put amongst the wool sent to be scoured. A shearer will never object to shear one odd wet sheep; probably he will put it on one side and shear it the last thing at night.

24. You have known of the wool getting wet in the railway-trucks?—I have known of it, but very rarely.

25. You think the Railway authorities take reasonable care?—Yes.

26. Do you know anything about the side stations where the teamster is responsible for covering the wool?—Yes, at the side stations the owner’s man would see to the covers.

27. Do you know anything about the regulations which compel you to load a certain number of bales in LA trucks, which necessitates the formation of a flat top to the load, thus preventing a good fall for the rain?—I do not know of that. I know that if the day is fine like to-day and the wool going straight to port, they would not think of covering the trucks.

28. But if you knew it was to remain overnight, would it not be covered?—Yes; but not if it was a night fine like last night. However, the getting wet in transit is not to my mind an appreciable factor in the danger at all. Another thing: most of this wool is dumped, and it is not as though it was going to the ship's side, but it goes to the shipping companies' sheds, and is unloaded without delay.

29. Do you know anything about the conditions under which the small boats load their wool?—No. I might say that I have had wool stopped at the port owing to its being reported to be damp, and I have gone down to see it, but on one occasion only had I to bring a bale away.

30. Do you know anything of the conditions under which the wool is finally shipped?—No.

31. Have you had any experience of fire on wool-ships?—No, I have not.

32. Is it the custom when they land the bales on the London docks for the bands to be cut and the two dumps cast asunder?—Yes. I might say I have in the course of my experience in the examination of wool in the London warehouses, found a box of ignited matches in the body of a bale of wool. The matches had all been ignited and the wool was not even charred.

33. Was that a tin box?—No, a paper box, about 2 in. by 1½ in.—one of those little flat cardboard boxes.

34. *Captain Blackburne.*] They had all ignited apparently and did not set fire to the wool?—That is so.

35. *The Chairman.*] Might not the accident have occurred through the man who was stamping the wool into the bale dropping it in?—We took it that when he had been treading the wool in he had dropped the box and had stamped upon it, set them off, and the next fleece thrown in would smother it and no harm was done. I might say I have known damp scoured wool to be shipped. One case I have in my mind is one in which I complained about a lot of wool being damp after purchase in Christchurch—Mr. Foster may remember the incident—I bought the wool at auction, and when I went to examine it I found it was wet. I examined a certain number of bales, and when we came to examine the bulk I complained that it was damp, and the matter was sent to arbitration of two of the most experienced men in the trade. They decided that it was not damp. That wool went Home, and being certain that I was right I noted particularly the reports regarding it, and they came out "Yellow—packed damp," but no word of its having heated. That was high-class wool, and brought 1s. 6½d. in London.

36. Even with the discoloration?—Yes.

37. Have you had any experience of fellmongering wool?—Yes, I was employed in a fellmongery for about two years.

38. Was it one in which the wool was slipped by sweat or chemicals?—Both processes. The foreign skins were sweated and the home skins were taken off by lime—just plain lime.

39. Sulphide of sodium?—No; it was before sulphide of sodium became in vogue.

40. Do you consider there is any additional danger through shipping fellmongered wool?—No, it is usually very carefully dried.

41. Not even if it is sun-dried?—No.

42. Are the people who have machinery not likely to pack it up when heated beyond its natural condition, and thus the wool in the trip Home be more likely to absorb moisture?—That might be, but no quantity of moisture that it could absorb would be dangerous.

43. It must be something extraneous?—Yes. I might say that if you take a pound of wool, dry it as dry as you can dry it, and spread it out on the floor overnight, or, say, for twenty-four hours, you will find that it will weigh 17 oz. or more when taken up. The capacity of wool for absorbing and retaining moisture is enormous. I remember a case at Home while I was employed by Herron and Sons. They bought a parcel of coarse Cape wool. This wool was roughly classed according to qualities and sent into the sales, and when they got the weights it had increased in weight in one case as much as 11 per cent., and in another case 14 per cent. I have known the wool from places like the Cape of Good Hope frequently gain sufficient in weight to pay the freight Home. One of the witnesses here said he had never seen wool blazing. I have. The conditions were these: Some wool was stacked up outside a shed in the open; some one threw a match on the grass, the grass took fire and the fire swept up the sides of the bales and they blazed up. I have shipped some thousands of bales of sheep-skins Home, and have never had a complaint of heating. One witness said he shipped them undumped. I used to ship sheep-skins undumped, and pay an extra rate for the privilege until on one occasion in Melbourne I went down to see the skipper of a vessel, and I saw my sheep-skins being screwed in between bales which were dumped. The result was I did not pay extra rate in future, and the company said they were not going to put the ship to the expense of dumping them. I have had complaints of the wool being discoloured, and no doubt this was owing to the sheep-skins having been damp, but I have never had complaints of the skins being heated. Some old shearers will tell you of cases of the water running out of bales of wool while in the press. They used to tell that tale about Lagmhör Station at Ashburton, but wool will stand a great deal of moisture before heating. I have had some hogget wool pulled from dead sheep and packed up during the winter waiting for the wool season—perhaps several months—but it never heated. Scoured wool I have known to be heated.

44. *Captain Blackburne.*] You think it heats quicker?—Yes.

45. When receiving wool in London, did you ever find any bales charred in the inside?—Never. Badly damaged, but never with the least sign of fire.

46. Was the discoloration more on the outside than in the centre of the wool?—Outside.

47. That might have been through being wet by rain?—Or sea damage. I have seen damaged wool in London—in fact, it would be perished to such an extent that you could crumble it up in your fingers. Last season I heard of a very considerable quantity of wool put up at Invercargill and repacked there, and suitable sorts sent to America and others shipped to London. I understand it was done in Dalgety's store, either at Invercargill or the Bluff.

48. Do you know any of the ships that carried it?—No.

49. This last season?—Yes. My information came from Melbourne, and I was told that that was the case, and was asked to ascertain if it was true. I found that it was so. I do not know who shipped it, but I understand it went through Dalgety's stores.

Mr. Marquet: I graded that wool at Invercargill.

Witness: You could ascertain if there was any heating in these bales, for some of it was sure to have been in pretty bad order.

BERT JAMES MARQUET sworn and examined. (No. 90.)

50. *The Chairman.*] What are you?—I am head wool-grader for Walter Hill, and instructor at the Christchurch and Ashburton Technical Classes.

51. Do you know something about this wool Mr. Bisset has just spoken of at Invercargill?—Yes. I graded about a couple of thousand bales at that place. Some of the lightest of it went to America—the pick of the wool went to America, and the rest went to Great Britain.

52. All classes of wool?—Yes, it was reclassified.

53. Had you any reason to find fault with it?—Some of the bales were damp.

54. Before they were shipped were they reconditioned?—Yes, all reconditioned that was not in suitable condition to be shipped. It was all fixed up before it left the store.

55. You know nothing about the returns for it?—Yes, the wool was all right. It got Home in first-class condition.

56. You have heard Mr. Bisset's evidence. Do you agree with it?—Yes, in most instances. My experience as a classer in the sheds in which I have classed has been that any wool not in condition has been scoured on the place.

57. In the sheds where they do not class at all have you known of any carelessness?—I have seen the shearers growling about being kept waiting too long for sheep, and go out to see if they were dry. I noticed that last year in the country.

58. They wanted to get on with them?—Yes; they said, "We have other sheds to go to, and want to get away."

59. Have you had any experience the other way about, where shearers have been forced to shear wet sheep at the risk of being discharged?—No, I have never seen anything like that. I have heard of it, but I do not credit it. As Mr. Bisset has said, there might be one or two to finish, and they might shear it a little damp. Naturally enough the sheepowner would like to get them through. I have noticed that the small farmer does not take the care he should take with his wool. He will roll the bellies up into the fleece.

60. Can you suggest any reason why there should be so many fires of late on vessels carrying wool?—The only way in which I can account for it is owing to its having been such a wet season.

61. And in consequence rushing the wool in?—Yes, for the big prices. That is the only thing I can see for it.

62. Do you not think if the wool had some inspection at the ports as before it would be a deterrent to the shipping of damp wool?—Well, on the 21st June I was sent to Lyttelton to inspect some wool which had got damp in transit. When I got there the captain of the vessel was loading and said he was satisfied with it. I was not satisfied, and would not allow it. He said, "If you give me a letter of indemnity I will take it"—that was to clear him of any liability.

63. I should think he would. It was a case of "Heads I win, tails you lose"?—Yes, that is what he wanted. I know he did take some. I was merely there to see it, and had it sent back again.

64. What was done with most of it?—Some of those bales had gained 15 lb. in weight. It was taken out and dried and repacked. I remember it was sent down on a Tuesday, and I got instructions to go down on Thursday to see it.

65. In the meantime it had increased in weight?—Yes, through getting wet in the rain. He said he would take it. It was not to be dumped. That was one of the Federal-Houlder-Shire Line. He would take it if I would give him a letter of indemnity.

66. Do you think it would be a hardship if the export of that wool was prohibited unless it was clean and dry?—That is a big question.

67. You think that the low class of wools are more likely to heat?—Yes, most decidedly.

68. We are told that not much of this class of wool goes Home, therefore why should it be a hardship?—I opened up some crutchings this year—and it was only a fluke that they were not shipped Home—and I am sure they would not have carried Home.

69. Where, then, is a man going to lose? He must pay the freight on dirt?—That is so.

70. *Captain Blackburne.*] You recognise the danger in these low-class wools?—Most decidedly.

71. *The Chairman.*] Do you think a reasonable amount of supervision at the shipping port would be a deterrent as to shipping wool damp or in a dangerous condition?—Provided you get suitable men who are able to detect moisture in wool.

72. Yes, but do you think a small levy per bale to pay the cost of inspection would be a hardship?—I do not think so.

73. About 2d. or 3d. per bale has been suggested as sufficient to pay the cost?—You might have to go through the whole lot of the bales to find if one is heated.

74. If you had only one man at the four centres he could not do it unless his attention was drawn to it, but if you had three or four men, could they not do it?—Yes.

75. You see, the small charge per bale would appear infinitesimal compared to the extra charge there would be for insurance. We have evidence that recently, following the fires which occurred, the "Delphic," which was not even overdue, was quoted at nine and ten guineas for reinsurance. That talks big?—Yes, it does.

76. Once the premiums are increased by the underwriters at Home it would be a difficult thing to get them reduced?—Yes, it would. But it would probably force the farmers to get up their wool in a better condition if there was supervision at the ports.

77. The mere fact of there being supervision would deter them from carelessness?—Yes.

78. It will come upon them in some way or other?—Yes.

79. *Captain Blackburne.*] What kind of wool do you think there is most risk about?—Low-class wools such as crutchings, slipe wools, and scoured wools that have not had the matter taken out.

80. Do you think dumping would test if there was moisture in it? Do you think if moisture—apart from foreign matter—were present it would be dangerous?—I have known bales which came from Napier some two or three years ago, and they were so hot that I could not put my hand on them. I have never seen wool blaze.

81. Have you seen a bale charred inside?—Never inside; outside.

82. Do you think there is a risk from bales getting wet from rain or sea-water?—Most decidedly, if they are damp there is a big risk.

83. Suppose bales to be wet on the wagons and dried superficially, there would still be a danger?—Yes. I know of a case in the country where a wagon went through the river, and the bales were only dried on the outside.

84. Were they opened up?—No, just dried outside.

85. Did they arrive Home safely?—I do not know. It is impossible to dry salt-water out of wool. You cannot do it.

86. *The Chairman.*] The reason of that is that the salt remains in the wool itself, and will, therefore, absorb moisture again?—Yes. I remember when the "Wakatipu" ran down the "Laura," barque, in Dunedin we had some of the wool out of her and tried to dry it, but we could not dry it. If there is moisture in the atmosphere it will take it up again, and it is dangerous to ship it.

Mr. Bisset: Would you ask Mr. Marquet if he found any of that lot of wool at Invercargill to be heated inside?

Witness: Not to any noticeable extent.

The Commission adjourned till to-morrow (Thursday), the 13th September, 1906, at 10.30 a.m.

CHRISTCHURCH, THURSDAY, 13TH SEPTEMBER, 1906.

The Commission sat in the Provincial Council Chamber, Christchurch, at 2.15 p.m.

Captain Blackburne: During yesterday afternoon I, in company with Captain Willis, surveyor to Lloyd's Register, visited the New Zealand Shipping Company's wool-store at Lyttelton. In conversation with Captain Willis and Mr. Dale, who is in charge of the store, it was impressed upon me as a remarkable fact, which they had both repeatedly experienced, that when bales of wool heated it was invariably the case that the greatest heat was in the centre of the bale; also, that when two bales were dumped together the greatest heat was always found to be in the centre of the double dump. Mr. Dale introduced me to the engineer at the store, who personally knew one of the crew of the barque "Beltana." This man had informed him that much of the "Beltana" wool was wet when received, and got further wet while on the deck of the ship. It was piled up on the deck, and covered with canvas while they were dumping it. They experienced some heavy south-west rain-squalls while the wool was on deck, and much of the wool had come down the line from a long distance. The dumping was all done on board the ship, in single dumps, and it was greasy wool. Both Mr. Dale and the engineer assured me that they saw several bales from the "Beltana" which looked in perfect order on the outside, while they were burnt away in the centre of the bale.

JOSEPH WALKER HURLEY sworn and examined. (No. 91.)

1. *The Chairman.*] What is your occupation?—I am a wool and skin buyer, carrying on business in Christchurch.

2. Have you a business of your own, or do you buy on commission for others?—I buy on commission and ship the skins on account of the purchasers. They are taken to Pyne and Co.'s stores, and there prepared for shipment. We go carefully through them, trim them, and dry them.

3. Do you reject those which are improperly dried?—In such a case we spread them out and properly dry them. It might take us as much as a month or six weeks to collect a sufficient quantity for shipment.

4. When going through the skin-stores this morning we observed some skins which had a considerable quantity of fat adhering to them, showing that they had not been properly trimmed. Do you look upon the presence of that fat as a danger if shipped in that condition?—No, not so long as it is dry and hard.

5. By the time it gets into hot water it would melt?—Yes.

6. Then, in that case, would it not be a danger?—Yes, it might; but if it is hard and dry, we do not look upon it as being likely to cause any trouble.

7. *Captain Blackburne.*] Have you been in the fellmongering business?—Yes.

8. Have you had any experience of wool heating?—No.

9. Did you use machinery for drying your scoured wool?—No, we used a stove some four or five years ago, but then we only put through small quantities. We dried as much as possible in the open, and when that was not possible we put it in the stove. We have done no fellmongering since.

10. Is there anything which you would like to say on the subject of the recent fires—anything you think would be helpful to the Commission?—No, nothing that I think would be of any assistance to the Commission.

11. You have seen the evidence which has been given here: could you add anything to that?—No. I have not had any experience of heating in wool, and have not seen anything which I would consider a danger in connection with wool for shipment.

The Commission adjourned till to-morrow (Friday), the 14th September, 1906, at 10.30 a.m.

CHRISTCHURCH, FRIDAY, 14TH SEPTEMBER, 1906.

The Commission sat in the Provincial Council Chamber, Christchurch, at 10.30 a.m.

PHILIP EDMOND SKELTON SWORN and examined. (No. 92.)

1. *The Chairman.*] What are you?—I am station carpenter at St. Helens Station, Hanmer.
2. You have had considerable experience as a shearer?—Yes, I have been shearing sheep since 1875, and was wool-pressing before that.
3. We want your experience from a shearer's point of view, particularly as to whether shearers are forced or asked to shear wet sheep?—Speaking generally I would not say so. Of course, owing to the new shearing agreement, if the bulk of the shearers consider the sheep dry the rest of the men are bound to shear them.
4. Before that award, how were these matters settled?—Well, back twenty years ago the shearers had no voice in the matter.
5. Did they shear them if they were wet at all?—Yes, they did. The sheep would be put into the shed, and the manager would come along and feel them, and if he considered them dry you might take it they were pretty right.
6. Was it usual to put the sheep in the shed overnight?—Yes, if the weather looked threatening the sheep would be penned overnight, so that they would be dry for the morning.
7. In the case of sheep being put into the shed damp, do you think they would lose or gain moisture by being there overnight?—In the case of a shed built fairly high off the ground where there could be a current of air circulating underneath, I believe they would be more likely to dry in the shed than in the open. Providing the sheep were not packed too close in the shed there would be more likelihood of their drying.
8. And if the shed was packed, would the tendency be to cause them to retain the moisture?—It would be more likely to spread the damp over them, to increase the amount of damp.
9. Many of the sheds are covered with or built of galvanised iron: would that not create a tendency to sweating, and thus show moisture as distinct from the rain?—I believe it would, provided the shed was built low on the ground, with no underdraught.
10. What is the usual height of the sheds?—Two feet, but they vary. My idea is that sheep very often get wet inside through a leak in the roof or sides, or through the rain beating in through the doorway. In many cases there is only a hurdle across the door, and a driving rain would wet a considerable number of sheep immediately inside of the doorway.
11. There might be as many as fourteen or fifteen hundred in the pens overnight?—Yes.
12. The wool-classer is invariably in charge of the shed?—Yes, of the wool.
13. And in the event of a wet fleece coming up, his attention would be drawn to it?—Yes. He would not put it in the bales with the dry fleece. You see there are many ways in which a fleece might become wet: one sheep might tumble into a creek, or half a dozen of them might walk in and wet the belly-wool, and perhaps saturate half a dozen others.
14. In the event of a shearer coming across a wet sheep in his pen he would leave it till the last?—Yes, and if muddy he would not shear it at all.
15. You understand pressing?—Yes. At the time I was pressing it was mostly spade pressing; there was no mechanical appliances at that time. The wool was put into the bale in a frame and driven down with a spade.
16. What is the system of pressing now on the stations?—Either a Ferrier or a screw press is used, with a tumble-over box.
17. Pressers are paid by the bale. They cannot exercise any supervision over the wool itself?—I have never heard of them doing it. That is all left to the wool-classer. Anything that is put into the bins the pressers are supposed to press.
18. Have you ever known any dags or pieces to be put into the bales with fleece wool?—Not unless a very small piece. Of course, people who have only a few hundred sheep do not make any classification; they simply bundle everything into the bale together. Of course, everything but actual dirt.
19. Is it not a fact that they have put dirt in?—Not as far as my experience goes.
20. Is it not probable that when wool is high this dirt might be put into the bales?—It might be done, but it has never come under my observation. I have never shorn amongst small farmers.
21. You have had experience of carrying wool in station-wagons. How are they covered during the journey from the station to the railway?—They would be covered if the weather was bad. Of course, they are not always covered.
22. Those carriers who cart by contract—would they be likely to be more careless than the station employee?—I should say they would be likely to be more careless. I do not think they would be so careful; they would not mind so long as they got through with their load.
23. Is there anything else you would like to tell us?—I think that sheep are shorn a shade wetter now than they used to be.
24. *Captain Blackburne.*] Were February and March last year particularly wet months?—I was not shearing in February or March. All the shearing was over then. I do not say that they were shorn wetter in any particular year, but of late years, and not on every place.
25. Are not the wool-wagons always covered when there is any sign of rain?—They spread tarpaulins over the wool, but there may be a chance of the rain driving up under the sheeting and wetting the wool—that is, if there is much wind. I think, however, that any contractor would take reasonable care of the wool.
26. They are expected to carry tarpaulins with them?—Yes.
27. We have been told that wagons have been sent with no tarpaulins on whatever, and in pouring rain. You do not think that is very likely?—It is quite possible, although I have not actually seen it. I should think that the owner of the wool would see that the contractor had proper tarpaulins before he allowed him to start away with his loading.

28. *The Chairman.*] Have you ever had experience of shearers being forced—at the point of the bayonet, as it were—to shear damp sheep, or leave the station?—No, I never have. I have seen it this way: Where the men had started to shear against the will of many of them. Some refused to shear and remained away from the shed until the sheep were dry, then the shearing went on as usual.

29. You have never know a man to be told by the manager to either shear the sheep or call for his cheque?—No. I might say that I have hardly ever shorn in a shed without shearing some small proportion of wet sheep. There might be three or four sheep together, and through some accident they become wet; they would not be muddy, and it may be due to their having got wet in the rain and remained in the scrub or sheltered places where they would not be likely to dry.

30. *Captain Blackburne.*] But those fleeces would be dried before they would be put in with the others?—As a rule the wool-classer draws attention to it, and it would be put on one side. Of course, a fleece might be wet on one side and dry on the other, the dry side might be turned out and the classer would only feel the outside, and it might in that way get into the press and be baled.

31. *The Chairman.*] If he passed that it would be pressed in the ordinary way. If it was discovered it would be sent to the scour?—Yes.

THOMAS TURNBULL ROBSON sworn and examined. (No. 93.)

32. *The Chairman.*] What is your occupation?—I am a wool-buyer and fellmonger at Avon-side, Christchurch.

33. What is the nature of your fellmongering appliances?—The usual appliances. I have a drier.

34. You do not depend upon sun drying?—Not altogether.

35. What is your process, right through?—It goes into the hands of the sorters and is got up for shipment to London. Some of the wool we buy we ship direct to London from the wool-stores.

36. Would that which you ship direct be more likely to be a big farmer's clip than a small farmer's?—It may be a decent-size farmer's clip. It would not be five or six bales. We do not send mixed bales. If we buy any mixed parcels we reclass it at the works.

37. I suppose you sometimes find the so-called little men know as much about their business as the big men, as these little men may have been managers themselves?—Yes.

38. And would you trust those men?—We get to know the class of wool they put up and the way they get it up. If we have had their stuff in previous years we may take their word as to the condition. Of course, it is to their advantage to keep it as regular as possible, or they will not get full market price for it. They will have to take a lower price. We always scour the dirty wools before sending away. We ship no pieces or locks without being scoured.

39. Do you think it would be a hardship if the shipment of these locks and pieces was forbidden?—It would not be a hardship for us. At any rate, I do not think much of that dirty stuff goes Home as it is.

40. Then it would be less likely to be a hardship were the export prohibited?—I think any man would be foolish to ship stained pieces, for it would be better to send it to the scour. It does not pay us to have fires. We have to sell our wool in London, and when there is a fire the undamaged stuff suffers in the sale as well as the damaged stuff.

41. Do you not think it would be much cheaper to have inspection here before shipment, provided the charge did not exceed 2d. or 3d. a bale?—I think it would be a good plan.

42. *Captain Blackburne.*] You think it would be helpful?—I think it would be

43. *The Chairman.*] We do not imagine that every bale could be examined, but we know that, if we have people ready to examine, the very fact of their being there would be a deterrent against the shipment of any damp wool?—I suppose it would.

44. *Captain Blackburne.*] If the owners were compelled to give a warranty as to the condition of their wool?—I do not think we should be able to get that. As a rule we examine it, and if it is not right we draw attention to it.

45. Can you suggest any legislation that would be helpful?—No. We do our best to keep the wool dry, because it is to our interest to have no complaints whatever.

46. Have you had any experience of fires in wool—firing or heating?—I have never seen wool fire. I have seen it heated.

47. To what do you consider a dangerous point?—Well, too dangerous to send away. We would not send it away.

48. What are the conditions that are most dangerous for heating, in your experience?—The low classes, I should say—locks and pieces.

49. Do you think that scoured wool is more dangerous than greasy wool?—I think scoured wool is less dangerous.

50. Would you consider slipped wool more dangerous?—We should have to watch the low-class slipes, just the same as low-class fleece.

51. You do not think the slipped wool itself is dangerous?—No.

52. Small pieces of skin and fat included might be a source of danger?—Yes, they would.

53. Is there anything else which occurs to you that might be helpful to us? We do not wish to leave a loop-hole—that is our reason for calling you before we left. We have invited every one to assist us, but you know there are many bashful people?—That is so. I think you have had everything which I could tell you. I do not know anything more that would help.

JAMES ROBERTSON CLARK sworn and examined. (No. 94.)

54. *The Chairman.*] What is your occupation?—I am a fellmonger and wool-scourer residing at Christchurch.

55. You have heard the evidence which has been given by Mr. Robson?—Yes.

56. We have had evidence from the large fellmongers, and we are anxious to give you every opportunity to place before the Commission your statement of the matter from the point of view affecting your business and others in the same line of business as yourself?—I shall be pleased to help you in every way I can.

57. You have some machinery in your establishment?—Yes, it is a very small machine. I am what you might call one of the small men.

58. We have been told by the big men that the small men buy small parcels and are inclined to put up their wool before it is properly dry?—I do not think so. I think the small men would be fools to do so, because they would suffer in the sales. I cannot see why any man should be careless with his wool, as he would be the sufferer.

59. Is there not a temptation when sun-drying wool to roll it up when there is appearance of the weather changing?—If I rolled mine up I should weather it again when the opportunity offered.

60. Do you consider that the small fellmonger is just as careful as, if not more careful than, the man who has a big plant and machinery?—I would not say more careful, but quite as careful. It is to his benefit to be so.

61. We understand that there might be some element of danger when the wool is heated up to a temperature of 130° by machinery and not allowed to cool down sufficiently?—I cannot speak of the machine driers, although I have my own opinion of them.

62. What is your opinion?—I have no actual experience, but it is only artificial heat, and, although the wool might feel dry, still it is not so, but contains a considerable quantity of moisture which cannot be detected through the heat. When it cools down the steam would be likely to condense and spread moisture which did not appear to be present in the wool. I do not say that that is a fact, but it is my opinion. I can imagine that the outside may seem to be dry, yet the centre may be quite damp.

63. Do you not think that the machines can separate the wool more than you can? Will not the machine shake it out more finely than could be done by hand?—But they cannot get it all out. The blowers cannot separate it. I am not saying that I know it, but it is my opinion. I can give you an incident relative to some wool that I bought in store—some greasy wool that stood in the store from about the third wool-sale in January to the middle of winter. I repacked it and sent it to London in the grease, and that was the only occasion that I got a report that the wool was country-damaged. I cannot see how that wool could have got country-damaged standing six months in the store after I had repacked it, so there must have been something in the transit from the store to the ship—perhaps on the railway.

64. You think it must have suffered damage on the railway journey between Christchurch and Lyttelton, or in going aboard the ship?—There must have been something of the sort. Of course, with steel steamships there is a possibility of there being some sweating. I do not know if it is so, but there is no doubt the wool must have been damaged between the store and the ship.

THOMAS HENRY BAKER sworn and examined. (No. 95.)

65. *The Chairman.*] What is your occupation?—I am a fellmonger and wool-scourer at Woolston.

66. You have heard the evidence which has been given by Mr. Robson and Mr. Clark: is there anything you would like to add to that evidence?—I do not know that I can add anything to what has already been given. Like Mr. Robson, we ship some lines direct from the stores to the ship.

67. Have you had any returns about any of your wool being out of condition?—No, never.

68. Mr. Clark spoke about some of his wool being wet in transit: have you had any of that sort of experience?—No; that is the first I have heard of that sort of damage.

69. Have you had any complaints against the Railway Department as to the method of packing or sheeting the trucks?—On one occasion we had three or four bales from Lyttelton that got wet during the night or during the unloading. They said it was not fit to ship. I examined one of those bales, and it was only wet through the pack. There was a heavy night's rain, but the pack only appeared as though there had been a bucket of water thrown upon it. They were stood in the sun, and were shipped in the same packs.

70. You have no complaint as to want of care in trucking and sheeting?—No. We get plenty of tarpaulins and trucks.

71. Are you forced to put a certain number of bales in a truck?—Yes. The Stationmaster has had instructions to put a certain number in each truck, but he has never bound us down to that number. They generally ask how many bales we have, and they give us trucks for the number. The tarpaulins are sent with the trucks, and if there are not sufficient he will say, "I will wire to town for more." We have never had any trouble. We find them very obliging in that respect.

The Commission adjourned to Timaru, to sit there on Monday, 17th September, 1906, at 2.15 p.m.

TIMARU, MONDAY, 17TH SEPTEMBER, 1906.

The Commission sat in the Supreme Court, Timaru, on Monday, the 17th September, 1906, at 2.15 p.m.

WILLIAM RUNCORN McLAREN sworn and examined. (No. 96.)

1. *The Chairman.*] What is your position, Mr. McLaren?—I am manager at Timaru for the National Mortgage and Agency Company of New Zealand (Limited), who are also agents for Lloyd's. I recently had a letter forwarded to me by the Secretary of Lloyd's in London, asking if I could furnish them with any information about these fires, and particularly asking me if I thought they were due in any measure to the discontinuance of the inspection which had hitherto obtained.

2. That was discontinued in June, twelve months ago?—I do not know.
3. We have it in evidence that it was discontinued June, twelve months ago. Can you tell us what was the nature of your reply to Lloyd's question?—I told them I thought the fires might be due to artificial drying of the wool, which, though apparently free from moisture, would not be thoroughly dry, and might have caused the fires.
4. Where did you reckon that wool came from?—The larger fellmongers and freezing companies, who use artificial driers, not the smaller ones, who dry in the open. I think the smaller men will be more likely to have their wool drier than those who use the artificial driers.
5. *Captain Blackburne.*] The evidence we have had has tended in the direction of saying that there has been no trouble with the larger fellmongers. For instance, when in Wellington, the Harbour Board officials told me they never had any trouble with the larger ones—that is, from the Gear Company and the Wellington Meat Export Company. Generally speaking, the witnesses have attributed any dampness to the small fellmongers where they have not artificial driers?—I have no doubt that the artificial drying would be best if done thoroughly, but it is a question if it is done thoroughly.
6. Do you not think the wool after being heated to such a high temperature as it is in the driers would be free of moisture?—You might put it up to a temperature of 120° and not have all the moisture out. You might have heated moisture, and, although it may feel dry, it might not be dry. When it cools the moisture will still be present.
7. You think it would be a better process to spread the wool out and allow a current of fresh air to pass through it?—Undoubtedly that would take the moisture out of it.
8. Do you not think it would be wise to have some guarantee that it had been laid out for some time?—Yes, if there was any suspicion of its not being properly dry.
9. And who would be the man to have that suspicion?—Well, the owner of the wool or the fellmonger.
10. Would he be likely to be suspicious of his own process?—I do not think he would be suspicious of his own wool, or that it would be likely to be dangerous.
11. Is it a wise thing to put that wool in a bin and, without any further delay, to pack it?—It would be unwise if it was not thoroughly dry and cool.
12. Have you found the wool from the large fellmongers to be badly heated?—There has not been much of that in Timaru, although I have seen some wool that was heated. I do not know the brand, but I remember having some wool from up-country which had been wet and had heated. We observed the heat, and had the wool sent to the scour. Occasionally bales which get wet are left to dry on the platform at the shed—that is, of course, if it is only wet on the outside.
13. Have you opened it right out?—Yes; we have gone into the wool to ascertain the extent of the wetting it has received.
14. Have you known where these bales received the wetting? Was it in the railway-trucks or on the teams from the sheep-station?—No doubt the wetting would be due to defective covering either on the railway, or on the wagons which delivered it to the railway.
15. Have you much objection to raise to the defective sheeting?—Well, no doubt it is an inconvenience to have the bales wet, but we find that the Railway Department are very careful; but these bales I speak of may have been wet at a flag station.
16. Do you think it would be due to defective tarpaulins, or to the defective manner in which it was put up?—The way the sheeting is put on more than the tarpaulins themselves.
17. Have you any objection to the flat-top loading instead of the tented top?—No. The fact is we have had no experience of it, and it does not seem to affect us.
18. *The Chairman.*] We have been told in Christchurch, where they receive a great quantity of wool, that they are compelled by the regulations of the Department to load a certain number of bales in certain trucks, and this necessitates the formation of a flat top to the load; it is contended that if they were allowed to load less, they would be able to form a tent top which would throw the water off much more readily?—I cannot say anything about that, except that it would appear that it would minimise the danger of leakage.
19. Where do you receive your wool from?—From the northern line, the south line, and Fairlie line—all round the district for a radius of about forty miles.
20. Have you any complaints against the Railway Department?—No, none whatever.
21. What wool do you consider to be the most dangerous?—I should say it would be the slipe wool. We ship a good deal of greasy wool, but I have never had any experience of greasy wool heating.
22. The general complaint has been against dags, locks, and pieces—low-class wools. Is that your experience?—Well, I cannot say that I have had any experience of those classes heating.
23. Take last season; the price of wool was high. Did you find any undue proportion of low-class wools being sent for shipment?—No.
24. What is generally done with the low-class wools in this district?—They are generally sent to the scour.
25. Do you think it would be profitable for a man to send Home in the grease his low-class wools?—I certainly think it would be a mistake to do so; it would simply amount to paying freight on dirt.
26. *Captain Blackburne.*] Did you find that last season, in this district, was wetter than recent previous years?—Well, we have had many as wet as last season.
27. February and March?—We very often have wet weather during those months.
28. The majority of the ships which took fire loaded during those months?—That might be so, but a large portion of the wool arriving at that period goes aboard the ships undumped. At that period of the year there is plenty of room in the vessels leaving here, and it does not pay them to dump. It may be found, therefore, that the undumped wool is the cause of the trouble.

29. No, the trend of the evidence is that there is a greater danger in dumped wool?—I think undumped wool will fire far quicker than dumped.

30. *The Chairman.*] It would appear that, as there is not much cargo offering at that time, the ships would rather take it undumped, rather than nothing. Of course, the wool which went through Wellington at that time was all dumped?—A good deal goes away from here at the end of the season undumped.

31. *Captain Blackburne.*] Have you known of a case of wool firing or becoming badly heated?—I have felt a bale that was so badly heated that you could not bear your hand in it.

32. And the inside might have been very much hotter than the portion you felt?—I had my hand into the very centre of the bale, and it was very much heated.

33. Can you suggest any method of detecting heat in wool-bales?—I do not know of any method except by the feel of it.

34. You could only feel the outside?—Yes; but if a bale has been lying on the floor and it became heated, it would leave a mark upon the floor.

35. Would not that be more evidence of moisture than heat?—If the heat is caused by dampness you would notice the mark, and you would then naturally feel the bale.

36. *The Chairman.*] Do you think there would be any objection at such a port as Timaru, where a considerable quantity of wool is shipped to a small charge per bale being levied to defray the cost of inspection, supposing the charge was not to exceed 2d. or 3d. per bale?—There could be no objection to supervision and inspection, but it would be a most unjust charge. I know men who have sent wool Home for the past twenty or thirty years from the back country, and have never had any damage whatever in it; then why should they have to pay for possibly the mistakes of a few fellmongers on the coast.

37. But have we not to make laws to keep the men who does the wrong in check?—The squatters in the back country would object.

38. But, you see, there will be an increase in insurance premiums and this will ultimately come upon the growers, so if inspection can prevent this increased rate of insurance, and be done at a cheaper rate as well as giving security to lives and property, is it not well to consider it? I will give you an instance of the possibilities in it. The "Delphic" was not overdue shortly after the fires on the other ships, yet reinsurance rates went up to nine and ten guineas premium—and, remember, she was not overdue. If this could be safeguarded by inspection at the port of shipment by a small charge of 2d. or 3d., what objection could there be to that?—None whatever, if the supervision will prevent the fires; but I say it would be most unjust to tax the grower.

39. It must come upon the grower indirectly. You see, if the shipping companies pay this it will eventually come upon the growers in any shape or form?—I am sure the grower in the back country will object to such a charge.

40. *Captain Blackburne.*] But he will have to pay more insurance?—I do not know that he will.

41. If one man ships a hundred bales in splendid order and another man ships a hundred bales in bad condition, probably both lines would be burnt if a fire broke out?—But the underwriters will pay for the wool.

42. Yes, but if there are many fires the rates will go up in proportion to the risk.

43. *The Chairman.*] The plain fact is that we have had five ships burnt within about a month, all arriving from New Zealand, and the question is, shall the underwriters and shipping companies make a special charge on New Zealand wools, or shall there be sufficient supervision at this end to guarantee the condition of the cargoes leaving our shores?—It would be more satisfactory to the underwriters.

44. And more satisfactory to the shipping companies and the wool-growers?—Yes.

45. No matter how that increase goes on it must eventually fall upon the grower?—Yes; but while the underwriters were paying £2,000 per annum for inspection there was no extra charge.

46. They took it off, and then the fires took place. Can you doubt that that had something to do with it?—It looks like it. When did they take it off?

47. June, last year—June, twelve months ago. It might be a coincidence?—It might be, but it is very strange.

48. Do you know why they took it off?—I have heard, but do you?

49. Yes, but I am asking you. I will tell you. It was because you could not agree as to the apportionment of the expense, because some of you were paying it and some were not?—I understood they all contributed. However, if Lloyd's were not contributing it is strange.

50. *Captain Blackburne.*] We understand Lloyd's were not contributing?—I have heard the same thing, but not officially.

51. Have you any great difference here between the wool that comes from the large stations and that which comes from the small farmer—that is, in the way it is got up, not as to the condition of the wool?—All the low-conditioned stuff is sold in the colony.

52. Not for shipment?—It may be reshipped when classed; some do and some do not, it depends upon the buyer.

53. Do you think there is much of the wool from the small ten-or-fifteen-bales men sent Home without reclassing?—Yes, if the buyer is satisfied that it is properly got up.

54. How does he ascertain that?—By going into the bales.

55. What proportion of bales will he go through?—He may look at pretty near every bale if it is a small clip. If it is a fifty- or sixty-bale clip he would be satisfied to take the specification of the grower and inspect a proportion of the line. Even with a ten- or fifteen-bale lot he might be satisfied and let it go.

56. But if he did not know the man's name?—After going through some of the bales he would be in a position to form a pretty good idea as to the condition of the line.

57. Have you had any cases of false packing?—Yes, we have had cases of false packing. I have heard of them last season.

58. Does not the small farmer simply bundle up the locks and pieces, and everything, and pack them together with any rubbish there might happen to be upon the floor, and send it all along in the bales?—It has been known.

59. Is that not generally looked for?—Buyers might, yes.

60. Through ignorance—we will not say fraud. Would that be sent Home without being reclassified?—Not if they found locks and pieces in the bales; but if they found one or two well packed they would not bother much about it as far as the rest was concerned.

61. It would depend upon the seller's name?—The buyer does not know who the grower is in many cases.

62. Can you suggest any legislation which would be likely to insure wool going Home in good condition?—I suppose the best way would be to try surveyors at each port, so that they could examine the wool.

63. You would not suggest any penalty for wool being found in bad condition?—It would be very wrong for any one to pack wool in a dangerous condition.

64. If known to be packed damp?—It might be by accident.

65. And would you suggest a penalty for accident?—Not unless it was wilful.

66. That is the trouble—not only wilful—but the trouble would be to prove it?—That is so. Beyond appointing surveyors I cannot see anything in it.

67. It has been suggested that the grower should give his warranty that his wool is in good condition. Would it be reasonable to let the owner or shipper of the wool give his warrant that the wool is in good order?—He could only say, to the best of his belief.

68. Do you not think he could be made responsible?—It would tie him more closely to his work when shearing.

69. *The Chairman.*] Is it possible to tie up the wool-grower by a warranty? How could you possibly do it?—I do not think you could. He might say it was all right when it left him.

EDWIN ROWLAND GUINNESS, sworn and examined. (No. 97.)

70. *The Chairman.*] What are you, Mr. Guinness?—I am a member of the firm of Guinness and Le Cren (Limited), of Timaru.

71. Wool-buyers?—Wool-sellers.

72. Do you receive wool?—Yes.

73. And you sell it and ship it?—Yes.

74. Do you dump?—No, we send it for dumping before shipping.

75. You know the object of the Commission, and we shall be very glad if you can assist us by detailing your experience and observations—in fact, tell us anything that will be of assistance to us in this investigation?—I have read a good deal of the evidence which has been given, and particularly on the question of wool heating. My opinion is that it is very difficult to find greasy wool heated—far more so than slipped wool. I have had a good many years' experience before coming to Timaru in managing stations, and I have often known of sheep being shorn wet. In the early days the shearers did not object to shear wet sheep—in fact, we had a difficult job to keep them from shearing them when they were wet; but now they will not shear wet sheep on any account. I remember one case in particular which came under my notice on a station which joined the one I was managing, where they rushed a lot of sheep into the shed during a heavy shower; some of the first got in dry, but the remainder were wet. Next morning the shearers said they were dry, and, of course, the man in charge was anxious to get through his shearing as quickly as possible.

76. Were they cutting out the shed?—Yes. Some eight or twelve bales was the balance, and, in view of their containing damp wool, he had a note made of the bales and their number, feeling sure that they would be damaged. The agents were instructed to have these bales sold separate from the rest, so as not to interfere with the value of the balance of the clip, but these few bales brought a higher figure than the rest of the clip, and they were not the slightest damaged.

77. Did it go Home dumped?—Yes. I might say, too, that this was merino wool.

78. Do you know if that wool remained any time in the sheds?—No; it was sent down in the usual way and sent forward by sailing-ship. In those days there were no steamers carrying wool Home.

79. And it would be afloat even a longer time than is usual now?—Yes, double the time.

80. Was there any low-class wool with it?—The locks and pieces were all shipped. They were separated in the shed and the whole of the clip was shipped.

81. How long ago is this you are speaking of?—Thirty-five years.

82. They would not send Home any heavy dagged pieces?—No; there are no heavy dags on merino wool, and there was no English grass about that time as in these days.

83. The wool was not at such a high figure in those days?—No.

84. And there would, consequently, not be the same eagerness to get in every pound weight?—No.

85. Was last season wet?—I should think the wettest season we have had, although the last three or four have been wet. However, I think last season was the wettest.

86. And the price of wool has been as high as, if not higher than, in previous years?—Higher than in previous years.

87. Have you observed any undue haste on the part of growers or shippers to catch the markets?—I have seen some lots of wool sent in to catch the Timaru sales, and such wool has not been very dry.

88. What would become of that wool?—It was sold to the Home buyers and shipped Home.

89. Without dealing with it at all?—No; but very few of them would deal with it. There are a certain number of local buyers who fellmonger their purchases. Other centres, such as Christchurch, may take the wool for fellmongering and scouring. Ashburton may also take some.

90. Do you know if they deal with it themselves or send it Home?—They deal with it themselves, that is my opinion. I think, as a rule, they reclass it—that is, without scouring it. Others scour it. Some of the fellmongers ship in the grease and others may scour, but I am not certain as to the proportion. I know they do both.

91. Have you had any experience of wool heating?—I have never known greasy wool to heat.

92. *Captain Blackburne.*] Do you know anything about the “Beltana” fire—that was greasy merino wool?—No, I know nothing about that.

93. *The Chairman.*] Have you any small fellmongers here?—There are several fellmongers. I remember some years ago a man who had a fellmonger’s plant, and used to dry his wool by artificial means. He used to slice the skins—

94. He did not sweat them with the sodium process?—Just sliced them. He might have done both—probably he did—but the new system was not in such general use. At that time I was with the New Zealand Loan and Mercantile Agency Company, and it was part of my duty to examine all wools for the purpose of making advances for shipment, and in one particular instance I examined some of this wool and thought it felt hot. I examined the bale right through, and found that it was so hot I could not retain my hand in the centre of the bale. Some of this wool of the same class had been dumped, and sent to the ship’s side to be shipped. Having found this one bale hot, I decided to examine the others, and found them all hot. I had them sent back again and redried. That was owing to the artificial process of drying.

95. Did you find any discoloration of the wool?—No, it had not been left long enough.

96. How long was that before it was shipped?—I could not say exactly. The wool as it comes in generally lies in the store until they have sufficient collected to make a shipment.

97. And you think this man baled that wool before it was perfectly dry?—I am satisfied that he did. That was my opinion at the time.

98. And you thought it was dangerous to attempt to take that wool Home?—Certainly, and therefore we did not allow it to be shipped. That was about fifteen years ago.

99. We were told in Christchurch that the shippers felt the wool, not so much for the risk of fire through heating as for the probable damage to the wool through discoloration and deterioration. Have you ever heard of such a distinction as that?—No, I have never heard it.

100. We had that evidence distinctly from Mr. Hill. He said, “I am the biggest shipper of wool in New Zealand, but I have never rejected wool because I had any idea of fire, but simply because of the possibility of its deteriorating the quality of the wool?—I can quite understand Mr. Hill doing that.

101. You have never heard of such a distinction as that?—No.

102. You think you would feel for heat in view of the possibility of fire resulting?—That is my experience.

103. With the object of saving any additional premium on the insurance of cargoes from New Zealand, do you think it would be a hardship if a small charge were levied per bale to cover the cost of inspection?—I think it would be a very good thing, provided they can find some proper method of thoroughly inspecting the wool. It seems to me a most difficult thing to do.

104. We admit that at once. We have people who want to show us all sorts of patents for the purpose. Supposing we had some one at Timaru who could be called in to inspect any wool which appeared to be heated. Would the very fact of having an inspector on the spot be something of a deterrent against the shipment of wool in a doubtful condition?—I think it would be a step in the right direction.

105. You think it would be no hardship?—No.

106. I asked the question of a witness, if he did not think it would be well to prohibit the export of wool of the lower grades which might be a danger, and the reply I got was, “What about the liberty of the subject?” Do you think there would be any hardship were a man prevented from shipping wool in such a state that it was really nothing more than a mixture of wool and manure?—I think there would be no hardship whatever were a man prevented from shipping wool which might be likely to take fire. We all know that locks and damp pieces are far more liable to take fire than clean wool, either scoured or greasy.

107. *Captain Blackburne.*] It is a reasonable prohibition?—Yes, but I do not think there are many men who would ship it.

108. *The Chairman.*] You do not think there would be any hardship if the export was prevented?—No.

109. *Captain Blackburne.*] Another man writes to say that breech-pieces should not be allowed to be shipped?—He does not know what he is talking about. Thousands of bales of them are shipped every year as usual.

110. You have a harbour here. Do any small vessels come in here from the small ports to tranship?—No, there is none of that done now. All the wool-ships come right alongside now. It is loaded from the trucks right into the vessel in the harbour. I would just like to say with regard to the transit of wool from the stations and farms. It has been my experience that very often a bale of wool arrives here soaking wet on the outside, but it is very seldom that it penetrates to any extent, and putting the bale in the sun for a time dries it sufficiently. I have seen bales that have been so treated opened up, and the wool has been perfectly dry.

111. It would not go in more than a couple of inches?—I do not think it would.

112. Have you ever seen a bale of wool so wet that you would be afraid to ship it?—Sometimes the bales get wet in the railway-trucks or in the station wagons. Any that has come to us in that state we have always opened up to dry, and we have been perfectly satisfied that it was all right; at the same time we should not think of shipping it in the condition in which it arrived from the trucks.

113. If the pack was wet for only a couple of inches it would perhaps not be noticed?—The pack always shows where the wet has been.

114. With fresh water?—Yes.

115. In that case you always examine it?—Yes, if we had anything to do with it. I might say that I have known a bale of greasy wool drop into the river from the wagons, and float down stream some twenty or thirty yards before it was recovered, yet the water had not penetrated the bale one inch. That was a screw-pressed merino bale.

116. You would in such a case open the bale and sun-dry it?—I mentioned that to prove that it is very difficult for water to penetrate any depth into a pressed bale even.

117. You do not think there is any danger through loading ships during rain?—Not from a few drops.

118. But a drizzling rain. We know that wool absorbs moisture pretty quickly, and if they are loading during rainy weather, is there not a probability of danger?—I think it is very unwise to do it.

119. You think that is likely to endanger the ships and add to the risk?—I would not like to say that, because I know that wool absorbs moisture very much. I know of bales of wool, the sheep having been shorn in very dry weather—probably during a north-wester—and the wool would remain in store for weeks, and when wet weather comes on it would increase in weight by two or three pounds.

120. Dumped?—No, I am speaking of pressed bales.

THOMAS DEMPSTER YOUNG sworn and examined. (No. 98.)

121. *The Chairman.*] What is your name?—Thomas Dempster Young.

122. What are you?—Manager for John Mill and Co.

123. I understand you receive a large amount of wool from year to year?—Yes.

124. And you take it right from the sheep-farmers?—It comes direct from the country.

125. Do you ship it?—Yes.

126. Do you dump it first?—Yes.

127. You heard Mr. Guinness's evidence right through?—Yes.

128. With regard to what he said, is your experience much the same as his?—Much the same.

129. Now, he has not spoken about the shipping or dumping of wool; can you tell us anything about the condition of wool when it comes to you before being dumped?—Well, our experience—and I have been here for sixteen years—is that we have a very small percentage of wet wool coming in—very small indeed, and there is always a close supervision and special instructions given to the storeman at all times that any bale of wool showing the slightest wet is put on one side.

130. And then, what?—It is dried.

131. If it is only on the outside of the pack I suppose it is sun-dried?—If it is merely the pack that is wet you can generally tell, and we cut the pack and then put it in the sun. If the wool shows any sign of being wet we open it out and dry it. Occasionally it is sent back, but very rarely.

132. That would be a very bad case?—Yes.

133. Do you send it back, or communicate with them and ask what to do?—We generally send it back.

134. Do you take it upon yourself to recondition it or send it back?—Not without informing them.

135. You say it is not fit for shipment and ask for instructions?—Yes. It has got to be very bad indeed before we send it to the fellmongery, as we have such a large place that we can practically dry it ourselves.

136. But a fellmonger has to put it out in the open air?—Yes. We have so much floor-space that we can dry wool practically as well there. There is a natural heat, and with the draught we can do it as well ourselves.

137. *Captain Blackburne.*] Is all the wool you have there in your store now slipe wool?—No.

138. Some of it is marked "Scoured"?—Yes, there is a lot of wool there that is held for the mills and suchlike.

139. There was some wool that did not seem to have any mark on it at all?—There is a mark on it somewhere. That is wool that has been bought. I could not say it is marked "Slipe," but there is always a mark on it.

140. There was some marked "Slipe" and some marked "Scoured": would all that scoured wool also be sliped wool, too?—I could not say.

141. Do you consider slipe wool is the more dangerous?—I have never known greasy wool to heat, and have never seen it heat. Occasionally we have the other, but I may say we have never had many cases of even heated wool. Last year we had one or two, but not very serious.

142. One witness has stated that slipe wool should never be allowed to be shipped dumped on account of the greater danger with dumped wool?—I do not think it would make any difference if thoroughly dry, and I do not think it is the dumping that would increase the danger—I think it would be the other way about.

143. *The Chairman.*] When the question was asked you about slipe wool being dumped, were you speaking about sun-dried?—When it comes into the store.

144. Your experience here is more of sun-dried than of machine-dried. With the machine drying at Christchurch the wool goes through at about 190° temperature and comes out at about 125°: suppose you take that straight out of the machine and put it into a bin, would that wool lose much of its temperature?—It ought to if it is thrown into the bin.

145. Yes, but it is put in as fast as it comes out of the machine?—It would depend upon how long it was in the bin.

146. Wool will not conduct heat, and supposing the man begins to put that down at once and goes on as fast as he can get it from the machine—mind you, the whole atmosphere of that place is just about warm enough to keep it going—and supposing that is baled as fast as they can do it into a pack, will that lose much of its temperature?—I should not think so if the room was as hot as you say—I cannot see how it could lose much.

147. It may be warm, and may it not also be warm and moist?—I dare say it would be.

148. We were told in Wellington that that wool ought to be, and, in fact, was, through their process left for twenty-four hours at least spread out?—That is more for an expert—I am not expert enough to express an opinion upon it.

149. The representative of the Meat Export Company stated that none of that wool ought to be put up before twenty-four hours after, and yet we saw it put up in Christchurch almost immediately?—I could not express an opinion upon it.

150. There is nothing like that done here?—I could not say that. There are two of the largest meat companies in the colony here who dry with machines. Those are the Christchurch Meat Company and the Canterbury Frozen Meat Company, but I have never found very much wrong with their wool, and we have sent a lot of it through.

151. But they had wool on these ships that were burned?—Yes. Of course, there is no wool put out of our stores without being examined—there is a close supervision over it.

152. But you dump the wool, do you not?—Yes.

153. But then it is pressed before it comes to you?—Yes.

154. And all the responsibility you take is the dumping of it?—Yes.

155. Unless you find it hot?—Yes.

156. And do you never find it hot?—Very rarely.

157. What have you done when you found it hot?—Sent it back.

158. And they opened it up again?—Yes.

159. You have had no actual instance of the firing of wool?—Never. I have never seen it approach any heat.

160. You have had no wool sent back or any claim sent to you because wool heated?—No.

161. Have you ever seen any wool heat in the centre and look like a cinder?—No, only heard of it through correspondence. I cannot credit that wool will burn like that.

162. *Captain Blackburne.*] You, no doubt, saw Mr. Hood's evidence in the paper?—Yes—that was in regard to the wool falling off a wagon and firing?

163. Yes?—I cannot swallow that. After the years I have been amongst wool I cannot credit it.

164. Mr. Mowat was asked if he had seen wool on fire, and he said "Yes, but in a shed. I had a shed burned down, and when it has fire to set it going it takes more to put it out than it does to start it"—Well, we have never had an experience of that kind—no sign of fire, and we have passed an immense amount of wool through our hands.

165. There was another case brought before us where the wool was so hot that when the air got to it it blazed?—I have not come across a case of that kind. We have had dumped wool left in the store for six months, and have not had the slightest sign of heating.

166. We gather from the professors that it may depend a good deal on the season of the year, and it is also said that fungi is the principal cause of the heating at the start, and if it has been a very wet season and warm at the same time, this fungi will grow much more rapidly and cause trouble?—Well, I should say, taking the Port of Timaru, that all the years I have been here it has been on very rare occasions that there has been heat in wool, and the bulk of it has passed through my hands.

167. *The Chairman.*] And you have your share of wet weather here as well as anywhere else?—Yes.

168. *Captain Blackburne.*] But the weather at Timaru is particularly fine, is it not?—We get a fair share of rain. Last season I think was a fairly wet season, but I do not know that there was more wet wool. Occasionally it gets wet coming in.

169. *The Chairman.*] Did you observe a larger proportion of low-class wool going Home last season?—No, I do not think so.

ARTHUR STANLEY PALMER SWORN and examined. (No. 99.)

170. *The Chairman.*] What is your name?—Arthur Stanley Palmer.

171. What are you?—I am a wool-exporter, a fellmonger, and wool-scourer.

172. You have heard the evidence given by Mr. McLaren, Mr. Guinness, and Mr. Young?—I have heard a good deal of it.

173. Do you agree with their evidence?—A great part of it.

174. Do you corroborate what they have said?—Yes.

175. You are a fellmonger?—Yes. I understand a good deal about greasy wool: I ship a great amount of it, and class it, and that kind of thing.

176. As a fellmonger you buy it?—Yes.

177. You buy it chiefly from the small growers?—Of course, and that is scoured.

178. What do you do with that wool as a rule, do you reclass it?—Are you dealing with greasy wool now?

179. Yes, the wool you buy?—What I principally do is that I buy at auction and also several farmers' lines that I might buy privately go into my store or into the Shaw, Savill, and Co.'s store, and I reclass it and ship Home what I consider the cleanest. Any locks and pieces that are taken out are sent to be scoured, but I mostly reclass all of it. It is shipped Home under its ordinary brand, and I repack and ship Home that which I reclass. If we find any wool which we consider is not fit or damp—

180. What do you mean by "not fit"?—Not good enough quality: broken fleeces or wool that is dirty or anything like that we send to be scoured, but I cannot say that I have found any heated in any way that I have bought. I may say I have had a large experience with regard to greasy wool, and I think the last witness mentioned a case of wool falling off a wagon into a stream. Well, I have seen wool in that state, and it has been dried and sent Home.

181. There was the case mentioned by Mr. Hood before the Commission, that out of thirty bales of wool on a wagon there were only seven saved?—Fire on the wagon?

182. Yes, and in forty minutes only seven out of the thirty bales were saved?—Do you mean to say the wool fired?

183. Yes, and burned. It had been packed up outside the shed as the river was up, and when the river went down it was carted away on the wagon, and it caught fire?—Well, it is rather surprising to me—I have never heard of anything like that.

184. You have never had anything like that in your experience?—No. I have been classing on some of the large stations, and I have seen after a spell of wet weather perhaps thirty or forty shearers at one shed, and in classing we have probably gone on for a couple of days without putting a blade in, as the shearers call it, and then they have got sick of it; the sheep have not been dry, but they have gone on shearing perhaps five hundred bales. There were four or five hundred bales shipped from one station which no doubt were safe; but I told the manager the wool would deteriorate. However, there were only some few bales which were reported on the catalogue as "country damaged"—that is to say, they were not properly treated at this end.

185. Have you ever heard in Canterbury a manager say "you can shear if you like"?—Yes.

186. Have you ever known shearers forced to shear wet sheep?—No.

187. We have had a letter from a man who wrote direct to the Minister saying that he has known whole sheds of men forced to shear, and that if they did not do so they would be sacked?—Yes, I believe there was a case in point down at Otakaikai; they either had to shear or go, and at last I believe they sued for breach of contract. That is the only case I know of.

188. Have you ever known of such a thing as that before—forcing to shear wet sheep?—The shearers will not as a rule shear wet sheep. It is an extraordinary thing, because it is one of the clauses in the agreement now, and they are to decide amongst themselves if the sheep are too wet.

189. Could a man fifteen years ago have said this to the shearers, "If you don't shear these sheep I will sack the lot of you"?—I do not know—it was not done in my time.

190. And the usual thing is to shear sheep in a proper condition?—Yes. At this place I was talking about they were getting sick of it; but I was very careful to see that none of the low-class wool went away. We are quite aware of the fact that any low-quality wools are liable to heat, such as dags and wool containing vegetable matter; but there was not a great amount of wool scoured on that station considering the size of it. In stacking and then sending wool away, we have had it stacked up outside the sheds for a couple of weeks and covered with tarpaulins, and when we have uncovered it we have found on getting into the middle that it has been wet, and some locks in the centre were practically worth nothing.

191. By reason of what?—By reason of the heat.

192. And they lost the quality?—Yes.

193. And you could crumble it up?—Yes.

194. Was that on account of the actual amount of heat in it?—Not necessarily. I have heard a lot about fire in wool, but I have really never known wool to fire, and I have seen wool in all conditions. I have seen it in the very worst condition, and I can say this, that if wool is covered on a truck or in a shed or outside—I am talking about greasy wool—and several bales are damp, it will heat. I do not say that it would not fire if there was some other matter with it.

195. That was not dumped?—No, none of it was dumped.

196. *Captain Blackburne.*] That seems to be an additional danger. The heat is imprisoned and cannot get away very well. If the hold is full the steam cannot get away, and it is not as if the bale was exposed to the atmosphere?—It is all the more reason why the pack would be wet. I have proved it from experience that if you can find any greasy wool that is damp, or any other wool at a certain temperature, I maintain that the pack will be wet and the other packs adjoining it, but why should it fire?

197. *The Chairman.*] You would want the grease and the moisture, and also the pressure, and a certain amount of ventilation. Our trouble is this: to find out what is the amount of ventilation that will either stop the progress of fire or will encourage it. You may have your hold on fire below with smoke rising, and if you are able to keep the hatches down without the heat increasing to a certain extent, possibly no harm may take place, and you may get safely into port; but in the meantime the heat may so increase inside that if you keep the hatches down there may be a danger in regard to the walls of the ship or the deck. If the captain finds the deck getting too hot he lifts the hatches to put the water-hose in if he has not got any other appliance, and immediately the fresh air gets in, you get an access of atmosphere which is quite sufficient to set the whole thing ablaze?—Well, this wool I was talking about was very hot.

198. Was it in a confined space?—Yes; that is what I am saying, that if we find a stack getting very hot through dags or anything like that, we pull the covers off and separate them.

199. But you cannot say that the mere covering of those bales would be like a ship's hold?—I say the hold is worse.

200. You pull the cover off and then you relieve the confinement of the heat at once, and it escapes into the air; but in a ship's hold it has got to such an enormous extent that it only wants something to get in and start it?—I have seen bales of wool burnt up to nothing, as I call it, stacked with other bales.

201. You have actually seen them burnt up to nothing—charred?—Yes; but I do not say charred—wool that has been stacked with other bales for a considerable time.

202. What do you call a considerable time?—Say six weeks, and we have disarranged the stack and come to the bale.

203. And what did you find?—That you could not tell whether it was wool or muck.

204. What colour was it?—Black.

205. Was it like a cinder?—No; it was practically rotten, and the bale was soaking wet.

206. What was the temperature?—I should say it was 170°.

207. Could you put your hand in it?—No, you could not.

208. That is to say, that there would have been fire there after awhile?—I do not say that there would not have been.

209. *Captain Blackburne.*] If that bale had been confined for some time longer, and there was absolutely no escape for any air, and with other bales around it in a hold, do you not think the heat would soon have increased to the point of incandescence, and then it would only require a little air to supply the oxygen?—That I could not say, because I have never had that experience.

210. *The Chairman.*] Instead of the temperature being 170°, would it not have got up to 200°?—It might have got up to 180°. It was sufficient for me that I could not put my hand in it. I consider the pack will blaze, but the wool will not.

211. It will set fire to the pack, but not to the wool?—Yes, but then the pack was wet in this case, and how can it take fire?

212. It will fire just the same, but perhaps not as smartly?—Possibly.

213. You have found this at one of the stations?—Yes, and at other places; but I have never seen wool on fire. I do not say it will not fire, but I have not seen it on fire. I have seen it in such a condition that it did not fire, although it seemed to have got past that condition. I do not say it would not fire if it got in contact with something else—it would not flame.

214. Assuming that the only thing between the wool and, we will say, bales of flax was a little dunnage and some mats which were also liable to ignition—very much more than the wool itself—do you not think the heat communicated to this and the woolpack would set fire to the flax?—It might probably do that. I consider that wool will not fire, but it might through being in contact with other things—it might cause combustion.

215. Supposing it was on top of the flax?—Yes, it might.

216. It is admitted that on the large steamers they put flax and wool in the same hold, and only put dunnage and mats in between, and those are just as liable to heat as the wool itself?—Yes.

217. And you would not hesitate to say that that heat would not be communicated to this flax?—No. I have read a lot of the evidence that has been given before the Commission, and it has been very interesting to me, because I am a large shipper in Timaru, and I say this, that I do not think any shipper could expect to benefit by shipping damp wool.

218. Is there anything else you wish to say?—Regarding slipe wool, I slipe wool and also scour wool, and I admit that slipe wool is more liable to heat than greasy wool. I have known a great deal of greasy wool in a damp condition, and I believe in many cases it might deteriorate. I have had sample bales myself, and I have found it has been damp, and it has gone back and been dried again and has caked. I have seen a lot of wool that has caked and deteriorated, but it was perfectly cool.

219. *Captain Blackburne.*] The danger with slipe wool is a little of the pelt getting with the wool?—That would be in low classes of slipe wool—the skin-pieces or thirds and fourths.

220. *The Chairman.*] Are any of those skin-pieces sent Home?—What I mean to say is that the skin-pieces are sweated and pulled.

221. Is not some of that skin-wool classed?—I would not say that it was not. The thirds are low classes, and there is a fair amount of sodium left in the thirds.

222. And practically there would be no harm?—I think all that has gone into it and is finished, and there is no harm. I have had several bales packed in that way, and I have found it has gone to dust after stopping in my store. We do not say that it is thoroughly dry, because we do not consider it could be thoroughly dry wool for the simple reason that wool will always take a certain amount of moisture back whatever you do with it.

223. If you take wool in its natural state, it would be what they call dry, but it still contains a certain amount of moisture?—Yes, we consider that is so.

224. If you make it drier than that it will absorb a still larger amount of moisture afterwards?—Yes, that is so. Of course, I dry in the sun.

225. There is no doubt perhaps that is the best process of drying, but if you wait for a few weeks for fine weather you may get impatient?—Yes. I do not make a practice of packing it damp. We pack it with the sun on it away in the bins for a couple of days, but if we can we do not like to pack wool until the heat has gone out of it. I know very little about artificial drying.

The Commission adjourned till next day, Tuesday, 18th September, 1906, at 10 a.m.

TIMARU, TUESDAY, 18TH SEPTEMBER, 1906.

The Commission met in the Supreme Court Building, Timaru, at 10 a.m.

WILLIAM JOHN TAYLOR sworn and examined. (No. 100.)

1. *The Chairman.*] What is your name?—William John Taylor.

2. And what are you?—I am in charge of the wool-store belonging to the Shaw, Savill, and Albion Company.

3. You receive wool from the wool-stores?—Yes.

4. And you dump it as well?—Yes.

5. And ship it?—Yes.

6. You might tell us in your own words how it is treated, and the conditions under which you receive it?—Well, you will understand that certain parts of our store during the season are let to the National Mortgage and Dalgety and Co. for showing wool, and we keep part of it for dumping. That wool comes in and it is shown for sale, but it really goes into the hands of the National Mortgage and Dalgety and Co.

7. It goes into their hands first?—Yes. After the sales are over, if it is coming to us for shipment, it is handed over to us for dumping. In the case of wool coming direct from the station to us, we simply dump it and receive instructions as to which ship it is to go in. It may not go out at once, but may be there for weeks. The owner may send part of it Home now, and then decide not to send the rest of it until two or three weeks or a month hence by another ship. It is then, of course, put into the trucks at our siding and sent down to the ship's side.

8. Do you exercise any discretionary power as to the condition of that wool with reference to dampness or otherwise?—Oh, yes, we would stop it at once.

9. If you discover damp wool you stop it?—Yes.

10. And do you communicate with the owner?—Yes.

11. Then, according to his instructions, you either recondition it or send it back?—Yes, as he instructs. Then there is an additional safeguard: I do not know whether the other shipping companies do the same as ourselves, but in all our ships each officer has a hold of which he has charge, and they are very keen to watch the wool go down, because they are in a very responsible position, as they have to turn the wool or any other cargo out as they put it in.

12. *Captain Blackburne.*] Do you mean that the officers of the ship are in the hold?—Yes. For instance, in Timaru, they seldom work more than two hatches, and they have an officer in each hold, and they are more than keen sometimes, and if there is the slightest doubt they will not have it. I have heard arguments on the wharf as to whether the cargo is fit to go in, and the officer has always been on the safe side.

13. *The Chairman.*] If he will not take the responsibility you must stop?—Yes. If the officer thinks the wool is damp there is no question whether he ought to take it for policy's sake, because he knows if anything happened to it he would get into trouble, and they are more than keen about the matter.

14. Have you ever heard of such a case as this on a sailing-vessel, the captain saying, "Oh, that wool is right enough; I will take it if you will give me an indemnity"?—No.

15. The man who is in charge and responsible for the stowing of the wool is not the stevedore, but the officer of the ship?—The officer of the ship is there too.

16. But the stevedore stows it according to instructions?—Yes. In the case of the Shaw-Savill Company they do their own work.

17. *Captain Blackburne.*] Have you a Marine Superintendent here?—I am under the Marine Superintendent.

18. And you have charge of the stevedoring?—Yes.

19. Are you or your foreman under the instructions of the officers?—You mean if anything should crop up—wet wool, or anything like that—whether I should say it should not go or the officers should say?

20. Your foreman stevedore who is stowing the ship—I suppose you only have one foreman?—We have a permanent foreman stevedore.

21. And he would be up and down the different holds?—Yes.

22. And would the stowage be directly under his supervision?—Yes. The officer, of course, has the direct control, but, of course, our stevedores are picked because of their experience in stowing; but supposing a bale of wool came to the ship's side wet, our officer would question it, and if it went any further he would bring his captain to look at the wool.

23. Have they any instructions about not stowing flax on top of wool?—Well, our flax is always stowed in a separate deck.

24. Always?—Yes.

25. Suppose there is only a moderate amount of wool, and a large lower hold that was only part full?—Well, my experience always is that there has been an upper deck kept for flax, say, No. 5 'tween-decks, and in some of our ships we have a forecastle deck, and that is kept for flax.

26. We understand, in connection with the "Gothic," that there was not a great deal of wool offering in Wellington at the time she was finally filled up, and No. 4 hold, the big main hold?—Not No. 4 hold—it is not a big hold. Do you mean the big hold?

27. Under the saloon?—If you understand, they both run under the saloon. If you mean the big hold, that is No. 3.

28. It is No. 3 hold I am thinking of—that is the main hold?—Yes.

29. I understood from Captain Evans, the Marine Superintendent who has charge of the stowage of the ships in Wellington, that they had not sufficient wool to fill that lower hold, and he said it was imperative to put the flax on top, and they have to very often?—Of course, we have no out-and-out instructions about that, but in Timaru I do not know that I have handled any flax since I have been here.

30. You have not a great deal of flax here?—No. In Wellington I think there is a good deal of flax, and the same at the Bluff, and I think there is also a good deal at Port Chalmers.

31. You have no definite instructions, but you endeavour to stow it properly in the hold?—Yes, and in a case of that kind we would have a talk with the captain about where he was going to have it. Really, the whole stowing of the ship is in the captain's hands in our ships, and then in the other ships like the "Gothic" the chief officer takes the whole responsibility, and the captain is aboard, too.

32. Of course, the chief officer would have orders from the captain?—Yes. My experience with ships coming here with flax is that when the ships get to Wellington they know it is the final port, and it is different.

33. *The Chairman.*] And they rearrange it?—Possibly they do; they know what cargo they are going to have. When they get to a place like Timaru they come pretty early in their programme, and they do not know what they are going to get to finish, but in Wellington they do know. Another thing in Timaru is that with the system of loading their trucks it is easy for them to detect anything wrong with the wool, for at our siding we put only twenty bales on our trucks.

34. And, therefore, you have no complaint to make at having to put too many bales in a truck?—No. My experience is that sometimes they are stuck up for trucks, but as a rule there is no complaint. I have seen them put forty or forty-three bales in a truck at Port Chalmers, but we only put in twenty.

35. Are they small bales?—No; same-size bales. There are special appliances for loading trucks.

36. I suppose you have no experience of wool actually on fire?—No; I have never seen a bale of wool on fire, and I have never seen a heated bale.

37. *Captain Blackburne.*] Although you sometimes have wool in the shed for two or three months?—Well, you remember, I showed you some wool. I would not say it was in nine months, but something over six months. I was trying to find out when it came in.

38. You would not be likely to have a lot in there for more than a month?—No, three weeks or a month.

WILLIAM HAY sworn and examined. (No. 101.)

39. *The Chairman.*] What is your name?—William Hay.

40. What are you?—I am a farmer and wool-grower.

41. In the Timaru district?—Yes.

42. You have had some considerable experience with wool?—Yes, in the growing of wool I have had forty years' experience.

43. You know the object of the Commission, and can you assist us in any way?—I am afraid that anything I have to say will not assist you much.

44. It has been stated that shearers have been forced to shear wet sheep, and if not there is the risk of their losing their employment: is that your experience?—No, it is not. My experience is that owners, to protect their own interests, are very careful about shearing wet wool—it is against their interests altogether. There may be wool shorn slightly damp, because it is a most difficult thing to determine when it is actually dry or actually wet—when it is neither one thing nor the other—and I think it is a scientific question when wool is positively dry.

45. Wool we call quite dry contains in its natural state from 15 to 18 per cent. of moisture?—My experience is that owners are very careful.

46. That is to say, that, shearing it damp and packing it damp, they would endanger the quality of the wool itself?—Yes, quite so.

47. It is not because of any risk of fire, but because of weakening the quality of the wool itself?—Yes. I may say that on one occasion I had to finish a shed, and I shored about a bale—about forty that were damp. I knew it was damp at the time, and I baled that wool, and kept it and put it on one side as one bale to see if anything would eventuate, and it heated.

48. How long did it take?—It heated within three days. I opened the bale out and put it out in the sun for a day, rebaled it, and kept it again, and it was perfectly right afterwards.

49. *Captain Blackburne.*] About what temperature do you think it came to in the three days?—Not practically more than blood-heat, and I was watching it carefully, and it was baled with an ordinary press.

50. Did you find whether it was heated mostly in the centre?—No. It was hot on the side it was lying on the floor—the pack was quite warm to the touch.

51. *The Chairman.*] Do you think it would have increased in temperature if it had been dumped?—I could not say because I have not had the experience.

52. *Captain Blackburne.*] Do you employ a lot of shearers?—Well, I have had a good deal of experience; I have had charge of large sheds for a number of years before I became a farmer on my own account. I was with the New Zealand and Australian Land Company for a number of years, and they had some large properties.

53. We are told that there is sometimes more danger from the small farmer where he does not employ shearers, but does it himself with the members of his own family?—Well, I say that is perfectly right, too, because a great many of these small farmers have not had the experience of wool and ships—I mean that they have not had the training.

54. And, of course, some men become farmers without any experience whatever, with a little capital?—Yes, I am afraid that is so.

55. And they do not know what they are doing possibly?—Yes, at the commencement. I suppose they soon get experience—expensive experience—and they have to pay for it occasionally.

56. *The Chairman.*] And, as a rule, with their wool they do not attempt to class it?—Not in the same manner that a large grower does. Of course, the latter, as a rule, engages a professional classer, but it does not pay a small grower to do that, and he puts it into different classes—crossbred, and so forth—but not like a large grower.

57. *Captain Blackburne.*] Where do you send the wool when it is baled up?—Usually it is sent into the stores to be offered for sale.

58. And that is equivalent to sale-wool?—Yes, and if not sold it is passed on to the dumping-sheds to be shipped.

59. Most of that wool is examined by the buyers in the stores, is it not?—Yes. Every bale is not opened, but I presume, if there is a sale made, that the buyer examines every bale.

60. *The Chairman.*] But previous to the sale he examines those bales that are open?—Yes.

61. Is there anything else you would like to say?—I have a suggestion to make, but I do not know whether it is practicable or not. It might entail a good deal of expense on the grower, but I imagine that it might be of some assistance if the date of packing of each bale was placed on the bale.

62. That is, when putting the brand on—at the same time the date is to be put on?—The date of the baling. Of course, in examining the wool afterwards they could tell at once how long the wool had been in the bale.

HENRY RICHARD HARRIS SWORN and examined. (No. 102.)

63. *The Chairman.*] What is your name?—Henry Richard Harris.
64. What are you?—I am a wool-buyer, scourer, and fellmonger.
65. Have you got machinery in your fellmongery?—No.
66. You are a wool-buyer, and you attend the sales?—Yes.
67. What class of wool do you usually buy?—Anything that comes within my valuation.
68. Do you scour all that you buy?—No.
69. What do you do with that that you do not scour?—Scour the locks and pieces and dirty wool as a rule, and the other we class.
70. And reclass it?—Yes.
71. And ship it Home?—Yes.
72. Are you careful to observe whether it is wet or dry?—Yes, very careful, as a rule.
73. You are not so careful over that which you are going to scour probably?—No. In buying I have often found bales of wool in the sale dirty—wool which has, to my idea, been damp.
74. Have they been heating at all when damp?—I do not say that I have found any wool which was heating.
75. But it was damp?—Yes, and if it was mine I would not care to risk shipping it—I should say it would heat.
76. And lose in quality?—Yes.
77. Have you ever seen any wool that was black in the centre of the bale?—Not in a bale, but by itself.
78. Do you think it is from any process of fermentation or decay going on in the wool itself?—I should say it is from heat.
79. Then, does it cake together when heated like that?—Some wools do more than that.
80. Which kind?—Slipe wools—that cakes together more than greasy wool. With greasy wool, when it cakes up, the grease seems to act with the moisture and it is loosened.
81. Have you found greasy wool when damp heat?—Yes, I have seen it heat very quickly.
82. When loose or packed?—I do not say that I have seen any heat which has been packed.
83. When you have to deal with the wool that you fellmonger yourself, what is your process?—You pull the wool off the skins and dry it.
84. Do you do that with chemicals or by sweating?—Chemicals.
85. Is that sulphide of sodium and lime?—Yes.
86. Can you tell us if it is at all likely that any of that sulphide of lime will remain in the wool in pieces?—Oh, yes, if you do not get it all out in the process of painting—you smear it over the flesh side of the skin, and a certain part of it gets on the edge of the wool, and when that is pulled off it goes amongst the wool.
87. Do you think that that sulphide of sodium and lime has become harmless if any should remain?—I think it is harmless.
88. When the lime has been slaked it would not do any harm?—When the lime has done its work it is dead; but in slipe wool, in seconds and thirds, before putting this through the washing process we keep it in a fair-sized heap, and by getting it warm it washes so much easier. The lime and sodium in the wool opens out free, and in the washing it is almost loose.
89. Do you wash it by machinery?—No, by hand.
90. And you sun-dry only?—Yes, all of it.
91. Are you ever bothered to wait a considerable time before being able to get it sun-dried?—Yes, often. I have seen it lying in the paddock for a month or two months through bad weather.
92. Are you not tempted sometimes to pack it up when it is not quite dry?—No, I never do that—I would not risk it. But, with regard to hot wool, I have seen more hot wool damp scoured and greasy than I have of slipe.
93. Have you had any experience of that wool that goes through the machines?—No, all dried outside.
94. You have more heated scoured wool than slipe wool?—Yes, scoured and greasy.
95. Slipe wool has got a bit of a name for itself?—Yes, I can see that. In drying wool in the sun it is sometimes brought into the shed on a hot day not quite dry, and it will be quite hot. It is put in bins and kept very tight and that will keep warm for a long time, and if there is not too much moisture in it the heat in the wool will dry it itself.
96. If left in the bin?—I have seen it put in the bin and left for a few days, and it will be hotter, and it is then thrown out and spread out finally to let the air get to it, and it is then put back in the bin and will be all right.
97. In the machine-drying, the wool is blown in by a fanner, and it makes five different journeys the whole length of the machine, going along and coming back, and then it is put out. The temperature of the atmosphere in the machine is about 190°, and we tested the wool as it came out at the end with a thermometer, and that registered 120°. Now, that wool is immediately taken by a man when it comes out and put into a bin alongside?—Yes.
98. Do you think that wool would lose much of that temperature of 120° if it is left to lie there only for a very short time before it is put into the bale?—If it was perfectly dry I should say it would get quite cool.

99. They say it is perfectly dry, and yet the whole process from the time it goes in at the one end till it comes out at the other only extends over forty minutes. The first lot that goes in, if the machine is not full, will be blown through in from twenty to twenty-five minutes, and if it is properly full it takes from forty to forty-five minutes. Do you think that will get dry—is not the heating rather deceptive?—I should not care to put it into the bales, no matter how dry, with that heat in it.

100. It is only fair to say that in the place I am talking about and in Wellington they told us they left it for twenty-four hours afterwards before they baled it?—Yes.

101. Do you think that would have sufficiently cooled down?—It would if it appeared to be dry when it came out. In drying wool outside I have often felt it myself: a north-west wind is very drying and warm, and wool will come in feeling quite dry, and after leaving it in the bins for twenty-four hours it will not feel dry.

102. Do you not think it is beginning again to absorb the moisture out of the atmosphere?—What I took it to be was that it was dried so very quickly with a north-west wind that the outer edges of the fibre were not thoroughly dry, and that might apply to the machine—wool lies pretty close together.

103. Have you ever seen wool actually on fire?—No, never saw it on fire.

104. *Captain Blackburne.*] Have you ever seen it heat?—I have seen it very hot, mostly greasy wool. We have been classing and sorting up wool out of bales and putting it in a heap, and we have got a shower of rain on it, and next day we have put some more on it, and it heated very quickly after that.

105. *The Chairman.*] That would be low-class?—No, fairly clean wool.

106. *Captain Blackburne.*] If it rains you put some more dry wool on top of it?—Yes; if there is a heap of wool lying out in the weather and it rains, the same wool will heat in a very short time without more wool being put on.

107. It is not pressed?—They are together—probably put out eight or ten bales in two or three days.

108. How do you scour it, by hand?—You have a large tub, and heat the water to something like 120°—it depends on the wool—and throw in some soap and press the wool under water and let it soak for a quarter of an hour, then let it go through the drainer, and wash through fresh water. There was a case of fire on board a ship some eighteen years ago in Lyttelton of Australian wool, and my employer bought a lot of it.

109. In the "Beltana"?—Yes. As far as I remember, it was all greasy wool. I do not know how the wool caught fire, but some of the bales were just clinkers—like cinder. You could not do anything with them, and others again were not quite so bad, but there was a bad mess.

110. You saw some of that?—Yes, I worked it up.

111. Did you see any of the bales that were comparatively all right outside and burned inside?—No, I do not remember now—it is a long time ago.

112. *The Chairman.*] Have you any suggestion to make which might help us in any way?—No. As for heating wool dried, the process of drying either by artificial heat or the sun, if the wool is a little moist and a fair amount of it is put into a bin and not too much moisture, it will get cool. It will not heat with the sun drying. It will have to get cooled first, and then, if it is not thoroughly dry when it is cooled, it will start combustion, I should say.

113. Start heating?—Yes.

114. And it might go on to the point of ignition?—Yes. Of course, at odd times in the sale-rooms we have seen bales of wool heating, but that is dags and dirty wool, but I do not remember seeing any decent wool get hot.

115. Do you think the dumping would accelerate the heat?—Yes, I should think so. With greasy bales, I had occasion to sometimes see them stacked up outside, probably twenty or thirty bales in a heap and covered up fairly well with sheets, and we had to pull that stack down because some of the bales were heating.

116. Was it seen?—No, you could smell it. Some greasy wool will not heat, and I do not know whether it is because it is not damp in the sale-room, or it may not be there long enough.

117. *Captain Blackburne.*] Have you found bales of fleece wool in the sale-rooms sometimes with dags in the centre?—Yes, I come across them occasionally.

118. Just accidentally, or rolled up?—Put in on purpose sometimes, I say.

119. *The Chairman.*] There is such a thing as false packing?—I have had occasion to reject wool on that account.

120. *Captain Blackburne.*] And have you come down on the man who was responsible for it?—No, I threw up the deal.

121. Has that man not been marked?—Yes; we would take a note of the brand probably, and shy clear of it afterwards.

122. Has it not been brought before the others?—No; it is passed over sometimes, and it has been blamed on to the workmen, but the thing ought to be put down.

123. Do you not think such cases ought to be shown up?—Certainly they should. It is false packing, and it is gaining money under false pretences, if it is allowed to go on. It is a deliberate fraud—wool packed up with dirt and dags instead of the ordinary fleeces.

124. It is not a common occurrence?—No. If the same class of wool is shown as in the middle of the bale, we pay accordingly; but I have seen fleeces all round, and in the centre of the bale has been rubbish, not quite to the top and not to the bottom, and there might be a hundredweight in the centre.

125. The heart of the bale was no good?—No.

HUGH LOWRY sworn and examined. (No. 103.)

126. *The Chairman.*] What are you?—I am auctioneer for the firm of Dalgety and Co. (Limited), of Timaru.

127. You have had considerable experience of wool?—I have had about twelve or fourteen years in connection with the auction sales, but I do not think I know much about the slipped or scoured lines.

128. Do you sometimes have damp wool arriving?—Very few instances.

129. What power do you exercise over such wool?—The bales when exposed for sale are opened up, and the buyers would find out if it should be damp, and those bales would be thrown out of the catalogue.

130. Do you then have it reconditioned, or do you wait for instructions?—We take it in hand as a rule, and take whatever action we think proper. We have very little of that sort of thing. Out of a total of some four thousand bales last season we had only two bales which required attention.

131. Did you observe any undue proportion of low-class wools passing through last year as compared with previous years?—I do not think so.

132. It has been stated by some witnesses in Wellington that there have been larger quantities of low-conditioned wools passing through?—It has not been the case here. I was in Wellington some two years ago, and I know that the wool is not got up so well there as here. Our wools are better skirted and better put up than that which is usually offered in the Wellington market.

133. What do you think is usually done with the slipped wool in this district?—As a rule it is shipped Home; it does not come into our hands at all. We have very little of it.

134. Have you ever seen wool on fire?—I saw a few bales at Mills's store some two years ago. Wool which had been station-scoured and sent down, some bales of which were so heated that it had to be opened up.

135. Did they look as if they had been on fire?—No, but very hot.

136. If these bales had been actually shipped at the time, and had been on a voyage Home, would the conditions surrounding them have caused them to heat a great deal more?—I could not say that.

137. As a matter of fact, the wool that was on board the "Pitcairn Island" was about as long at sea as wool that was on board the steamers. It seems to point to the fact that a certain given time is required for wool to disclose its condition as to heating?—I know nothing about that.

138. Have you anything to do with dumping or shipping?—No.

139. In view of the fact that it might save a large increase in insurance, do you think it would be a hardship if a small sum were levied upon each bale for defraying the cost of inspection before shipment?—I think it would be unfair to the station-owners who carefully handle their wool and class their greasy wool.

140. Yes, but there will be the same or heavier charges in the shape of higher premiums?—Will there be higher premiums?

141. I have quoted to the previous witnesses the fact that for reinsurance upon the "Delphic," when not overdue, a premium of nine to ten guineas was asked. You see, if once the rates go up, we shall have to be good boys for a very long time before they will reduce them again?—Yes, but as I said before, it will be very hard on the station-owner and people who ship their wool in good condition to have to bear the expense of those who are careless. The only wools which heat are the low-class wools and slipped wool. Of course, the fellmongers will tell you it is the greasy wool.

142. Yes, the big fellow tells you it is the little chap, and on the other hand the little chap is certain it is caused by the big fellow?—And I come in between; I am neither one nor the other.

143. *Captain Blackburne.*] Would it be a hardship if the export of locks and pieces in the grease was prohibited?—I do not think they should be shipped in the rough state.

144. And should be absolutely prohibited?—Yes, locks, at all events. I do not say pieces, but locks.

JOHN PATERSON NEWMAN sworn and examined. (No. 104.)

145. *The Chairman.*] What are you, Mr. Newman?—I am manager of the Canterbury Farmers' Co-operative Association.

146. You have had considerable experience of wool?—Not practical experience. I have no handling.

147. But receive it in the stores?—Yes.

148. Can you tell the Commission something with reference to the condition of the wool as to dampness or otherwise?—As far as my own knowledge goes, we have never had any instance of wool being received in a damp condition at all.

149. You have received some that has had to be reconditioned?—Probably Mr. Hassall, our storeman, will be able to tell you more about that than I can. I have read a good deal of the evidence that has been given before the Commission, and my own ideas are more theoretical than practical. My opinion is that the probability is that where there has been spontaneous combustion it has arisen from the locks and pieces in the bales, and either amongst the washed or slipped wools, but not amongst the greasy. I do not think, myself, it is at all likely that there will be any heat engendered in greasy wool. The only thing that I think might happen is in the case of a few bales of greasy dags where there might be a danger of heating. That is not a common thing, however. In going through the wool catalogues at Home you will find but occasional lots of locks and pieces having been sent Home in the grease. If there is any chance of wool generating heat it would be in such quantities as I have mentioned. If the locks and bellies heated it might be a cause of danger. I believe a considerable amount of trouble has arisen from the washed wool which has been spread out to dry and presumably baled up dry, but has actually contained a large percentage

of moisture, and has not been in a proper condition to ship. I think that will be found to be the source of trouble. I do not think it will be found to be the greasy wool. Mr. Hassall has handled a good many thousand bales of all kinds. I have never seen a bale of heated wool, although I have heard of bales being heated, and I know that if there is any moisture in a bale it will usually show signs of it on the outside of the pack, and if it is standing on the floor it will mark it.

150. *Captain Blackburne.*] That would not be known where the wool is not any length of time in the store?—No. I know of some wool being in store for two years, and it has never changed. That, of course, is an exceptional case.

151. *The Chairman.*] It has never altered in condition?—No, nor has there been any generation of heat. Last season was a particularly trying one for the wool-scourers; they had a great deal of broken weather, and the probability is that they exposed wool for drying for a certain period and they imagined that it was dry, whereas the slightest excess of moisture arising from the moisture of the atmosphere would probably make it out of condition for shipping.

152. *Captain Blackburne.*] What months do you consider were the most damp?—Well, the season was broken throughout. November and December were very broken months, so was January; it was about February before it became settled. I know that, because I went to Australia about that time and I observed the conditions.

153. The ships which first left the colony at the latter part of March and April and the early part of May?—To my mind, that is a point in favour of my contention as to the slipped and washed wool. The greasy wool would have been gone before that.

154. It was drizzly rainy weather during the time that most of those ships were loading?—I know of my own experience that weather like that will have a deteriorating effect upon grain, and it is far more susceptible to climatic influences than wool. In a damp season like that we are very chary about shipping grain for any long voyages unless we are thoroughly satisfied it is in a dry condition, and grain brought in during such weather has to be kept in store for observation before being shipped.

155. Does it heat?—Yes.

156. Does it sweat a little?—Natural sweat; but it is generally due to the climatic conditions that it heats to any great extent.

157. Do you handle any flax or tow?—There is not much shipped from this district—very little. That has always been regarded as being somewhat dangerous; but, as far as I am able to see, there has not been any direct evidence on the point.

158. It is very inflammable, but not so liable to spontaneous combustion?—Yes, I should think so. Of course, it is possible that if the wool had been properly surveyed before it left they might have been able to find signs of damp, still it is quite possible that the heat would not generate until it was confined on board.

159. Can you make any suggestion as to how the ships are to be protected?—No more than I think it is desirable we should have inspection before the wool is shipped. I think, in the light of what has occurred lately, it would be foolhardy not to do something of that sort. My opinion is that Lloyd's and the underwriters should bear their share of the cost of the inspection for their protection. They will probably recoup themselves in the rates.

160. Have you thought of any means that might be adopted for ascertaining the presence of moisture or heat in the wool?—No, I do not know that I can make any suggestion in that direction. I think it would be a matter for some man with more experience than I have had. It is not like grain, for you cannot run a trier through it.

161. We have had copper or steel wires in each bale which would conduct the heat from the centre where it is greatest to the exterior?—I do not know that there is any means of inserting anything like a thermometer.

The Chairman: That has been tried, and it is too expensive; in the first instance they break.

Captain Blackburne: Steel spikes would be troublesome.

162. *The Chairman.*] With seven thousand bales a day passing through a shed it would be impossible to do it?—I suppose, if a system of inspection of the bales was inaugurated, it would amount to opening up the side of the bale, and taking the temperature by the feel to the hand.

163. *Captain Blackburne.*] They would probably pass over big lines and brands which they knew to be good-conditioned, and test those they considered to be doubtful?—I should be most suspicious of bales of locks and pieces. It is very rarely that growers will ship locks—they are generally kept here; but you will find in the Home catalogues that clips are sent Home in their entirety.

164. Should they be prohibited?—Yes; it would certainly remove one source of danger. There would not be any hardship to the grower. He would lose nothing by it, for it would be better to have them scoured first.

WILLIAM HASSALL sworn and examined. (No. 105.)

165. *The Chairman.*] What are you, Mr. Hassall?—I am head storeman for the Farmers' Co-operative Association.

166. You have had considerable experience of the handling and dumping of wool?—Yes, twenty-five years. I have been in the employ of the Farmers' Association for over twenty years.

167. What can you tell us as to the detection of damp or heating in wool?—Our wool is mostly sale wool. We do not dump wool. Nearly all the wool we deal with is opened up, and if there should be any not dry the buyers would not bid for it, so it is very rarely that we have anything of the kind. Occasionally we have had a bale of dirty locks, and when we opened it up it was warm in the middle. It was not, however, intended for shipment; it was bought by the scourers and scoured before shipment.

168. Have you ever seen it so hot that you could not touch it?—No, but we had to shoot one out on the floor last year. It is hard to say what it might have got to, but it was quite hot when we opened it up.

169. And it might have been worse if dumped?—Yes, but it was not intended for shipment.

170. Would it be a hardship if the shipment of such as that class of wool was prohibited?—No. They would only be paying freight on dirt. I believe it is the slipe wool that wants looking after; it is the water in the grease that does the damage.

171. You think the small fellmongers are liable to pack that up before it is actually dry?—I have heard of that, but I have not seen it. I have heard of wool coming in and having to be sent back from the dumping-sheds to be dried.

172. Do you know anything about the system of liming, or the proportion of lime which the fellmongers put on the skins?—No. I do not think it is the natural wool that is dangerous, but that from the fellmongers. We have had a bale come in wet with rain—clean greasy wool—and we have dried it and it has been shipped, and there was never anything heard about it. Of course, it would not be wet into the centre of the bale.

173. Most of the wool that comes to your store is opened out. If greasy wet wool came to your store and remained there it might be sufficient to heat through?—If set on end I do not think it would, because it is not dumped. Nearly all the wool that is shipped by the buyers is examined. It is the outside wool that is most dangerous.

The Commission adjourned to Dunedin.

DUNEDIN, THURSDAY, 20TH SEPTEMBER, 1906.

The Commission sat in the Supreme Court, Dunedin, on Thursday, the 20th September, 1906, at 10.30 a.m.

ANDREW TODD sworn and examined. (No. 106.)

1. *The Chairman.*] What is your position, Mr. Todd?—Local manager of the New Zealand Loan and Mercantile Agency Company (Limited).

2. You have had considerable experience of wool?—I have been handling wool for the past twenty or twenty-five years.

3. You receive wool from the Company's clients for sale?—For sale and shipment.

4. Is it laid out in the stores?—That portion which is for sale is exhibited in the store. That portion which is for shipment goes down to Port Chalmers, and is dumped down there.

5. *Mr. Foster.*] You dump through John Mill and Co: they have the only dumping plant here?—Yes.

6. No dumping is done by the Harbour Board?—No.

7. You know the object of the Commission is to ascertain the cause of the recent fires on wool-ships, and we should like to hear what you can tell us?—I have read a great deal of the evidence which has been placed before you at the other centres, and I do not think I can throw any fresh light on the subject. I notice that in other places you put very pointed questions to some of the witnesses, and in some cases the replies would seem to indicate that the witnesses were in considerable doubt as to the effect of dumping wool and its probability to heat.

8. Have you had any experience of heating in wool?—I have seen heated wool.

9. Under what conditions and to what extent?—I have never seen wool in such a condition that you could say it had been charred. I have never seen charred wool, but I have seen wool which has been damaged in transit arrive wet and become heated to such an extent that we have had to open it out to prevent further damage.

10. Would you conclude that if it had not been opened out it would have heated to such an extent that it might have ignited?—One might imagine so. It is difficult, of course, to cause wool to flame by putting a light to it.

11. By that you mean that wool at its normal temperature will not readily flame if you put—for instance, a candle to it?—Yes.

12. But supposing you raise the temperature, would it continue to burn when you take the light away?—I am inclined to think it would. The normal temperature would not be very high.

13. Some people say wool will not burn. What I want to get at is the question of temperature of the wool, whether it will burn if you raise the temperature sufficiently?—I think it will burn if it gets sufficient heat, and it will cause great damage.

14. Put it this way: Supposing you put a handful of wool into an oven, not packed close together; raise it to a temperature of, say, four or five hundred degrees, then put a match to it, would it flare up and burn?—I am inclined to think it would.

15. So it is only a question of the temperature at the time you apply the light?—Yes.

16. Do you remember what was the description of the wool you saw heated?—I have seen several lines of heated wool, both low qualities and fleece, chiefly through damage in transit; rain having entered into the bales. If left alone it might cause trouble to the whole of the pile. If one wet bale was in the centre of a large number of bales it would heat right through, although possibly there was only one side wet originally. I am speaking, of course, of wool that has been dumped.

17. Supposing that wool which was wet in transit—damaged on the outside edge—would that be a greater danger when dumped?—It would depend upon how far the moisture had penetrated.

18. Would you suppose that heat set up in the bale when escaping would go to the weakest part of the bale?—Yes.

19. So that if the wet had not penetrated very deep the heat might escape at the side without serious trouble?—Yes.

20. And would you consider that unless it was great there would be no great risk in putting it aboard?—There would be no great risk.

21. You know the conditions on board ship, the bales being pressed and wrinkles left at the ends in the packing, would you think there would be a possibility of that heat escaping and the moisture evaporating and causing no damage? Supposing the wool to have been damped in transit—not saturated—these corrugations would allow a certain amount of air-space, if there was any heat or moisture might it not escape by those wrinkles, and thus not be a danger to the ship or the adjoining cargo?—I do not think it would. It would not be very serious. That is to say, moisture that might probably be on the pack I do not think would do any harm at all.

22. Have you noticed if there has been a larger quantity of low-quality wools being shipped last season than in previous years, such as locks and pieces?—I looked through my catalogues this morning, and I noticed that nearly all the locks that were sold were sold to New Zealand woollen-manufacturers or to fellmongers. As to pieces, a large quantity was sold to English and foreign buyers.

23. But would they buy as low quality as locks?—I do not think so. I specially looked that up, and could not find that any foreign buyer had bought any locks at all, not in my catalogues.

24. We understand that the local manufacturers and mills practically bought as much this season as previously?—Quite.

25. And owing to the higher prices, would the local mills be likely to go for the lower qualities?—They always have been strong-buyers of that particular class of wool.

26. Is it your opinion from what you have seen that there would be any greater danger of heating in the low qualities than in the higher qualities?—I should think so, decidedly.

27. Have you had much to do with the packing of skins? Have you any reason to believe that there would be any special danger through the shipping of sheep-skins?—I have always thought so.

28. Has anything come under your notice that would lead you to suppose, or confirm you in your opinion to that effect?—Well, there used to be here about fifteen or more fellmongers, whereas now there are only two or three, and they can only put through a small quantity; the consequence is that sheep-skins that were at one time treated locally are now dried in Dunedin and sold to buyers for shipment.

29. And do you then lose trace of them?—The skins are received green, but they are not offered until they are dry enough for auction, because we know that the shippers do not care to buy unless they are in a fair state for either finishing off or shipment.

30. Are they dried under the supervision of your men?—Yes.

31. Would you consider there would be any danger in sheep-skins if thoroughly dry?—Not if thoroughly dry; the difficulty is to get them thoroughly dry.

32. Would it be fair to assume that you have a doubt in your mind as to whether they are thoroughly dry and properly prepared?—When we offer skins we do not know who will buy them; we do not recognise in any way that they are not fit for shipment. If we choose we will put them up green. The shippers, however, prefer that we should not offer any skins until they are about ready for shipment.

33. Is there any inspection before shipment?—The buyer takes them away from our premises altogether.

34. Then you lose trace of them?—The usual thing is that the buyer takes them away and packs them himself.

35. Have you shipped sheep-skins?—Yes, for different clients.

36. Have you at any time discovered anything like damage by fire?—I recollect one instance in Wellington. We got an order for bare pelts from America, and after these pelts had been treated for about four or five weeks I gave instructions for them to be baled up. They were baled up and sent into our store, but just prior to shipment I happened to walk through the store and noticed a very peculiar odour, and I traced it to the bales. I ordered the storeman to cut them open, and I observed that they were almost red-hot. There were six or eight bales of them—shearlings.

37. *Captain Blackburne.*] Would it be dry hot weather when they were put up?—The weather had nothing to do with the heating—it was inherent moisture in the skins.

38. Not fat?—No, very little fat on them. The real reason was that they had been painted with some mixture to prevent the intrusion of vermin.

39. *Mr. Foster.*] It was arsenic, was it not?—Yes.

40. Would you be inclined to think that it would be due to the closeness of the, practically, green skins in contact?—I rather came to the conclusion that the less quantity of wool on the skins the longer it needed to dry the pelt, as there would be no air-space at all.

41. Have you ever had any fellmongers' wool to ship from here?—Yes.

42. Have you had any of that returned from port for reconditioning owing to its being damp?—I cannot recollect any. I do not see how they can discover it at the port.

43. Have you had any consignments in trouble in those steamers which have been on fire recently?—By last mail we received advice of wool that had been affected by fire, not actually damaged.

44. Did it bring fairly well up to its price?—It was reckoned slightly smoke-damaged.

45. Have you had any special reports from London as to the wool-fires?—No, just mentioning that they had occurred.

46. Have you in your correspondence asked any questions as to the facts they are possessed of or the conclusions they have drawn from information which is within their knowledge?—I have not done so yet. I ought to have advices from Home shortly.

47. I think it would be better for the business men to make inquiries, and it might lead to a means of preventing a recurrence?—It occurred to me that some very valuable evidence could be got in London, because, as you know, we never see the bales once they leave us or the condition in which they are when they reach Home; we do not see the effects of dumping unless some unfortunate vessel puts into our ports with a fire in her holds or has the misfortune to be shipwrecked. We have had shipwrecked wool on several occasions.

48. Did any of that wool come within your own observation?—Yes.

49. Did you see any of the wet bales?—Yes.

50. Were they dumped?—They had been dumped. Some were saturated with water, and some were very hot.

51. Would you think there would be sufficient moisture to prevent a very great excess of heat?—I think it seemed to get hotter every day.

52. Would you imagine that there might be a degree of water that would heat to a point of ignition, but less or more than that particular degree might be harmless or might delay the ignition-point indefinitely?—It might be so. We thought it might not take any harm.

53. It might delay the heat for a tremendously long time?—My idea is that the dumping is a safety-valve.

54. Yes, but what I mean is, supposing a bale dipped into water and then dumped, it would squeeze the water out to a certain extent. Would it be your impression that it would take longer to heat to the point of ignition than if merely dumped?—I think it would heat very rapidly if surrounded with other bales.

55. In the ship's hold, while the bales are touching at a point, still the corrugations in the ends of the bales will allow of air-space?—But occasionally you get flat sides alongside each other—the two sides are flat.

56. Still, there is an immense amount of air-space about them?—There is very little air in the hold.

Captain Blackburne: In the lower hold I do not think there would be any ventilation at all.

58. *Mr. Foster.*] I do not mean circulation, but still, for the purpose of giving off heat it does not matter whether the air is circulating or not?—Room for it to escape.

59. Yes, and, of course, it would be very rapidly detected outside the hold?—It has occurred to me that there might be some danger through the steel bands of the dumps rubbing against each other, especially in the case of where flax was dumped. The vibration of the ship—

60. It is one of the possibilities, but I think it is rather remote, for unless there is something to receive the heat they could not do much harm themselves; they are so thin themselves?—They could pass it very readily to tow.

61. Will tow heat rapidly? It is so porous, free to let off moisture and steam, and I should imagine it would not hold heat?—But a spark generated by the friction.

62. Have you thought of the movement of the steamer, and the consequent movement of the wool? It would be very slight; it could only create great heat if the pressure was very great; it would not be very hard rubbing?—If it started it would generate a great deal of heat through the steel bands.

63. We have evidence from practical men that it would not be so; still I do not think it should be overlooked?—I always thought that a source of very great danger.

64. *Captain Blackburne.*] Have you ever had any practical experience of wool heating to the point of ignition? Have you any records or authentic evidence from others who have seen it?—I have never seen wool on fire. I have heard of a wagon-load of wool being on fire, but it is so long ago that I cannot recall the circumstances. But I fancy that the fire I speak of was caused through the teamster carrying phosphorus.

JAMES ARMOUR JOHNSTONE sworn and examined. (No. 107.)

65. *The Chairman.*] What are you, Mr. Johnstone?—I am managing director of Wright, Stephenson, and Co. (Limited).

66. You have had some considerable experience in dealing with wool?—Over thirty years'.

67. And you have learned the object of the Commission—can you assist us in any way?—I think I could give my evidence in one sentence. I do not believe in the theory of spontaneous combustion of wool. In saying this I am speaking of the greasy wools grown in Otago. My experience does not extend to wools produced in other portions of the colony, nor to scoured or slipped Otago wools. During the whole of the time I have been connected with the business, I have never seen wool come into our store in such a condition as would in my opinion lead to its spontaneous combustion, except as the result of an accident—for instance, it might become wet in a coastal vessel, in a railway-truck, or on a carrier's wagon. In this case the damage would be noticed, and the wool would be reconditioned.

68. Those are extraneous causes?—I have never under any other circumstances seen wool in a condition to take fire in our stores.

69. Do you know of any cases of dampness through shearing wet sheep?—I have seen what was alleged to be dampness due to this cause, but it was so slight that though buyers might notice it and draw attention to the fact that it was cold and clammy to the touch, they would not let this affect their readiness to buy it.

70. Did they mark it as wet?—No, and never asked for any allowance either in weight or in money for reconditioning, or anything of that sort.

71. *Mr. Foster.*] You have seen wool come forward from stations cold and clammy?—Never in considerable quantity. I have seen an odd fleece in a bale.

72. Has such wool ever passed through to London and been sold?—Yes.

73. So that the conclusion you drew was that although the buyers described it as cold and clammy it was harmless?—Yes, quite.

74. You heard Mr. Todd's evidence?—Portion of it. I was not here during the whole of the time he was giving evidence.

75. Is there anything you wish to add to what you have already heard here or read?—No, a great deal of the evidence that has been given consists of the theories of witnesses as to what happens in a ship's hold, and I am not prepared to offer theories as to that.

76. You do not believe in theories at all?—To be of any value, the theories must be those of men who have studied the question in a scientific way; but I can only deal with the practical side of the matter.

77. Theory to the practical man you do not believe in?—No. One may imagine, or hold one's own opinion as to the causes operating to lead to combustion occurring in ship's holds; but when one begins to offer such opinion as theories having any serious value it becomes a different matter. There are many safeguards against wet wool being shipped. No station owner or manager would permit the sheep under his charge to be shorn with wet fleeces if he could help it, and both the shearers and the classer would refuse to handle sheep in such a condition. Then, if there were anything to suggest that the wool was wet, it would not be allowed to go on board ship without being properly examined. In my opinion the chances of wool being put on board so wet as to lead to fire are practically negligible, and the safeguards I have suggested seem to me to be those which must be relied upon entirely, for it is impracticable to examine every bale of wool.

78. *The Chairman.*] You think the very fact of inspection would be a deterrent against shipping or forwarding wool in such a condition that it might not be fit for shipment?—Yes.

JOHN ELLIOTT THOMSON sworn and examined. (No. 108.)

79. *The Chairman.*] What are you?—I am Inspector of Stock in Dunedin.

80. We understand you have had considerable experience in wool?—I have had over forty years' experience on stations and among sheep. I might say all my life, practically.

81. You know the object of the Commission, and we should be glad if you could give us some information with reference to the condition of wool which you have observed, and more particularly with regard to heating?—I wrote to Mr. Foster—

82. *Mr. Foster.*] Yes, I received a letter from you. Do you think you could put wool into such a condition that you could make it burn?—No, not the wool; but I think it will get so hot that it will make the bale round it take fire.

83. Do you think you could put it into such a condition that you could create a fire aboard ship?—Undoubtedly, I think so.

84. Have you had any experience that would lead you to that conclusion?—Only what I wrote to you about. I had some wool which had been in salt water, and it was so hot you could not touch it. I had it all scoured.

85. But you do not say what would have been the result if you had not done so?—Undoubtedly it would have set the whole bale on fire.

86. What leads you to suppose that?—The great heat.

87. What leads you to believe the heat would have risen much higher than it was?—Well, only imagination.

88. Have you had actual experience of that, such as to the point of ignition?—No.

89. Have you seen any at such a heat that it would scorch the floor?—I have never given it a chance.

90. While you believe wool will heat to the point of ignition, still you have had no actual experience of it?—No.

91. You mentioned in your letter that your experience was at Akitio?—Yes, that was the only occasion. We never shored wet sheep.

92. On that occasion was the damage in many bales?—No, only one, which dropped into the sea. We took it out at once; it was a hard-pressed bale of locks and pieces, and the water had only penetrated to the extent of about a foot.

93. Did the heat extend to the centre of the bale?—It seemed to go right through.

94. Would you assume that, although the water had not gone in very far it would have continued soaking in, and by the morning it would have been evenly distributed, and thus account for the heating being fairly even all through?—I think so.

95. Was the outside as hot as the centre?—It was so long ago that I cannot remember—it is over twenty-five years ago now. I think salt water is particularly dangerous in wool, but that, of course, is only theory again.

96. But most of us are theorists, I think. You got a circular from your Department in Wellington asking you for the constituents of the dips used in the district?—Yes.

97. What is the nature or names of the dips. Are they Cooper's, Macdougall's "Highland." Do you know the ingredients of the respective dips used?—No.

98. Did you get samples for the Department?—The circulars were sent to the officers outside, and they returned answers to the Department.

99. At the same time the Department was asked to send circulars to the Inspectors asking the nature of the chemicals used by the various fellmongers in the different districts?—I remember that. I think soda was the principal one.

100. Sulphide of sodium and lime?—Yes, I remember there were only four replies. There are not many fellmongers in Otago. I could get the replies for you. We have copies in the office.

101. Never mind, we shall receive them in Wellington. Has it ever occurred to you, or have you ever heard anything of the likelihood of fire originating from the chemicals used by the fellmongers?—Never heard a hint of such a thing, and do not think it possible.

102. Can you tell me the latest date at which dipping is done here?—April is the time, they must dip then.

103. So that the interval between April and shearing-time would be sufficient to get rid of any risk there might be in that direction?—There is no risk at all.

104. You have knowledge of the contents of the dips?—It is mostly carbolic and arsenic.

105. Do you know if any contain sulphur?—No.

106. What about Cooper's, is there any in it?—I do not know.

107. Even supposing there was sulphur, the interval between the dipping and shearing would be sufficient to get rid of any danger?—I used that for two or three years, and my wool never caught fire.

108. Practically no sulphur has been used since the scab scare, and it was lime and sulphur then?—Yes; some people still stick to it.

109. Who do?—The Rutherfords do, so I have been told.

110. They still use lime and sulphur?—So I have been told.

111. We will ask about that, because if there is any danger in dips I think it would be through lime and sulphur?—I have dipped with it for years, and have never had any trouble with it.

112. And there was no trouble in the scab time?—I have used it for years, and never had any trouble whatever.

WILLIAM HENRY HUTCHINSON CAREY sworn and examined. (No. 109.)

113. *The Chairman.*] What are you?—I used to work in a fellmongery at one time, and we had the old way of treating the wool. We used to sweat the skins, but before we sweat them we had to soak them for two or three days in the river, and then we took them out and drained them and hung them in the sweat-house, and in the course of three or four days they got quite hot, and the wool came off. Sometimes in the winter they would take longer.

114. About what time?—Perhaps a week in the winter, for the ice would be very thick on the sweat-house; but they could be drained for three or four days and then hung on some hooks about 2 in. apart, and the skin rolled up. If you did not watch them in the summer-time they would get black and drop, and you could hardly handle them at all, and you would have to take them out to keep them from getting too hot. They were then sweated after being pulled. I have seen also in the locks and pieces in the fellmongery, when I have been taking the good wool from the bad, it has been so hot that I could not put my hand near it.

115. Would there be any quantity of it together?—There would be a quantity together, and it would be placed outside on the green, and I have gone to take the dirt away from the wool and it was so hot that I could not handle it. I have not seen that with first-class wool. There are other things I have seen. In packing all the wool was scoured and the yolk taken out, and this was kept for the packing; but that yolk was not out so well and held the water that was kept inside, but the wool that was scoured was kept to finish the bale off.

116. How did they begin at the other end of the bale?—Always put a bit in at the other end of the bale before we started, and that was what I was told to do. With regard to fern-stained wool—people call it tutu, but it is not tutu—it is a sort of floss, and you will not get it out of the wool without scouring. It is when they burn the run off and the young fern grows up again, and the sheep get amongst it, the wool is fern-stained, and I consider it is dangerous.

117. Why?—Because it retains this moss or fern. I do not think if wool is well scoured and all the yolk taken out that it will burn; the wool itself will not burn, it is the material in the wool. As for the drying of slipe wool, I have seen it and packed it, but with regard to the drying of slipe wool, I think you might just as well try and dry a piece of fat before the fire.

118. *Mr. Foster.*] You cannot dry it?—I have not seen it properly dry.

119. *The Chairman.*] Are you talking about slipe wool sun-dried?—Yes, I know nothing about the machine.

120. You do not think it is possible to dry slipe wool?—No. You put it on the ground, and the sun draws the damp in, and if it is on gravel you will find it quite damp.

121. But they would not leave that out when the sun goes down?—They take it in before the sun goes down, and you will find when you lift the sheet away that the gravel is wet.

122. That is not getting in the wool in any way; that is simply the sheet which is preventing the radiation from the ground, and therefore the cold ground will condense any moisture that lies between the sheet and the ground?—Yes. You put your sheet down quite dry, but the moisture might be the cause of that.

123. If you had left the sheet there without any wool at all?—The sheet would be dry.

124. You would certainly find not so much, because you had a little covering, but you would find some moisture?—Yes. I have really never seen slipe wool in the sun properly dried, and I have seen it out for a fortnight.

125. Do you say that under the ordinary conditions under which they pack it up there is likely to be any danger?—Yes, I really think there is a danger with slipe wool.

126. That it will heat afterwards?—Yes, that is my experience—I really believe it would. It is wool that I have never seen thoroughly dry in the centre at the places I worked, and I was with one man three years. There is another thing in regard to the scouring of wool: some of them cold-water-wash the wool; they sweat the skin, and put it into the vats and soak it.

127. Is not that soaked in warm water?—No; in one place I was at they soaked it in cold water. They put in ammonia with the water first, and soaked the wool and took it out next morning and washed it to get a good colour in the wool, but you never get the yolk out. It looked very well, and was shipped Home.

128. It weighed well?—Yes, it always weighed well; that was the idea of getting the colour and keeping it wet.

129. *Mr. Foster.*] Do you mean that the wool is put into the cold-water wash after it is taken off the skins?—Yes.

130. Can you tell us any cases within your knowledge where that is done?—I do not know Dunedin: I worked at Kaikorai at Barron and Co.'s, where they did it.

131. You know no one here that does it?—No. It was the practice there to do it—just take the wool off the skins and soak it.

132. Do you think that is being carried out now anywhere?—I do not know. I do not know what the small people do in the back country.

133. But in that case it would be cold-washed slipe?—They call it washed wool, not slipe wool.

134. Slipe wool is slipe wool because it is sliped off?—Yes; it is taken off and sent away in the bales. As for the washing of it, they used to do a good deal of it at this place I was working at, and the wool turned out very well and looked well, but the weight was always in it.

135. Had you any long connection with that place?—No; it was not in existence, I suppose, above two years.

136. Did you ever hear of any trouble arising from that wool?—Never heard of any trouble.

137. Have cases come under your notice of trouble in connection with the slipe wool which you say will not dry?—I have always had the idea that slipe wool was dangerous.

138. Have you ever had any instances come under your notice where your opinion was verified?—No, never had one. Of course, there is a sort of fluff that comes off the wool as well as the skin, and they do not tease it out and dry it.

139. What comes off, I suppose, is what one might term "scurf"?—It is a sort of yolk or scurf. They never used to tease it out like they do scoured wool, and it was put on the sheets and knocked about a bit. I have never seen it properly dry. I worked in the ships in Port Chalmers in years gone by, and I saw in one boat one day wet greasy wool on board, and the water was running out of it. It was put on the top of the after hatch, and they left the hatches off and the wool had to be left to get dry. There was the "Bluejacket" which took fire.

140. Was it ever proved what was the origin of the fire on the "Bluejacket"?—I do not know. You would see bales of wool coming down in the early days in wagons, and it used to get wet, and the men would take the cover off and let the sun get to it. It will take a lot of water to get through to the wool, the packs shrink up and get tight. From what I have seen, I think it is a great deal to do with the neglect in packing that causes the trouble.

141. You mentioned the system of packing where higher-washed wool is put into the ends of the bales?—Yes, that was at the place I worked at.

142. What did you assume was the object of that packing—practically false packing?—Yes, practically.

143. Do you not consider the woolmen of the present day may have advanced in morals?—I should think so.

144. *The Chairman.*] If not in morals, have not the woolmen advanced in their inspection of the wool?—There is no doubt about that. Of course, they do not see all that is in a bale.

JAMES JOSEPH BEWLEY SWORN and examined. (No. 110.)

145. *The Chairman.*] What is your name?—James Joseph Bewley.

146. What are you?—I am a wool-classer.

147. You have had considerable experience?—Twenty or thirty years.

148. You know the object of the Commission?—Yes. I have been connected with fellmongeries, and I have been on stations for a good many years classing and scouring, and I may say I think the only evil with regard to wet wool firing on ships is the wet packing, so far as I have seen it. I noticed in Wellington that the witnesses were talking about microbes and bacteria which cause the wool to fire, but I do not think so. I have had large quantities of wool lying in wool-sheds—the locks, pieces, and bellies of the whole clip that have been put on one side for scouring, which was not done till the whole shearing was gone through.

149. And do you mean to say that you never saw that heat?—I have seen bales of locks and pieces, especially locks—I suppose 60 per cent.—and I have left it in the shed for six months, and when I have opened that wool to scour it there was not the least sign of heat in it—it was quite cool. It is a fallacy to suppose that because wool is dirty it will heat.

150. *Mr. Foster.*] It went into the wool-shed dry?—Yes. I have seen locks, especially after being scoured, heat in less than twenty-four hours.

151. Do you mean before you scoured it or after?—After.

152. After you take it out of the water you put it up in a heap?—Yes.

153. And you saw it heat then?—Yes.

154. After it has been saturated with water?—Yes.

155. And you mean, lying in a sodden heap as it is thrown out by the men, that that wool heats to that extent?—Yes, in less than twenty-four hours. There are various classes of wool, and merino will heat quicker than half-bred, and half-bred quicker than Lincoln and Leicester.

156. The coarser the wool the slower it will heat?—Yes, the merino would be the first to heat.

157. And that would be quicker than half-bred, and half-bred quicker than crossbred?—Yes. In fact, Lincoln and Leicester and those wools take some time to heat—there is no density in them—they are very coarse.

158. Can you give us any reason why the finer class of wool should heat quicker when it is wet?—Because it has more weight and lies closer together, and there are more felting properties in it.

159. Why should that add to its heating properties?—Because it draws it closer together—it is inclined to pull together—the nature of the merino wool does that.

160. Well, that is after it is out of the wash?—Yes.

161. Can you tell us anything about it after it is taken and dried on the sheets?—You can dry it thoroughly. I have never had any difficulty about getting it dry.

162. To distinguish from Mr. Carey, that was not all cold-water washed?—Oh, no; scoured it hot water. I have done sliped wool, too, in the fellmongeries. With the slipe wool the skins are sweated and the wool taken off, and it is usually dried on sheets. Some fellmongeries have lofts battened all over, and it dries much better there than on the grass; but in the summer-time I do not think there is any difficulty in drying it, but in the winter-time there is.

163. Mr. Carey said he never actually saw slipe wool dry—do you agree with him in that?—No, I do not. In the summer-time there is no difficulty. It always has a clammy feel because the grease is there: the dirt gets washed out but the grease does not. In fact, scoured wool has the same feeling if you do not scour the grease out of it, and it is very difficult to dry.

164. *The Chairman.*] Do you think there is any danger if the slipe wool is properly dry, as you say it can be dried, if it is packed honestly?—No, I do not think so; and I was in a fellmongery where we packed a great quantity of it.

165. Do you know the process of drying by machine?—I have seen it done in the factory.

166. Do you think there is any additional danger or any additional safety in doing it by machinery?—Well, you can get the wool completely dry.

167. It goes through a machine as we have seen it at a very high temperature?—Out of the scoured water?

168. No, when it has gone through the drying-machine. Now, is there likely to be any deception between the heat of it and the fact that the moisture has gone from it? If you take hold of the wool it is very warm, anything between 170° and 180°, and the men taking it out may consider it dry when it is hot—could the man be deceived?—Not in scoured wool. There is no difficulty in telling when scoured wool is dry—there is in greasy wool. I was in a very large fellmongery at Kaikorai, where we ran through a lot of wool every year—about two thousand bales—and I have seen this wool brought in from the sun shining on it and thrown into the bins quite warm, but we never heard of any fire breaking out.

169. But you never thought it was so warm as to be doubtful about it breaking out into fire?—No, not from the heat of the sun or the heat of the drying-machine. I think wool must have moisture to generate heat.

170. May it not have come through these drying-machines, which we are told and were shown will take only from forty to forty-five minutes—may it not have come through and be heated, and yet the wool be still damp?—Yes, of course. I was never in a factory working this wool. I have seen it dried and seen the machines at work. It is hot air, and the wool is always on the move.

171. There is no doubt it goes thoroughly through?—I have handled wool on these machines, and I have felt it when they were taking it off, and it seemed to me to be thoroughly dry. I think the whole evil is in the way the wool is packed. I can tell you of an instance you may like to know of. I was on a station for some years, and we had been shearing the day before—

172. In this instance you are giving, were you the wool-classer?—Yes, at the station.

173. And it would be for you to decide?—Yes. We had been shearing up to 11 o'clock that day, and during the previous night it rained very heavily, and the owner came to me and said, "I think those sheep are dry enough to shear."

174. Were those the sheep that were out the night before?—Yes.

175. He could not very well say that unless it was a very slight shower?—I was going to tell you. I said to him that I did not think the sheep would be fit to shear, and he said, "When the tussocks are dry the wool would be dry." These sheep were put into the shed, and I entered a protest against it, and the shearers shorn two sheep each.

176. You were the wool-classer, and you entered your protest. Who decided whether the sheep should be shorn?—The owner.

177. That must have been years ago?—Yes. After the shearers had shorn one or two sheep each they knocked off.

178. They put the shears down?—Yes.

179. Were the shearers in doubt themselves?—No, they were not in doubt at all—they started to satisfy the owner. They started and their trousers got very wet, and they knocked off.

180. Was there any threat thrown out to them?—No. I maintain the whole evil is the packing of the wool wet on the stations.

181. You say the whole evil arises from the packing of damp wool on the stations?—Yes. I do not see where it can get wet anywhere else.

182. Do you not know anything about transit on wagons, and trucks, and small steamers?—That is true, but I have had wool standing in the open alongside scouring works—standing on end for two or three weeks, and the wet would never go through the wool, and it would be perfectly cool.

183. Do you wish us to assume that if it is left long enough it would heat?—Yes, it is a question of time. There could be a certain amount of dampness in wool and it will not heat—there may not be sufficient moisture. It was only last year that I was out on a station, and it was a very wet season, and I have noticed that it was during this very wet season that these fires broke out in the wool.

184. *Mr. Foster.*] What do you mean by a wet season—when was it last season?—It was constantly raining through the shearing.

185. What months have you in your mind?—November, December, and January.

186. The ships that loaded here and took fire were in March, April, and May, so that apparently the wet season was not the cause in those cases?—It was a wet season right up to the end of the shearing. I have seen us stop a week in shearing the sheep on account of the wet, and perhaps we would not get far on when the wet would come again, and a place that should have been shorn out in about a fortnight I have known to take a month. To show you how quick wool will heat, there were twenty or thirty fleeces lying over the floor in one shed, and I rolled them up to put them outside when the dry weather came, and I put them in a small corner, and in a week that wool was quite hot—right from the centre it started to get hot. It will heat quickly if there is a sign of moisture in it. I remember a wool-shed very nearly being burned down through having a bale hung up against the wall. The dags had been thrown into this bale, and the wool got so hot that it burnt the side of this bale, and it was put out.

187. *The Chairman.*] The wool got so hot that it set fire to the shed?—To the bale first.

188. Did the bale burn—the woolpack?—Yes, it burned through the woolpack and caught the boards. Of course, that was very wet stuff.

189. *Mr. Foster.*] And how long had that lain in that condition?—It might have been there for four or five days.

190. And did you notice whether it was very wet or slightly wet?—This was very wet, and it was the trimmings off the ends of the fleeces, dags, &c.

191. There was probably a certain amount of urine with it?—Yes.

192. And foreign matter in the shape of vegetable matter?—Yes.

193. And would you understand that that would be more dangerous than other classes of wool, such as fleeces, for instance?—Oh, yes; no doubt about it. I think if wool is packed very hard in a bale, if it is pressed, and there is sufficient moisture to make it heat, it takes some time to work its way out after it has got heated; and it is only when it comes to the bale that it causes mischief, because I am certain you could put a big heap of wool on an iron floor and let it get so hot that it would be thoroughly black, but it would not blaze.

194. Supposing slipe wool in that condition, with the woolpack on top of it, would the heat ignite the woolpack?—Of course, I never tried that, but I think it would get sufficiently hot, at any rate. In this instance, with the bale up against the wall, it got sufficiently hot to set fire to the shed.

195. Well, what would you say is that whilst, in your opinion, wool will not flame, it might get so hot as to cause the woolpack to flame?—Yes, there is no doubt about that.

196. A good many people have doubts even about that?—I am positive about this, that if a lot of wool was in the bottom of an iron vessel going Home it would not injure the vessel without some inflammable material coming in contact with it. If wet wool is packed into a vessel and it works through and gets to the bales, that is where the mischief is. I have seen men knocking off shearing when there has not been a drop of rain for a week. I remember in the Pareora shed, near Timaru, an instance occurred. Sheep sweat very much if they are in a shed all night, and these sheep were very fat, and we started shearing them in the morning, and the shearers knocked off and said the sheep were wet, and when the fleeces came off you could sweep the sweat off with your hand; but I do not know whether that would hurt the wool, and we did not shear them.

197. *The Chairman.*] Did you say that was fine weather?—Yes; we had not had a drop of wet weather for a week.

198. Did the sheep come in perfectly dry?—Yes, perfectly dry.

199. And then these sheep condensed the atmosphere in the shed?—Yes.

200. Was the shed full up?—Yes.

201. *Mr. Foster.*] And that would be under an iron roof?—Yes. The old way of dealing with them years ago in Spain was by sweating the sheep and pulling the wool off.

THOMAS OWEN PRICE sworn and examined. (No. 111.)

202. *The Chairman.*] What is your name?—Thomas Owen Price.

203. What are you?—I am manager of the firm of J. W. Swift and Co.

204. The Commission understands that you have had some considerable experience with wool, and we shall be very pleased if you could give us the benefit of your experience?—I have only just returned from Home, arriving in Dunedin this morning, and I am afraid my remarks will be prejudiced to some extent, because, unfortunately, I was on the spot in London when the stuff arrived. It was a very large question in London at that time in regard to settlements with the underwriters, and I shall be very glad to answer any questions.

205. *Mr. Foster.*] As you were at Home at the time you, no doubt, took considerable interest in any investigation. Do you know whether there was any keen inquiry made into the way the wool arrived Home?—Yes, more particularly by the underwriters. I think, for the rest, it was quite obvious to any one and every one who saw the wool, because many thousands of bales were put up for sale at the July auctions and created a very large amount of attention, and there is no question about the damage—that was quite obvious.

206. But, with regard to the nature of that damage, when you spoke of a large number of bales, I assume that the damage was mainly in the direction of smoke-damaged or water-damaged, not by fire?—Yes, and there was also a good deal of charred wool. In a good many instances the packs were badly burned.

207. Were there any bales that came under your notice in which it might be assumed the fire originated—that is, burned in the centre and not come to the outside of the pack?—Personally I did not notice any wool where that could have been judged. As far as my recollection goes, most of the damage was caused where the bales had stood adjacent to some fire in the hold. That, I think, caused the charring of the bales more than the ignition from the centre of the bales,

208. Would you understand that the fire must have originated in some of the other bales of wool?—I should say it originated in some few bales of wool that were badly damaged, and which were not exposed for sale, and those that were offered for sale were only partly damaged.

209. What was the impression at Home: that spontaneous combustion had originated in one or more bales?—That was the general opinion.

210. But you saw no bales that you could say positively it was caused through?—That is so. I did not see any bales of wool which seemed to show unmistakable proof of this spontaneous combustion. That was the term used by nearly every one in London when discussing this matter. They said it must have been due to spontaneous combustion.

211. Do you know the nature of the inquiry that was held at Home?—No.

212. Do they take evidence or merely trust to what they see?—I think they would take the evidence of those connected with the ships on the voyage Home. I do not think it was anything in the nature of an inquiry such as this.

213. Do you think those who made the examinations at Home would have the marks and numbers of those bales which originated the fire, and which were not entirely destroyed?—I think it is very likely.

214. Have you formed any opinion yourself as to what caused the spontaneous combustion?—I take the view which seems to have been generally expressed, that the fires may have been caused by damp wool—wool shipped in a damp state, and particularly slipe wools. I once had an experience of that kind about seven or eight years ago, and, curiously enough, by the "Gothic." We were shipping about thirty bales of fellmongered slipe, and this wool was stowed in John Mill and Co.'s shed, waiting for the boat to come in for perhaps three weeks, and it was dumped and went on board. Well, in the course of being stowed it was found that the wool was uncomfortably warm, and attention was called to it, when it was found to be hot. I think I was at once advised about it, and we had to draw the consignor's attention to the wool, and it had to be brought up and reconditioned. That is the only instance I have had in all my experience of wool which had to be rehandled because it was too hot to be shipped with safety.

215. *Mr. Foster.*] It has been stated in evidence that slipe wool cannot be perfectly dried—is that your impression?—No; I should say that with reasonable care slipe wool could be properly dried.

216. Have you ever had brought under your notice any cases of excessive heat in low-quality wool?—Greasy wool?

217. Any wool?—Yes; I had one case of greasy wool—a clip which we bought in the Hawke's Bay District. It was apparently shorn wet, and when it came to the port it was dumped. I am not sure whether it was not dumped on the station, but, at any rate, we usually inspect our private purchases before shipment, and on this occasion we found some wool that seemed to be dry, and we made an examination and found some of the wool very hot. We rejected it, and the owner of it had to have it redried, which put him to considerable expense. I know that every bale of that wool was turned out and dried on sheets. In our opinion the wool was too hot to be shipped with safety.

218. And have you any idea as to how long that wool may have been in the bales?—Certainly not more than a month.

219. That was greasy wool?—Yes.

220. Was that put up in a fair way as regards classification?—Just in the ordinary way—in the manner which had been customary on the station for a great number of years previously.

221. A good big clip?—Yes, a clip of 350 bales.

222. Cases have been referred to in regard to farmers' clips where the whole thing has been put in. In many cases it has been said they roll up everything?—Well, that is so.

223. That was not one of those cases—it was all clean wool?—This was a clip which was usually very well skirted?—possibly 10 per cent. of skirts.

224. A witness referred to a method of packing wool that obtained some years ago in regard to scoured wool: they reserved some really well-scoured stuff, and some of it was put in the bottom of the bale before packing, and then a lower quality in the centre, and better again on the top. What would you assume would be the reason of that?—Fraud, I should imagine.

225. You would not say it would be for the safety of packing?—Highly improbable.

226. The witness thought that they had improved in their methods since?—I should think so.

227. Have you any knowledge of the stowing of wool on the ships?—No, none whatever.

228. You attend all the local sales of any importance?—Yes.

229. Have you come across any parcels of wool which you valued and passed over as being damp?—Yes.

230. In such cases did you merely pass them over or value them?—Generally note in the catalogue that they are wet.

231. Do you happen to know of any such wool being packed up and shipped straight away without drying them?—No, sir.

232. Have you had any of your wool in trouble in any of these ships?—Yes, principally scoured, and it suffered more from damage by smoke and water—some few cases.

233. Water put in to subdue the fire?—Yes, and the Clayton fire-extinguisher did a considerable amount of damage to the wool in this way. It probably may have extinguished the fire, but it damaged the wool because it discoloured it—stained it pink and yellow.

234. Is it your opinion that that process of fire-extinguishing may prove injurious to the wool?—I think you have got to decide that on the question as to whether it is able to deal with the fire successfully.

235. *The Chairman.*] You mean preserve life?—Yes, preserve life or preserve property. I think it has a tendency to discolour the wool, and that was the general impression among underwriters.

236. *Mr. Foster.*] Do you know there has been a parcel of wool rejected by the American buyers, and sent back to London because of the fumes from this extinguisher?—I saw it in the newspaper, but the actual facts were not known to me when at Home.

237. It would not surprise you if it did?—Not in the least.

238. Your firm has a very large export of wool from here, and do you think it would be a step in the right direction to renew the inspection by the underwriters' surveyor that existed a year or two ago?—Yes; I say that the inspection cannot be too rigorous.

239. You would realise that it would be impossible to have such an examination that would absolutely detect every bale?—Yes, I think it would be impossible.

240. Notwithstanding that, you think inspection would be a step in the right direction?—Yes, I do.

241. As it is a matter of expense, would you think it reasonable that the expense of that inspection should be borne by the owner of the wool?—Speaking for my own firm, I feel sure of this, that we should be most willing to pay a small charge—a reasonable charge—for such inspection.

242. Say, 2d. or 3d. a bale?—Yes, we should be quite willing to pay that.

243. You see, 2d. or 3d. a bale on the whole export of wool from the colony would supply a large amount to cover the expense, and it would not be heavy on the owners of the wool?—Yes.

244. You, I suppose, would probably put yourself in this position: that if there is this risk, I shall either have to pay it per bale, or, indirectly, per insurance?—Yes.

245. The insurer has to pay it?—I think so. It is a protection we have to provide in the interests of our clients if we can possibly do it.

246. As an exporter, you would not think it at all a harsh measure or a restrictive measure of trade to appoint inspectors to all main ports, and give them also wide powers as to deciding whether wool is fit or not?—Yes.

247. And also with powers to prosecute owners of wet wool—that is to say, if it can be proved that they packed wilfully wet, a severe punishment; and if negligence, it probably could be met by a fine, or something in a less degree. You would not think that a hardship?—Not at all, sir. We should look upon it as a distinct advantage.

248. Do you think it would be a deterrent?—Yes, I think it would be. It certainly would be a check against carelessness.

249. And craft?—Yes, craft and ignorance.

250. *The Chairman.*] In the case of that American wool being sent back, it seemed to me when I read it that there was something wanting in the cablegram in this respect: that they bought that wool as having been on a ship that had been on fire, and on which a certain appliance had been used to put the fire out. What remedy could they possibly have against the vendor?—I do not know whether that wool was bought out-and-out or whether it was on consignment, or whether it was bought by the representative of some of those American firms.

251. Is it not more likely that this wool was sold under a representation or under circumstances which did not explain that it had been wool taken out of a burnt ship?—Probably it was wool that had been specially graded for the American market in New Zealand.

252. And the fact had not been disclosed that it was on board a ship which had been on fire?—That would arise afterwards.

253. *Mr. Foster.*] You mean the sale was probably made in New Zealand?—Yes, during the period of our wool-sales in November, December, and January for delivery in America, say, in May or June, and in that case, of course, the damage was a contingency that was not looked for. The damage occurred, and it was a circumstance over which the shipper of the wool had no control.

254. *The Chairman.*] The purchaser could not accept it as he thought fit?—No, hardly that.

255. *Mr. Foster.*] You mean this, that it may have been a sale made for delivery in America?—Yes.

256. In which case the buyer would only take possession of what he bought?—Yes. I can quite understand an American firm sending it back, because the handling is done by dealers in America who require a very showy article. If they have an unsightly article they are bound to make a certain loss, because they cannot get the intrinsic value for it in America, whereas in London they can.

257. Do you know of any such contracts being made in America for delivery there?—Yes, for delivery there to arrive in April, May, June, or July.

NORMAN SMITH sworn and examined. (No. 112.)

258. *The Chairman.*] What is your name?—Norman Smith.

259. And your position?—I am a wool-buyer for White and Co. (Limited).

260. We understand you have had considerable experience in this business?—Yes.

261. You probably know the object of the Commission, and you might give us in your own words the benefit of your experience?—Yes—that is, with regard to the probability of damp wool catching fire?

262. Yes?—Well, of course, I have had very little experience with damp wool. My experience extends to station-work, classing on stations, and also reclassing for the market for English buyers—for Mr. Walter Hill and Swift and Co. There is only one instance I can remember of wool coming to hand warm, and that was when I was with Mr. Hill. I noticed in opening the fleeces that the oddments, which are generally called dags, had been left on, and with ewe sheep the hind quarters are generally wet. When the wool came into my hands and the fleeces were opened out I noticed inside the fleece was quite warm, and that had been caused by these wet oddments and dags being rolled inside the fleece whilst wet. Well, I had to go through that bale and take

all the oddments off. Of course, on the stations I know there is a lot of damp wool packed. It has been a strong point of argument between shearers and station-managers as to when the wool is wet or otherwise. That is only a matter of opinion, because the grease in the wool will absorb a great quantity of moisture—in fact, it will absorb twice its own weight. Of course, the trouble is, when is the wool wet? Some farmers send clips into town and they say, "I have shorn these sheep and I consider the wool is dry." Some shearers will shear sheep whether they are wet or not, but the majority of shearers will not shear what they consider to be wet sheep. When wet wool comes in to us we can notice it at once, but wool that has been slightly damp bears a very rusty appearance—a brown colour—when it has been in the bale for a good length of time—say, six weeks—and this deteriorates the wool to a certain extent, because the brown colour will not wash white.

263. Have you found any of this heated?—Yes, I have found it just sensibly warm, but it had not been in the bales for a great length of time, the brown colour not being then apparent.

264. What do you call a great length of time?—It had been in the bales for three weeks.

265. That is a considerable time, is it not?—But moisture will stay in the yolk of the wool for a considerable time, because it does not evaporate very quickly.

266. *Mr. Foster.*] What amount of moisture do you say wool will absorb?—Twice the weight of the yolk in the wool. There is moisture in the wool and also in the yolk.

267. What proportion of the wool would the yolk represent?—It depends on the quality. In the low-quality wools there is a great deal more than in the better-class wool.

268. Under all conditions?—Yes, that is so. In buying wool, the English buyers go by the yield.

269. What you mean, I suppose, is that the pieces have more grease than the fleeces?—Yes, that is so. The pieces have been known to lose 70 per cent., and that 70 per cent. would be two-thirds grease and the rest dirt.

270. Would the crossbreds lose 70 per cent.?—The crossbred pieces would.

271. What would you assume that greasy merino loses in greasy pieces?—Almost the same. Crossbred pieces have to be very small and dirty to lose 75 per cent. I am speaking of the lowest of them.

272. That would not be all grease?—No, a portion dirt.

273. When you say wool will absorb twice its own weight, I suppose you could leave it in water and it will absorb twice its own weight, but it will not take it from the air?—No, it will not take it from the air—you must soak it.

274. You mean wool will hold an enormous quantity of water, the same as a sponge will?—Yes, and immediately you get over that proportion the water will drain off.

275. What proportion of moisture do you think wool will naturally hold?—I have not gone into that subject. I have got my information from Dr. Bowman's book, the leading authority on the chemistry of wool, and it is a very hard thing to gauge, because it all depends on one's touch, some people having a more sensitive touch than others.

276. What proportion of moisture do you think wool would absorb from the atmosphere, in addition to its natural moisture?—That is another point which is very hard to gauge. I could not tell you with any accuracy, because it would vary according to the amount of yolk there was in each sample of wool.

277. Have you had much to do with the slipping process of wool?—No, never—only greasy wool.

278. Have you been receiving much wool from the country?—Yes; I usually receive every year up to three thousand bales.

279. Have you had much trouble from the wetting of wool in transit?—No. Well, we have had one or two cases where wool has got wet through the covers on the trucks not being put on properly and they have held water, and instead of it running off it has run between the bales, and we have had to take these bales out and fix them. Sometimes the wind will detach the covers and let the water down, and possibly it is twelve hours before the bales are taken out of the trucks, and the water has then had time to soak in.

280. In cases where the water has leaked through the cover, have you found it go in to any great depth?—Yes; I have seen it in one instance go in half a fleece, which would be 7 in.

281. Have you found any of that which was wet heated?—No, the water was not in long enough. My opinion is that water must be in the wool a certain length of time—it must be in twenty-four hours, in my opinion, before heating, depending again on the quality of the wool and the amount of yolk and vegetable matter contained therein.

282. Would it be possible for the wool to lay, as it did in one case, in the docks for hours without heating?—Yes.

283. What proportion of moisture do you think it would have to contain before the fire was long delayed?—The wool must have been just sensibly damp to lie that length of time. I had one experience when serving my apprenticeship in Bradford, when the old "Matatau" went down about Magellan Straits, and my employer, Mr. Smith, bought about two hundred bales of damaged wool. I sorted a certain amount of that wool, but I did not notice any heat.

284. Was it then wet?—It was not wet when we got it.

285. Had they unpacked it to dry it?—They had not apparently unpacked it. The fleeces seemed to dry themselves.

286. They were dumped bales?—Yes.

287. Would you imagine the water had penetrated very far?—No, it had not penetrated very far, but the damaged appearance was there—the brown colour aforementioned.

288. And did the damage go right through?—No, only on the outside of the fleeces; but there was no heat when we got to the centre of the bale.

289. Then to what would you attribute that?—I puzzled over that at the time, because wool with a certain amount of moisture is heated very rapidly. For instance, a pack of dags left on the floor for twenty-four hours would become so hot that you could not put your hand in.

290. Would you assume that the water getting in on the outside might get out the same way?—It might evaporate.

291. The water only having got in three or four inches, any water that might have penetrated would have got out very easily?—Yes.

292. If that is the case, would you not also assume that superficial damage on trucks would have no effect—slight wetting?—It might have. We have had no actual experience of it getting warm, but we have taken care to get it out of the bales and dry it, principally on account of the damage to the wool if left undried, and on account of the shipping companies refusing damaged bales.

293. Here is the case of the "Matatua," and the water in transit would not get in deeper—do you think there would be more water get in than in the ordinary case?—No, it has not come under my observation.

294. Some witnesses have said that wool is taken on board ships in very wet weather?—Yes.

295. Would you assume that getting it down from the wool-stores would be a detriment to it or risk?—No, I do not think it would be—that is, if it was taken on the ship and not left on the wharf. Some of the wharves hold pools of water, and if left there the wool would absorb the water quickly.

296. *Captain Blackburne.*] It has been said that fine merino is more liable to heat than coarser wool?—I have not had any experience of fine merino in a damp condition. My information is that wool with vegetable matter in it heats quicker than anything else, because it sets up a chemical action; but wool with the ordinary grease in it will not heat so readily.

297. More especially if it is wet?—Yes.

HENRY LAWRENCE KEENAN SWORN and examined. (No. 113.)

298. *The Chairman.*] What is your name?—Henry Lawrence Keenan.

299. What are you?—I am storeman for Dalgety and Co.

300. You have had considerable experience in dealing with wool?—Yes, we receive a good amount of wool in a year.

301. You no doubt know the objects of the Commission, and can you give us some of your experience in reference to this wool, especially as regards dampness and heating?—As far as we are concerned we are only sellers and brokers, and should a line of a hundred or five hundred bales come in we only open half to see it.

302. And before you open it out do you not observe any wet bales—or should you observe any wet bales, what do you do?—If there should happen to be any wet we open them out and let them dry. The only wet ones we know of are those that get wet in trucks.

303. If you found any that got wetter than that, would you adopt any other course?—Yes, open them out on the floor to dry.

304. And you would instruct the owners?—Yes.

305. Have you ever sent them back for reconditioning?—No.

306. *Mr. Foster.*] What is the special nature of your business here—it is a town store?—Yes.

307. No shipping?—Very rare.

308. You receive wool for local sales or something similar?—Yes.

309. It was said that last season was a very wet season: did you notice the wool coming forward in a damper condition?—No.

310. Did you happen to notice any larger proportion of locks and pieces not scoured?—Most of them were scoured here.

311. You do not think there was a larger quantity of locks and pieces shipped last year than in previous years?—No.

312. Has anything come under your notice in the way of heating of wool?—I have seen a few lots heated when the "Strathgryfe" fire occurred.

313. Did you see that wool?—Yes.

314. Handle it?—Yes, sold some of it.

315. Some of it was burned?—Only the outside of the woolpacks.

316. Was any of the wool that you saw burned in the inside of the bale?—No, not that I can remember.

317. Then from what you saw you would assume that whatever caused the fire it was from an outside cause?—Yes, from what I know.

318. Were they dumped bales?—Yes, in every case.

319. Did you happen to know of any being left at the port and not discharged?—Not that I know of.

320. You did not hear whether there was any cause that pointed to spontaneous combustion—that is, firing from the inside of the bales?—Not that I know of.

321. You receive sheep-skins?—Yes.

322. Do you receive them dry?—Yes.

323. Dry them and offer them for sale?—Yes.

324. Do you make them as dry as station skins?—We do the best we can.

325. Do you leave the ears and shank-pieces on?—No; cut the ears and shank-pieces off.

326. Do you cut the butt of the neck away?—Yes, cut it across the neck.

327. So that you do take off a certain amount of wool with it?—Yes.

328. Do you consider there would be any danger if the butts were left on?—It would not do so much.
329. And if it did not dry would it be dangerous?—Yes, possibly.
330. Do you notice much damp with these skins?—No, very little.
331. Have you ever had experience of skins heating in your store?—No, sir.
332. If you happened to throw a green skin down, it would sweat?—Yes, it would sweat.
333. Do you handle flax in your store?—No.
334. Do you handle rabbit-skins?—Yes.
335. Have you ever known of a case of rabbit-skins heating?—No.
336. How do they come forward to you—in packs?—In bales and packs.
337. Evidence was given in one case that rabbit-skins have been known to heat—you have not seen it?—No.
338. And you have not heard of it?—No.

CHRISTIAN EUGENE REMSHARDT SWORN and examined. (No. 114.)

339. *The Chairman.*] What is your name?—Christian Eugene Remshardt.
340. And your occupation?—I am an exporter of wool and skins, &c.
341. You have had considerable experience?—Yes, I have had a long experience of shipping.
342. We shall be glad if you will give us some results of your experience in regard to the heating of wool or skins?—I have never had any cases of my own wool heating to any extent. I have seen rabbit-skins heated just lately.
343. What were the facts of that case?—There was one bale very wet going down to the port in the "Thomas and Henry," which is a lighter, and, of course, the captain would not accept the bale, so it had to go back again to Dalgety's store. I think it was two days after that when I inspected it, and you could put your hand inside, but it was not comfortable—it was uncomfortably hot. I was surprised myself at rabbit-skins heating like that.
344. *Mr. Foster.*] Would that be through their being insufficiently dry?—No, owing to their having been soaked with water.
345. That is the same?—Only that they were more soaked than any one would pack them. The outside was quite soft.
346. Had the moisture got so far into the bale?—Yes, considerably; it must have been soaking for some time, I should think.
347. Do you dump your skins?—No, rabbit-skins are not dumped—they are hand-pressed.
348. But when they are put on board a ship, are they dumped?—No, never dumped.
349. I suppose you consider that dumping would spoil the skins?—Yes, exactly.
350. Make it crack?—Not that so much; it spoils the fur, and they stick together. I have seen them warm but not hot, except the bale mentioned above.
351. Have you had any experience or any education in the direction of the theory of heating of wool?—No, I have never studied the matter—just from experience.
352. The practical parts?—Yes. My own opinion is that it must be fellmongered wool that would heat to that extent and not catch fire. That is the only wool I have ever seen yellow from heat or warmth.
353. The fellmonger does not seem to have many friends?—I do not know how they do now, but they have artificial means of drying. Years ago it was very wet when put up in the sale-rooms. Only at times I noticed a few bales damp and odd ones wet.
354. Do you consider the artificial means are absolutely reliable?—Of course, I have had no experience of that, but I should think so—it is a matter of care.
355. Have you heard about the fires on the ships lately?—Yes, I have had some of my goods on them.
356. Have you formed any opinion as to what caused it?—The general opinion was that it was damp wool.
357. What was the nature of the damage to your own wool?—It was not wool—it was rabbit-skins.
358. Were they burned?—No, only the outside was blackened by smoke, and the skins lost more than the usual percentage of weight being in the same hold or near to it.

The Commission adjourned till next day, Friday, the 21st September, 1906, at 10.30 a.m.

DUNEDIN, FRIDAY, 21ST SEPTEMBER, 1906.

The Commission sat in the Supreme Court, Dunedin, on Friday, the 21st September, 1906, at 10.30 a.m.

WILLIAM THOMSON SWORN and examined. (No. 115.)

1. *The Chairman.*] You are a master mariner, and you are a marine surveyor?—Yes; I do very little surveying now—sometimes the survey of damaged cargo.
2. You have been surveyor for the underwriters?—Yes, for eighteen years I was surveyor to the underwriters.
3. In the course of your duties you had to examine large quantities of wool, and you exercised the power of preventing some of that wool going on board if not in a fit state for shipment?—Yes.
4. By reason of its being wet?—No power exactly to do that; but if wool was found to be wet it should be sent to be dried and reconditioned.

5. What would be done with it when you reported against it?—Sent to the fellmongers and opened out, dried, and repacked.

6. Would you do that of your own initiative, or would you report to the Underwriters' Association?—To the shippers. Sometimes it would be so trivial that the very fact of ripping the bales open would allow them to dry in the shed.

7. That would be in the case of slight damp through being wet in transit?—Yes; sometimes the wool would not be properly covered by the Railway.

8. Did you have any complaints to make of wool getting damaged by reason of defective tarpaulins?—In days gone by, but not during later times; they have been much better than they were some eighteen years ago.

9. Could you say if the wetting you refer to would be occasioned at the wayside stations?—Yes; I think at the flag stations.

10. Was it through the defects in the tarpaulins, or the faulty method of fixing them, or carelessness?—Not properly put on, not carefully covered. This is supposed to be done by the carters, and the probability is they did not cover them carefully. It might have been done on the road by wagons from the sheep-stations to the railway.

11. Have you had any experience of wool being heated when it was dumped?—Yes, I have seen it.

12. To any great extent?—I have never had any experience of ignition through spontaneous combustion or otherwise, not to my knowledge.

13. Do you consider, if it had been allowed to go away in the condition in which you saw it, that it would have heated to a point of ignition?—I do not think so. I carried wool from Brisbane in the fifties. In those days we could not get up to Brisbane, and had to lie at the mouth of the river, some twenty-three miles from the town, the wool being brought down by lighters. On one occasion I filled up the ship, and had one bale of wool which I could not get down below; I would not send it back, so I had it stowed in the booby hatch. We carried a good deal of water on deck, and one cask was in the hatchway. This odd bale of wool just fitted in the booby hatch on top of the cask, so I let it go on top of the water-cask, and carried it Home a voyage of a hundred and nineteen days. When I got to London I found that where the bale had touched the bung of the cask it was quite rotten with the moisture drawn up through the bung.

14. The wool had absorbed a certain amount of moisture through the cork, and had become damp?—Yes, and was rotten for a considerable distance into the wool, as far as I could put my hand into it, nearly right through.

15. Was it heated?—No, it was rotten. The bales were not all dumped in those days—it was quite a loose bale. Another experience I had might show that wool does not ignite spontaneously by the addition of water. I was running the old "Geelong" in 1859 on the coast, and at that time I carried a good deal of wool, and sometimes carried two tiers on deck with about 6 in. of dunnage beneath it on the deck. The water used to play on the deck around the bales, and they were all wet below the tarpaulins. In those days we had no wharf to go alongside, and had to dump the bales aboard the vessel, and when doing that we usually placed buckets beneath the press to catch the water which would be squeezed out of the bales in the dump. That would go Home in that condition, and we never heard of any fires.

16. Did you ever hear of the loss of any ships that could not be accounted for?—No, not going Home; we had some coming out, but not going Home.

17. Would that be greasy wool or scoured?—I could not pronounce on that. Perhaps more greasy than scoured.

18. Do you know anything about slipped wool?—Well, it is in my experience that the wool from the fellmonger gets heated, and you cannot say what caused the heat. Any inquiry I have made in that direction led me to think there must be something in the sulphide of sodium used for painting the skins. The sulphide of sodium might be absorbed by the wool, and if it was not washed out carefully the chemical action which might be set up might lead to spontaneous combustion; but I know nothing further of that except that I have found bales heated when put out at Wellington, having been found heated there. It did not appear to me in any one instance that there was any wet on the bales. They were opened at Wellington, and it could only be explained that it was fellmongers' wool.

19. *Mr. Foster.*] How long is it since your services were dispensed with as underwriters' surveyor?—June last year.

20. Can you tell us the arrangements that prevailed at this port for receiving, dumping, and shipping?—Now the stevedore people and the shipping companies have plants of their own, and receive the wool and dump it. John Mill and Co. have also stores in which they receive and dump the wool.

21. The shipping companies have dumps of their own?—Yes.

22. Did the same conditions prevail when you were surveying?—Yes, I had access to the places.

23. Have you seen vessels loaded here in wet weather?—No, I cannot say that I have, only passing showers, and then they put a tarpaulin over the hatch on a spar across the deck.

24. Would the hatchway be thus sufficiently protected?—Yes; they would roll the bales in under the sail spread over the hatch. There might be a little wet in coming from the sheds across the wharf.

25. When brought out of the shed are they left on the wharf at all?—I have seen them sometimes when they have not had room for them in the sheds having to wait on the wharf, but that would be before putting them in for dumping.

26. They would not be likely to be rolled out of the shed across the wharf, and pick up moisture from the wet wharf?—No, I have not noticed that.

27. You mentioned that you carried a great deal of wool along the coast on deck which took in sufficient moisture to run out when being pressed?—Yes.

28. Would you think that would be dangerous?—We did not know anything about it in those days.

29. Supposing the moisture to have penetrated to the centre of the bale, would it then be dangerous?—I do not think so in view of my experience of a hundred and nineteen days with a wet bale.

30. But that was at one particular point on the outside. Supposing the moisture had been in the centre of the bale instead of on the outside, would that cause heat?—I think that moisture got into the centre because it was rotten.

31. But then, one would assume that as that started from the outside it would allow of the moisture getting away. I do not think the position is quite the same. Supposing a fleece of wool to be saturated and placed in the centre of the bale, and the bale then dumped so as to prevent any escape of the moisture, do you think it would heat?—I think it would.

32. Have you come across any cases of heated wool at all in your experience?—Yes; except that it would be fellmongered wool I could not say where the heating came from.

33. Have you found heat in anything but fellmongered wool?—There may have been some cases. I have seen wool sent back to be reconditioned owing to its being heated a little.

34. If you had not discovered that, would the temperature have gone up very much?—If it had not been discovered I do not think it would have ignited.

35. Would that one bale be a fair criterion when I remind you that that moisture started from the outside, and although it may have heated there was opportunity for it to escape. That would account for the rotting?—Yes.

36. The rotting process was following the heating?—Yes.

37. As it was on the outside edge of the bale, would you imagine that the heat would get away as it rose?—No, it would have got a fresh supply of water all the time.

38. Only a gradual process as it was sucking it up?—It must have been a slow process.

39. If we have an amount of water withdrawn from the cask the water would not then have touched the bung?—The wool draws up moisture in a simple manner.

40. But if there was no actual contact between the bung and the water it could not take it up. What I want to ask is this: when once there was space between the water and the bung, it could then only take it through evaporation of the water, and that would be a small quantity?—Yes.

41. Have you thought whether a greater or lesser quantity of water in wool will tend to rapidity of heating?—I could not say that.

42. Do you still think that that would be a fair criterion of what might happen to damp wool?—Yes.

43. You consider that is the same condition practically as happened with your wool brought coastwise and wet on the outside?—Yes. In my opinion it requires some chemical action besides the water to cause spontaneous combustion.

44. Have you thought it possible for it to set up bacteriological action?—No.

45. Well, scientific men have told us that the process of heating brings into operation bacteria, which bacteria grow and intensify the heat?—I know nothing about that. It would make it rather warm for themselves.

The Chairman: But they like heat, and thrive on it.

46. *Mr. Foster.*] Did you notice the appearance of the wool you say was rotten?—Black.

47. Did it bear the appearance of a lump of pitch?—Just rubbish; not fluffy at all.

48. Did it look like a lump of cinder?—No, more like dirty waste.

49. What size of a hole would it have left?—Just about the size of my fist.

50. How far did the rot extend into the bale?—About the middle, perhaps further if I had tried to put my arm in.

51. Five or six inches?—Yes, the pack was rotten.

52. *Captain Blackburne.*] Did you test the wool at the stores by any instruments?—I have a barb that I can put into a bale and pull out a lump of wool from the centre, and by twisting it you will see if there is water in it by the little crystals.

53. *Mr. Foster.*] There would have been a good deal of moisture before it would show by that process?—Perhaps the wool may appear not wet, but if you twist a thread it will show little crystals which would indicate that there was moisture in the bale.

54. About three or four years ago there was a quantity of flax loaded on the "Ionic" which heated?—Yes, I remember hearing of that; it was loaded here. The centre of it was heated, and it was not detected.

55. Did you hear anything of its condition when it arrived in Wellington?—I heard that it had to be opened out, that is all I can say. I have opened out bales of flax and found them filled with rubbish. That would be condemned.

56. Have you seen any other cases of flax heating?—Just at the beginning of the business there was a good deal of that carried on; there might be rubbish in the centre.

57. Did you find any bales in a heated condition?—Yes, all were opened out and taken away.

58. Were they very hot?—No, not very hot. Just rubbish put in to make up weight.

59. You said you thought the danger of fellmongered wool would be caused by the sulphide of sodium. Have you thought of the properties of sulphide of sodium?—No; I could not pronounce on that. It is possible there might be something else along with the sulphide of sodium.

60. Do you know anything of the process?—To the extent that they paint the inside of the skins; that opens the pores of the skin so much that the wool is easily rubbed off. The wool will take up so much of that sulphide of sodium, and it should be scoured before it is put into a bale.

61. You think the chemicals—sulphide of sodium and lime—get into the wool itself?—Yes, I think the wool will take up a little of it.

62. Are you aware that sulphide, when it gets moist, will set fire to a sack or wood?—I could not say.

63. That is the case; but the process in use is that they take the fire out of the sodium by slaking it, and also lime when mixed with water has all the heat taken out of it. The general impression amongst scientific men is that there can be no danger in that?—Possibly, if it is properly gone through; but if there is carelessness in the matter then comes the danger, I should think. It is a matter of preparation.

64. Have you given any special consideration to the matter?—No, I have not. I have made all inquiries about it, although I have never had any experience such as you refer to. I think if it is not carefully washed out there may be danger.

65. That is why I ask you if you know the process?—Yes, I know the process.

66. Is there anything in your mind that might have contributed to the recent fires?—We had an incident up in Wellington where one of the stevedore's men lighted a match amongst the bales. That was on one of the Union Company's steamers.

67. Is there any control over the stevedore's men as to the use of matches?—It depends upon the officer of the hold, and his management. He should be the first man into the hold and the last man out.

68. Would you think it right if men engaged in the stowing of cargo were prohibited from taking their pipes and matches into the holds on any pretext whatever?—Yes.

69. Would it be possible to bring that about?—I think they could make an order to that effect. Put up a notice on the gangway.

70. Do you think men would feel very much hurt?—They might at the beginning, but it is only a matter of enforcing it.

71. As there is no regulation to that effect, do you think the ships are to blame?—In a measure, if proper care is not taken. I might say that I would stop a man smoking anywhere in the holds in my day.

72. Have you seen cases of men smoking in the holds?—No, I have never seen it.

73. You do not think it unreasonable, then, that men should be prevented from taking matches below with them?—I think it would be a very good rule, and should be enforced.

74. Some witnesses have expressed the opinion that there might be fire caused through the rubbing of bands one against the other, or against the stanchions of the vessel?—There would not be any friction.

75. Even if there was friction, do you think it would be possible to cause fire?—It might be possible to cause fire just as the Maoris rub two sticks together.

76. But, take the slow movement of a vessel?—No, the wool is too well jammed in for that.

77. Have you noticed in the holds of vessels whether the electric-light installation might be the cause of setting fire to the wool?—No.

78. Have you noticed any wires leading through cargo-spaces?—No.

79. Do you think it is likely to be a danger?—There are no open wires; they are all carried down in pipes.

JOHN EDWARD GALBRAITH sworn and examined. (No. 116.)

80. *The Chairman.*] What are you?—I am superintending stevedore, and in charge of the Shaw-Savill Company's wool and flax stores at Dunedin and Port Chalmers.

81. You are responsible for the receiving and shipping of the wool?—Yes, and the stowage.

82. You have had considerable experience?—Yes, twenty-five years' experience.

83. Will you give us some idea of the methods you adopt for supervising the condition of wool?—Taking flax first, so far as the stowage of flax is concerned, we have strict instructions from headquarters that the flax and tow must be stowed away from any other cargo; if possible it must always be stowed in the 'tween-decks. If it should be compulsory to stow it near other cargo, such as wool, it must be divided with battens and wood and dunnage mats.

84. Might it happen on some occasions that there might be wool and flax and tow in the same hold, and separated in the way you mention?—Yes.

85. Do you separate them with the view to the prevention of fire?—No; it is more for the purpose of preventing the grease from the wool getting amongst the flax and causing discoloration of the flax, and interfering with the quality of the flax, not with the view to the prevention of fires.

86. Is flax ever stowed on top of wool in the same hold?—I would not sanction that myself.

87. If on any rare occasion it were done you would take care that it was properly separated?—I would never stow wool on top of flax unless compelled to. It would have a deck to itself. As far as receiving flax is concerned, I have had considerable experience, and with flax being wet. I do not think it is possible for flax to fire of its own accord, even if wet. I have seen hundreds of wet bales too.

88. It has a tendency rather to rot?—Yes, in such a condition that you could break it like a thread. Of course, that would not occur in such places as Wellington or Auckland, where they have the Graders always available; but here we do not have the Grader's attendance but once in ten days. I think it would be impossible for any wet flax to go on board ship at this port. I suppose the grading is practically the same at all ports—that is, the Grader comes down and pulls a hank from every bale, and should that hank show the slightest sign of damp he will order the bale to be opened right out and examined. In addition to that, he opens 10 per cent. of the bales outright. If three or four bales should show signs of damp it would be necessary to dry the whole line. That is a most expensive matter for the shipper, for it will cost him fully £2 per ton to dry it.

89. The very fact that it is graded acts as a strong deterrent?—Yes; if flax is properly graded I think it is impossible for wet bales to get aboard a steamer.

90. The shippers know the grading is going to take place, and that is a strong deterrent against their putting up wet flax?—Yes. Of course, it is possible that it may get wet in transit, through the tarpaulins.

91. Is there much of that?—Very little; not 1 per cent. Tow, on the other hand, I consider, will be most dangerous if put aboard ship wet. There is no grading of tow. I have seen tow wet, and just on the point of breaking out into fire.

92. *Mr. Foster.*] Was that dumped?—No, before being dumped. I think that every bale of tow should be covered with scrim. It is all covered from Port Chalmers.

93. *The Chairman.*] Is that a preventative against fire, or is it rather for the purpose of making it more tight?—No, we always dump first and cover it afterwards; in other ports they cover and dump at the same time. It is such a thing that the very slightest ignition would cause it to flame; but, being covered, it would prevent that.

94. Is not the scrim itself highly inflammable?—Nothing like the tow itself; the scrim is more like flax.

95. *Mr. Foster.*] Is the scrim very tightly drawn over the tow?—No, only by hand-stitches.

96. Not anything like as tight as woolpacks?—No.

97. *Captain Blackburne.*] Do you know anything about a case of flax being badly heated or firing on board the "Ionic" going from Dunedin to Lyttelton three or four years ago?—No, the "Ionic" has never been inside the Otago Heads.

98. *Mr. Haycock* told me about that?—The old "Ionic"! The old "Ionic" has not been here for nine years, and the new "Ionic" has never been inside Otago Heads.

99. Do you know anything about a case of flax heating?—No, I never heard of it.

100. *Mr. Foster.*] You heard Captain Thomson say he remembered it?—I do not remember that at all. If it had occurred I should have remembered it. As regards wool, I have seen a good many heated bales, but in every case it has been slipped wool. I have never seen a hot bale of greasy wool.

101. Not scoured?—Either slipped or scoured, it has been one or the other. I was going to say that in years gone by it was common to see buckets placed beneath the dumping-presses on board ship to catch the water as it was squeezed out of the bales, and I only know of two ships taking fire; those were the "Blue Jacket" and the "Matoka." The "Matoka" was supposed to have caught fire, and nothing has been heard of her since.

102. You heard what I asked Captain Thomson about the position of the moisture in carrying wool coastwise on deck. It might be wet enough for water to be squeezed out—?—The chances are that the wool would be wet right through; every sea coming over the bales would wet it right through. Although there would be tarpaulins over the bales still the seas would get into the wool. It would absorb a good deal of water, and soak right through the woolpack.

103. Have you ever noticed that jute stack-covers are now in use—like the rick-covers, but made of jute?—Yes.

104. Are you aware that they remain in the weather throughout the winter?—Yes, but they are different from a woolpack.

105. Of course, they have a pitched roof, but a woolpack tightly stretched has a certain amount of ventilation?—Yes. In the event of wool getting wet in transit it should be very easily detected. If there is any sign of wet on the bale we open it up. In days gone by, when we got a bale like that, we would report to the underwriters' surveyor, and while it is well for their protection, it is the people in the ship who have to be careful. If the woolpack got wet in transit it would leave a sign on the pack, and the bale would be examined if that sign was seen.

106. You speak now mainly in the interests of the ship?—Yes, that is the part we have to look after.

107. Not so much for the sake of the wool?—No, to prevent the possibility of fire aboard ship.

108. You look upon it from a different standpoint from that of the wool-grower?—Yes. There is no doubt wool will deteriorate if it is wet.

109. Your object is to be able to get a clean receipt?—Our own clerk gives a receipt for it, but we must be careful of all the wool going aboard ship, to prevent fire. We have a rule in our company to the effect that the hold-book must be signed every night. One of my clerks goes round to each officer in each hold, and he has to certify that he has carefully examined the holds, and that there is not any sign of fire at the time of putting on the hatches. The officer should be the last man out of the hold at night and the first man down in the morning. On the question of smoking, I would like to say that, during the whole of my experience, extending over twenty-five years, I have never seen a man smoking in the holds. As a rule, when the men go down into the hold he leaves his pipe and matches in his coat-pockets; he leaves his coat in the 'tween-decks, or some other handy place, but he would never think of taking it into the lower hold with him. I think any honest workman would think it a crime, just as I would myself, to smoke when down a ship's hold.

110. Still, there are cases?—I have never seen men smoking in the hold of a ship. I have known men smoke on deck when driving a winch, but I would dismiss him at once for doing it.

111. *Captain Blackburne.*] And not take him back again?—No. It is a most serious thing in Port Chalmers, because there are only three firms who employ such labour, and if a man gets out of one of them for smoking he would not get employment in any of the other firms again.

112. *Mr. Foster.*] It has been given in evidence that cases of smoking have been detected?—Yes.

113. Every precaution is taken, you think, to prevent it?—Yes. In the Shaw-Savill Company there are always officers down the holds, and I am continually up and down myself. You will see, therefore, that it would be next to impossible for a man to smoke and not be detected.

114. *Captain Blackburne.*] Does the officer remain down the hold?—We have three officers who go down the holds, and if four holds were being worked we would send one of our men down. They would remain down the hold the whole time the cargo was being worked. That is one of the strict rules of the company. The second, third, and fourth officers would be below if the three holds were working.

115. You would be able to trace from the records, if any particular bale was found to be on fire, where that bale was stowed?—Yes, if we knew where it was shipped from.

116. *Mr. Foster.*] The marks would tell you?—Yes.

117. *Captain Blackburne.*] If you had not sufficient wool to go right up to the deck, you would not mind stowing a bale or two of flax on top of it?—No. If the ship had space we would not put it on top of the wool. I would not do that.

118. Suppose in completing a ship here the bales of wool were only within one tier, you would not leave that space vacant?—If there was plenty of cargo I would stow it in a full ship, but it would be properly separated with dunnage mats. However, it is contrary to our rules to do such a thing. I would fill up the tier with wool, and make room for stowing the flax apart from the wool altogether.

119. *Mr. Foster.*] Do you load in wet weather at all?—No. We are not allowed to load in wet weather.

120. Supposing a vessel due to sail and the weather was continuously wet?—I would try to get it in between the showers, but not in the wet. That is a thing I am not allowed to do.

121. You said you would not stow wool on top of flax. Is there any special reason for thinking that it should not be done?—The special reason is that it does not make a shipshape job, and on account of the possibility of grease coming out of the greasy bales and injuring the flax underneath.

122. Have you seen wool so greasy?—I have seen it so that you would think it was soaking wet.

123. Have you seen it dripping?—I think going through the tropics it would drip.

124. Taking into consideration the heat of the hold in the tropics, and compare with that the heat in summer when the wool is on the sheep's back, would you expect the ship's hold to be any hotter?—On a very hot day I think it would be hotter.

125. I have seen the fleece on sheep greasy, but that is a different thing to dripping out of a bale?—Yes.

126. Greasy bales might part with some of their grease when in contact with the floor, but I have never seen a case of the grease dripping?—Even stowing greasy wool against flax will cause it to absorb the grease from the wool.

127. But when you told us that a considerable quantity of dunnage and dunnage mats were placed between the flax and the wool I was only wanting to know why it was done; was it only on account of the condition of the flax?—Yes, that is all.

JOHN ROBERT BAXTER examined on affirmation. (No. 117.)

128. *The Chairman.*] What are you?—I am a practical woollen-manufacturing expert.

129. You have had considerable experience of wool?—Yes, for over thirty-six years.

130. We have had letters from you, and we should like you to tell us in your own words your experience, or such as would be of interest to the Commission?—My experience has been entirely confined to woollen-mills. I am satisfied that the cause of fires lies in the lime and animal matter—that is, intestinal matter, or manure, from the sheep; and the caustic soda or any other sodas of a crude nature. They are very firing. I am not satisfied with the statement that if lime and soda are slaked they could not heat. I am satisfied they do, from practical experience. I know that a solution of lime and sodium will burn wool. Those three agents, lime, animal matter, and alkalis are very active with water, such as calcium of carbide would throw off gas. I am also of opinion that there are gases formed by this action, and if it is not freed from the pelts then decomposition will take place to a greater or lesser degree.

131. Decomposition being the first process leading on to combustion?—Yes. And from that cause I think the fires originate. The proof of that may be found in one case where a mill was burned down, and it was attributed to the wool that had been treated with these agents. In the preparation of wool for carding and spinning we have to apply oil and water, and to get them to amalgamate we have to put in alkalis (soda), and when this wool is damp I know it will heat and will deteriorate if allowed to remain for three days in that condition, so that if sodium is slaked it does heat. If you make a solution of sodium strong enough and allow it to remain on the wool dry it will burn flannel, and it will also burn wool.

132. *Mr. Foster.*] You say that wool will burn?—Yes, it burns to this extent: it goes into a state of decomposition, and instead of looking like wool it goes more like rubber. Perhaps that is why wool is sometimes found in a state resembling jelly.

133. It has been described as being like pitch?—I am not sure of that, but it has lost its density. I might say that yesterday I tried a little wool which I got from the National Mortgage and Agency Company. This wool in the grease [exhibiting a parcel of wool marked "A"], and this is the same quality of wool after having been relieved of the grease [exhibiting parcel of wool marked "B"]. In this bottle is a 10-per-cent. solution of caustic soda. You will see that the wool in this bottle has lost all its springiness. In fresh wool you could not force a pencil down to the bottom of this bottle, but you will observe the ease with which I can now pass this rod through the wool. This is because of the decomposition which has set up after being in the solution for twenty-four hours. It is going very black. You will observe also that the wool is more like a jelly.

134. How did you apply it?—I simply washed the wool in the ordinary way, wrung water out, took a 10-per-cent. solution of caustic soda, into which the damp wool was dipped, and wrung it out quickly.

135. How long was that solution made?—Fifteen hours, thoroughly cool; and I would say that if that wool were properly dried after being rinsed out, it will absorb moisture, and the wool feels damp, although no water or rain has been applied to it. The alkali (a deliquescent) seems to absorb moisture from the atmosphere. In the woollen-mills we have great difficulty in working the slipped wools, and we attribute that to the lime. Wool that has not been properly rinsed in order to thoroughly take out the yolk will be found to be troublesome, because alkali remains and weakens. If it is not thoroughly taken out there is always a certain portion of sodium in it, and it caused trouble later, in this way: it makes the wool weak, and it does not work so well in carding and spinning, and if damp is allowed to get near it it goes soft and slippy. I think it is the caustic soda and dirt that sets up the chemical action and raised the temperature. We certainly think it originates in these chemicals.

136. You would think it possible to wash out the sodium?—Yes, for all practical purposes, by rinsing in clean water at a proper temperature.

137. And do you know where it is not done before shipment?—I would not like to say where it is not, but I know it has been.

138. Do you know of cases where they have been packed up?—Not for shipment. I will give you a case that occurred three years ago. In one of the district woollen-mills there was a very dirty lot of wool came in, and the room was limited, so we put this through the scour at once. We put the wool through a strong solution of sodium and caustic soap to remove the grease and lime. It was passed through and laid aside damp. By the second day it was very hot and beginning to deteriorate. Very hot, but not smoking. Then, after the wool was taken and scoured a second time, it remained for five days, and there was very little heat. I attributed the heat to the animal matter and sodium.

139. Would you have expected that heating process if there had been no sodium but animal matter being there?—Yes, animal matter will cause heat, but not to the same extent as with the presence of sodium and damp.

140. The sodium would be harmless if there was no moisture?—Not quite harmless, but it would do little harm.

141. How long have you had that solution on the wool?—I think about thirty-six hours, but it was decomposed before ten hours. It was spongy.

142. The wool was massing?—Yes.

143. Will you leave us those samples?—Yes. This [a small glass-stoppered bottle] is a 10-per-cent. solution, and the wool placed into it has completely dissolved. The same effect to a less degree would be produced with 1 per cent., and that often happens when scouring wools where it is not thoroughly eliminated from the wools in scouring. I have noticed if the station scourers try to save a certain amount of yolk in the wool a certain amount of alkali is allowed as well.

144. Do you know the nature of the chemical that the fellmongers use in their process?—I do not know; I am not speaking from that point, but from the scouring at woollen-mills it would be less than that. It might be from 2 to 3 per cent, and it largely depends upon the nature of the wool. The manufacturer likes to take all the yolk out.

145. Assuming that the quantity of sulphide used by the fellmongers is less than that, would you think the risk would be correspondingly reduced?—Yes; it is reduced, but not entirely removed. So long as that matter is there it is liable to heat by chemical action, and especially if it is intestinal matter, which has not been removed. We can see some of the dung here; it is burnt also as you can see. There are some portions not properly washed, and it is affected by this chemical action of the caustic soda. So I say it destroys or decomposes the wool, and when you break this wool up it smells as if a gas was being given off. Here are two lots of wool, dry, and a little wool rolled round some caustic soda. That is not slaked. This is a wet piece of wool rolled round a piece of soda, and you see the effect.

146. Is it damp?—Yes, the wool is simply washed and squeezed and rolled up over this piece of caustic soda. You see this piece which is dry is not apparently affected at all.

147. Assuming you put that dry sample into a bottle and corked it up, would it be affected by the moisture of the weather?—That is to say, if thoroughly dry before being put in, it would have no effect or very little effect, provided the damp was kept away.

148. What do you consider is the effect of damp on wool with enormous pressure? Would that have the same effect as a cork in a bottle, and moist weather could not affect it?—Provided it is dry. If damp under high pressure it would decompose, and the gas would not get free.

149. On your showing, heat is attributable to moisture?—Not without the other three agents, dirt, lime, and alkali.

150. But assuming there is no moisture, there is no danger?—If wool is clean and free from animal matter—I do not look upon yolk as foreign matter—and if the wool is dry, whether greasy or not, I say from my experience there is not any danger.

151. Then, in your opinion, the risk is the excessive moisture in wool?—Quite so, and the presence of foreign matter. Referring to these samples, I might say that the wool that is saturated with the 10-per-cent. solution in the larger bottle was wet with water when put in, so it is really weaker than 10 per cent.

152. To what extent would it weaken it?—I should say very little.

153. Can you tell us how much solution you put into that bottle?—It was not measured. As I say, the wool was damp, having been thoroughly wrung out through wringers, and it was then dipped into this 10-per-cent. solution and mixed up and put into this bottle, with this result. As for the production of gas as I was speaking of just now, when I was in the Home-country in one of the mills there was a good deal of this wool treated, and it was standing in a bin and was pressed a little bit by treading it with the feet, and when the foreman went in in the morning with a light the place went into fire immediately. Investigations were made, and they showed that all the meters and pipes were secure, and it was attributed to the gas coming from the wool.

154. Was that investigation a public one?—I could not be certain. It was in the Village of Alva, in one of the woollen-manufacturing parts of Scotland.

155. When?—About twenty years ago.

156. Would you be able to turn up any records or literature on the subject of the investigations?—I think not. I am speaking of my own experience. I have always found that if the wool is packed in heaps, and is dry, and it gets proper ventilation to take away the gas, there is no harm.

157. It is the confinement of the gas that is the danger?—Yes. I once saw a hamper of woollen yarn fire of itself. The raw wool material had been duly scoured clean at the mill, and then stone-dried, and afterwards it was lubricated for carding and spinning with a solution of 10 lb. cloth-oil, 14 lb. warm water, and 4 oz. common soda to 100 lb. wool. After being spun, and while in cop form, a keen frost prevailing at the time, it was frozen. To take the frost out the whole basketful—about 100 lb.—was placed in the boiler-room, where the temperature was somewhere about 150° Fahr. Fifteen minutes was the usual time to leave such goods in the boiler-room, but this basketful was forgotten, and was left there over an hour. It was completely charred, it emitted smoke, and the odour was very strong, smelling as wool does when burnt in a flame. I should say that the temperature outside the wool caused damp by defrosting, and set up an action with the oil, and the alkali decomposed the wool in moisture until it was dried by its own heat and the heat from the boiler-flue plates on which it stood, and dry combustion took place. It is to be observed that all happened inside seventy-five minutes, without any open flame being near. I have a knowledge of blending oils, and making of caustic and potash soap for woollen purposes. I made an oil-emulsion for wool-spinning, and sold my rights to a Dunedin firm. When experimenting I used caustic soda to emulsify; but as it heated the wool in the storage-bins it had to be kept out of the composition. Ammonia and neutral potash have not the wool-destroying properties of other acids or alkalies, and have preference for shipping-wool. Common salt is slightly, but caustic soda, caustic potash, and calcium very, deliquescent, and become damp with damp weather and heats. The trouble with sodium-chloride (common salt) is that it hardens the wool and prevents saponification when washing. To a degree these can be detected in wool by touch, smell, taste, and sight. I might mention that I have written about as much as I wish to say on this subject. I have written to the Hon. Mr. Hall-Jones once, and to the present Chairman twice, and I think that is all I can tell you, having put this demonstration before you.

JAMES HILL SWORN and examined. (No. 118.)

158. *The Chairman.*] What are you?—I am a wool-classer.

159. Do you know the objects of the Commission: can you assist us?—It is only with regard to shearing that I can speak. This last couple of years it has been wet. We have had a deal of trouble with wet sheep—last year especially; although as a rule in the big sheds the shearers will not shear wet sheep. In the smaller sheds where only two or three shearers are employed they are more likely to do it. In the big sheds they carry out the rules of the Shearers' Union more systematically, and will not shear wet sheep; but I think it is in the smaller sheds that the wet sheep are shorn. They have no expert wool-classers over them. I might mention that it is generally in the low grades of wool that dampness occurs, such as bellies and stained pieces. Last year, for instance, it was a damp season, and in the smaller sheds they are not so careful to pick out the stained pizzle-pieces. I always have them picked out carefully. Last year we had a lot of these stained pieces stowed away on the floor, and it came on to rain, and for a couple of days there was no shearing. I told one of the employees to see that those pieces were turned over. This instruction was neglected, however, and when I went into the shed on the third day and saw the wool had not been turned over, I put my hand into it—into the centre as far as I could get my arm—and the heat was almost unbearable. I at once spread it out on the floor to dry, and it was dried thoroughly. I saw the same wool sold in Dunedin, and it was all right. If it had been put into bales and packed right away when it was shorn I do not know what the result might have been. I am mentioning that to show that the natural moisture adhering to the wool will cause heating if those wet pieces are not carefully taken off. I suggest that all that class of wool should be scoured.

160. Would you believe in prohibiting the export of that class of wool, and saying that it should be scoured?—Or properly treated and dried. In a small shed, in nine cases out of ten, it would have been packed right away. In driving sheep from the hills, although the weather might be fine, they might have to pass over a stream and get wet about the bellies, and if they are otherwise dry the shearers will not object to shear them; but the belly-pieces from these sheep should not go into the wool-bales with the other dry wool.

161. *Mr. Foster.*] What was the description of the wool you found heated?—Stained pieces.

162. With a large amount of urine in it?—Yes.

163. If, as you say, these were packed in a small shed, would it be less likely to have heated because there would be separation between the stained pieces and the other wool?—But there would be a good bit of it in a bale.

164. Still there would be a smaller proportion than the heap you speak of?—Yes. But the fact of it being there would tend to heat the whole bale.

165. What you refer to as the pizzle-pieces would be about an inch or an inch and half?—About the size of your hand, because it is not taken out properly. It would be about three inches across.

166. Then the boy does not take out more than he should?—Sometimes he does and sometimes he does not. Then, these last two years the wool-growers have not scoured the wools they used to scour on account of the high prices. They have sent it away.

167. Have you any data to go upon in making that statement—because inquiries at every port we have touched at have shown that no more has been shipped than usual?—I know that on one or two places where they usually scour they did not scour last year or the year before.

168. Did they sell locally?—The bulk of it.

169. You could not say that it did not go to the fellmonger after being sold?—I could not say.

170. So you cannot support that?—No, I would not like to swear to that.

171. It is just an opinion that you have formed—that more was shipped?—Just an opinion. I think if on the small stations there was more method in dealing with their wool it would do a great deal of good.

172. Have you anything to do with fellmongering?—No, only wool-classing on stations.

JOHN ROBERTS sworn and examined. (No. 119.)

173. *The Chairman.*] What is your name?—John Roberts.

174. You are senior partner in the firm of Murray, Roberts, and Co.?—Yes.

175. You have had a large experience in wool?—Yes, since 1862.

176. No doubt you have gathered pretty well what the Commission is trying to get at, and we shall be glad if you can assist us?—Well, I may state that, generally speaking, my experience—in fact, my universal experience—has been that wool will not fire itself under ordinary conditions.

177. Whether greasy wool?—Yes. I have seen wool that has been packed very wet get into a very heated state, so much so that the interior of the bale has developed into a black soft pulp, but I never saw it fire.

178. Never actually ignite?—No.

179. Has that wool been for any time baled up?—Not for any length of time; but this wool that I speak of was wool that was thoroughly saturated with water, not merely damp. Of course, all wool is shipped, especially scoured or sliped wool, more or less damp; it is almost impossible to get it entirely dry. It is very seldom you can get slipe wool to carry its weight to London without losing weight, showing there was moisture in the wool.

180. *Mr. Foster.*] The bale of wool that you referred to—that was undumped?—Yes, in an undumped state.

181. Do you think that if it had been dumped it might have ignited?—Well, I do not think it would because the air could not get to it, and there could be no combustion without air.

182. Do you think it is possible that the wool might have heated up in an undumped condition to such a point that it might have ignited the woolpack?—I do not think I am quite prepared to say so. I say that, with this wool that I speak of, the heat would ultimately have gone right through the whole bale, and when it got outside one does not know what might happen. These fires are things which have not happened on board ship before. I do not know whether there are any peculiar conditions in the ships themselves arising from other cargo stowed with the wool which would tend to combustion.

183. *The Chairman.*] When you say “peculiar conditions,” would you say such a condition as the insulation or non-insulation of the electric wires going through the cargo-holds?—Yes. Well, with the non-insulation of wires I could imagine that they would result in combustion adjoining the wire, but I cannot imagine any serious conflagration of a ship.

184. *Mr. Foster.*] Are you on the board of other shipping companies?—I am one of the local advisers of the Shaw, Savill, and Albion Company.

185. Have you seen a copy of the report from Professor Friswell?—I have.

186. That report refers to the wool as having been burned?—He reports upon samples of wool produced to him, and I quite understand how he could come to the conclusion to which he has come, because there is no doubt that the samples of wool he had got had all the appearances of having been burned. The wool I saw in the bale I spoke of, if dried, it would also have the appearance of having been burned. I do not think the professor was in possession of all information to justify him in coming to any decided conclusion in the matter.

187. All the evidence points to the fact that there was a fire?—There is no doubt of fire in the ships; whether it arose from the wool or not I cannot say.

188. In the report I dare say you remember one sample being referred to as having the edges coming together, indicating the corner or angle of the bale, all the interior being burned and the exterior being fairly sound?—Well, that quite bears out my own experience, that the outside of the bale with the natural drying in the atmosphere, would not consume the same as in the inside. I never saw fire come right through a bale.

189. You do not think it is possible for a bale of wool to reach such a high temperature as to set fire to the packs?—I do not think so, not in the condition in which the hold of a ship is. You have, first of all, the wool dumped, and then screwed in the ship.

190. They do not screw it much, do they?—They do sometimes—it all depends on the ship—sometimes they do screw it, and other times they do not.

191. The evidence we had from your superintendent in Lyttelton and Wellington was that they did not screw it into the steamers. If there is rather bare space to get the wool in they might jack it in, but not the screwing process as we understand it was in the old days?—It depends on the demand for space. If space is wanted they put more in. You speak, I presume, of Captain McDougall and Captain Evans?

192. Yes?—The bales that seem to have been affected in the “Gothic” were slipe wools, and there is no doubt there must be a certain amount of animal matter attached to that which is not attached to ordinary wool. I should say, to a certain extent, a small film of the pelt comes off with the wool, and I dare say that would be more liable to heat than the ordinary wool. It is owing to a certain amount of animal matter being attached.

193. But, in that case, assuming those conditions, would you still think that those bales would not be likely to get heated to such an extent as to set fire to something adjacent to them or touching them?—Wool is a very good non-conductor as you know, and, although the inside of a bale may be very hot, it does not follow that the outside of the bale would become the same.

194. If there was in the bale the something necessary to continue the heating, it would ultimately get to the outside?—I suppose it would, but it would be a long time before it came through.

195. But, in the case of the "Rimutaka," the fire did not occur till she got alongside the docks?—And in the case of all the steamers it did not occur till they left Teneriffe. That may arise from the fact that it took the time from Wellington to Teneriffe to generate the fire. I do not know whether there was any particular opening-up of the holds at Teneriffe; they generally take in large quantities of fruit there.

196. *The Chairman.*] But it is a coincidence that the "Pitcairn Island" was just as long away from Wellington, although not so far on her journey, as those ships were from Wellington. Does not that seem to indicate that the action is going on in the wool?—The "Pitcairn Island" was abandoned about the same time after?

197. It was just about the same time after that the steamers left Wellington before reaching their destination?—Yes.

198. *Mr. Foster.*] Would you assume that the time necessary to develop a certain temperature would depend largely on the amount of moisture?—Yes, I have no doubt it would.

199. That is to say, if it was saturated it might possibly take double or treble or more time than if it was slightly saturated, or *vice versa*?—I suppose there is a certain amount of moisture that would be more conducive to combustion, otherwise conditions of moisture might not produce the same rapid effect.

200. *The Chairman.*] That is the point we were trying to make yesterday, that if you lessen the temperature of the water it will condense to a certain extent, to 39°70, but if you make the water colder than that it immediately begins to extend again and perform the opposite operation, and the result is that ice floats; and is there not some point of saturation which we cannot get at at present at which the heat will progress rapidly?—I suppose there must be; it requires some process to make it more rapid. It seems to me the Government should have special experiments carried out to find that out.

201. *Mr. Foster.*] We are having experiments carried out now?—And, perhaps, find out the amount of saturation. I think, no doubt, it will be found that slipe wools are most liable to combustion if there is heating.

202. So far as the evidence given by wool experts is concerned, we have had evidence both ways, that wool will burn and it will not burn, and some people say slipe wool is more liable to heat than greasy, and others say the opposite?—Yes. You will find many people in the colony who will tell you that they have never found a bale on fire, and others who will say that it is as black as your coat and not on fire.

203. *Captain Blackburne.*] Altogether there have been five ships that were on fire?—Why should that peculiar condition exist this year?

204. *Mr. Foster.*] I was going to ask you if you could give us a reason?—There has been a wet season, but that does not affect slipe wools.

205. Might not this fact have led to it: the high prices, and the great desire there was to get the wool away in the ships as early as possible?—Yes.

206. I happened to know a case where there was that anxiety, and instructions may be given to the foreman to expedite as much as possible, and possibly they would pack the wool a little bit sooner than otherwise?—It may have been, but any one accustomed to packing wool will know that packing wet wool is not in the interests of the shipper.

207. That is so, but under pressure of that kind a man might err on the moist side?—It is just possible a man might if he was told to keep things moving smartly and get the work put through quickly, and he may be probably inclined to take it for granted that the wool was drier than it was.

208. *The Chairman.*] The wish would be father to the thought?—Yes, that is so.

209. *Mr. Foster.*] We have heard it is extremely difficult in drying washed wool to decide whether the wool is really dry or not, and, again, in some places they are in the habit of packing their wool hot from the machines where it is mechanically dried?—Yes.

210. Do you think that would be the cause?—It is difficult to determine.

211. Difficult to determine whether the wool was really dry enough?—If it was hot you must let it cool if you want to detect dampness. If it was hot and damp at the same time, of course, the combustion would go on more rapidly.

212. *The Chairman.*] It is sent through these machines in a very short time—from forty to forty-five minutes—and it gets hot going through, and is it not quite possible for it to carry moisture with it, and that with the heat it preserves when going through the machine might deceive honestly the man who handles it?—No doubt about it—warm wool can be packed without noticing it.

213. *Mr. Foster.*] We have been told that the mechanical process of drying is the regulation of the heat, and as the wool passes it is manipulated, and the result must be uniform; but would you consider where a man feeds it and it is fed with wet wool, that the desire to put in more would tax the machine, and it might come out with twice the moisture?—That might be so: most of these works wring the wool by a hydro-extractor, and if it is put too quickly through it might go on to the drier with more moisture in it.

214. And if that was put through the hydro. in larger quantities it would tax the drying-machine more?—Yes.

215. And there is no absolute certainty where you have to depend on the guesswork of the operators?—No; and if it is packed hot I can understand wet wool being shipped.

216. So that a man trying to get the best work may overwork the machinery?—That is so. It is difficult to understand why the fires should have occurred all in one year, because the same conditions must have been going on for years.

217. But it is coincident with the withdrawal of the inspector at the ports—it is the first year you did not have the marine inspector?—That is so, and I suppose the inspectors look upon it as a just retribution for the insurance companies. Personally, I took a very strong opinion about that. I thought it was very wrong to dispense with those marine surveyors, because they were frequently sending back wool in a bad condition.

218. The cost of an inspector at every main port would not be a very serious matter, and in all probability would not represent a tax of more than 2d. or 3d. a bale to pay the salaries. Would you think that a fair thing to charge on the wool?—The insurance companies were paying before, and I think the movement towards dispensing with the marine surveyors came probably from the English insurance companies, who thought they were not getting the return for the cost, but I think this year they will change their minds.

219. It comes to pretty well the same thing, that the owners would have to pay even through the insurance company?—I do not think so—I think competition causes the insurance companies to bear it.

220. Is it not taken into account in the premium?—I do not think so to any great extent.

221. *The Chairman.*] Would it not be better for the shipping companies to reinstate those inspectors to anticipate the insurance companies putting a heavier premium on?—Possibly the individual shipper, however, does not consider he is to blame. We fellmonger a lot of wool here, and have no serious experience of loss in weight.

222. *Mr. Foster.*] Might it also not have been an inducement for a fellmonger in a small way to get wool through quickly to get a draw against it?—Yes, it might. Such a man dries naturally and not artificially, and should be able to detect dampness better than the man drying by machinery.

223. But the same temptation would be in his way if it was a temptation?—Yes, that is so.

224. Do you think anything like superficial wetting of wool, such as in loading—I understand they load in a Scotch mist, but not in a heavy rain—do you think that could contribute in any way to the mischief?—I do not think so. I think we have seen plenty of cases in the early days—wool coming coastwise, where they ship at sea out of surf-boats, and when a bale was wetted and put out in the sun for a day it was all right.

225. You think the hold would evaporate any such wetting?—Yes, I think so. If any soaking does cause the trouble it must be internal.

226. Do you think there is any risk in shipping sheep-skins?—I do not know; we have shipped large numbers, and have never had any trouble.

227. You know the process in use for removing wool from the skins?—Yes.

228. You know the chemicals used?—Yes.

229. Do you think they are liable to contribute to the fires?—No. You speak of sulphide of sodium?

230. Yes?—It has been used for ten years, and you will find a large quantity of the sodium on the shanks, and so forth, and there has been no experience of any trouble from it.

231. Sulphide of sodium will actually set fire to wool and creates great heat?—But it does not set up combustion.

232. Where sulphide of sodium has been in a drum it has set fire to the floor?—That may be sulphide of sodium itself.

233. Yes?—But a professor says it does not create any great heat.

234. That is if it is slaked with lime?—Yes.

235. That is for painting on the skins?—Yes.

236. We had a witness this morning who laid great stress on the likelihood of danger from that?—I rather think that an expert at Home says that sulphide of sodium as used on skins would not generate heat.

237. And generally it is the opinion of men who use it?—Yes, it has been used for very many years. If this year was the first time it was used, I should think that might be a contributory cause; but it has been used for many years without any trouble arising from it.

238. *Captain Blackburne.*] Have you had any experience of flax heating?—No, no experience of flax.

DANIEL WATTERS SWORN and examined. (No. 120.)

239. *The Chairman.*] What is your name?—Daniel Watters.

240. What is your position?—I am manager for Murray, Roberts, and Co.'s fellmongery business.

241. You understand the object of the Commission?—Yes.

242. We should be glad if you could give us some information in regard to the process that goes on in the fellmongery business: the process is well known to the Commission, but as to your experience with reference to any heating that you may have noticed in the wool?—Well, we have never had any complaints about any wool of our own.

243. How do you take your wool off—by the sweating process?—Any of the pelts that are worth painting are taken off with sodium and lime, and the others are simply sweated.

244. *Mr. Foster.*] What do you do with the pelts that are rejected?—Thrown out and taken away for manure.

245. You do not make glue-pieces of them?—No.

246. Can you tell the Commission what is the proportion of sulphide of sodium to the proportion of water in which you dissolve it?—We put about 150 lb. of sodium to 200 gallons,

247. That is less than 1 lb. per gallon?—That is in mixing it up, but according to the class of stuff it is to be used on—for instance, for lamb-skins and light pelts it would be reduced again.

248. Then you break down your lime too?—Slake the lime.

249. And what proportion of that do you use?—Well, just enough to make a wash.

250. Can you give us any approximate idea as to the proportions?—No.

251. Guesswork?—Just make it thick enough to lie on the skins. Some of the stuff bought in the market would take a little more than that from the freezing-works.

252. So that the proportion of water to the sulphide of sodium would not alter appreciably?—No. The powder is put into that and stirred, and if it is too thick a little more sulphide of sodium is put in.

253. We had a witness this morning who had tested the solution of sulphide of sodium on wool and he showed that it destroyed it practically, but his solution he told us was 10 per cent.—that is, 10 per cent. of the sulphide to 90 per cent. of water. Have you any knowledge as to what effect such a solution would have upon wool?—Well, if you use it too strong it dissolves the wool—the wool disappears and washes right away.

254. Have you ever noticed the effect of the solution, that which you paint on the skins, upon some of the wool that it adheres to?—I had a case last season from the freezing-works. They had been killing some old ewes; they were thin pelts, and what we call the fell comes off in the root of the wool.

255. What we may know as scurf?—Yes. If it was too strong for the pelt scurf would come off like tissue paper, but it disappears in the drying practically.

256. This witness said that some of the sulphide would go through the skin. I can hardly imagine that that would be so—that the actual preparation would get through on to the wool?—Well, no, not to any extent in that way—there is always a little on the edges.

257. He said it would go through, but you think it would not?—It will go through to a certain extent, but what strength it would be after penetrating through the pelt I cannot say.

258. Do you think that would be the case, or is it not that the action has a different effect upon the skin—it would not go through into the wool?—Not into the wool, just the root of the wool—the butt of the wool.

259. The trimmings, of course, have very frequently a lot of lime on them?—Yes.

260. What do you do with those, sweat it off?—Wash it off.

261. Before you sweat them?—All the trimming-pieces?

262. Yes?—That is sweated entirely—that never gets any paint.

263. There are a certain amount of edges—what do you do with those?—That wool is kept by itself. We put it in a heap every day or two until a slight heat comes in it, and then we wash it; it takes it out and cleans it better.

264. What is the effect of that sodium upon that particular lot of wool—does it break it up or dissolve it?—If it is used too strong, but we never use it as strong as that.

265. I am speaking of the strength at which you paint your skins?—No, it is not.

266. This witness was also speaking in relation to the usual method?—Yes.

267. So that you say that any of this sulphide of sodium and lime which gets on to these small trimmings of wool around the edges of the pelt, you say it has no effect on the wool after two days?—No; it is washed out.

268. And the wool is not injured?—No.

269. So that this witness in saying that—I think he said fifteen hours with a 10-per-cent. solution applied directly to wool, is a condition that does not exist in your trade: you do not apply 10 per cent. in the first place, and you do not apply it sufficiently strong to affect the wool?—No.

270. Even although it remains in for forty-eight hours?—Yes.

271. Have you ever had any experience of heated wool?—Well, we have occasionally wool sent up from Port Chalmers to be reconditioned sometimes in the season—a few odd bales, and occasionally a bale that drops overboard, and if it lies too long it comes up pretty hot.

272. And in the case of wool that drops overboard and becomes saturated with salt water, do you just dry it?—The only case of that sort I had I advised them to sell it in town, and it was washed.

273. Would you consider that wool wet with salt water would heat quicker and to a higher point possibly than wool moistened with fresh water?—I could not say anything about temperature.

274. We have been told that wool wet with salt water is always scoured, and wool wet with fresh water may be dried?—Yes.

275. Do you think that should be?—Yes.

276. And why do you think so?—You can never dry the wool with salt water in it. Supposing it was a very hot day yesterday, it would feel perfectly dry, and on a damp day like this it would feel quite wet, and would be wet.

277. Would that not be the case more or less with all wools?—With low-grade greasy wools it is.

278. Does not that apply also to the slipe wool to some extent?—Not so much with the cleaner wools.

279. By “cleaner” wools you mean “half-bred”?—No, fleeces.

280. But any greasy merino fleeces—are they not affected by the atmosphere at the time even to the point of feeling cold and clammy?—Yes.

281. As a matter of fact, would you say, as between a dry hot day and a cold misty day, that there would be a kind of wet in the bale as between one day and another?—Well, a little; it does not go very much into the bale, but if it was lying in a heap as it is put off the drying-machines it absorbs moisture.

282. Would you think it possible, as between a dry day and a misty day, for it to gain in a bale in a day two or three pounds?—Yes. With slipe wools in a good dry day or coming off a machine, it feels perfectly hard and rasping, but if it lies long on a damp day in a heap, it has quite a clammy feel, while with a good dry day it is not so.

283. And what do you attribute that to?—The wool absorbing the moisture.

284. Is it something taken out of the wool?—It is the yolk taken out of the wool in the washing of the skins, and the wool absorbs the moisture from the atmosphere. With the greasy wool the moisture lies on the surface and feels wet; but it is not any wetter than the other—it is simply because the moisture is lying on the surface.

285. Assuming that the taking-out of a certain amount of the yolk from the slipe wool brings about a colder condition in cold weather, ought it not when more is taken out to feel colder still in the scoured?—No, not if it is clean scoured.

286. But might it be this: that the soaking of the skins removes some of the animal matter without taking the yolk?—Well, it does clear the animal matter. The principal thing for heating in skins is the animal and vegetable matter, more especially vegetable matter down here.

287. Do you think the washing does take out much yolk?—Oh, yes. I could not give it from memory, but I have tested it both ways, taking part of the same fleece of wool and soaking it even in cold water.

288. I know there is a certain amount of the yolk disappears, because in cold-water washing below the wash of the sheep you will see a certain amount of scum?—Yes.

289. At your fellmongery do you dry mechanically?—Yes.

290. What machine do you use?—A McNaught, an old-fashioned machine.

291. Is it a table machine?—Yes.

292. Something like the "Petrie"?—Yes.

293. And there you have to lay it on to the machine by hand and handle it the whole time?—Yes.

294. What is your practice when you take the wool off, do you allow it to remain in the bins?—Yes.

295. And take it off the tables at a pretty hot temperature?—Yes.

296. About what?—I never tested it, but you cannot touch the wires.

297. How long do you give it to cool?—It depends on the class of wool.

298. You always super-dry it and then let it come back?—Yes, overdry it. It is very difficult job with some low-grade wool—we have sometimes to put it over a second time.

299. Have you ever noticed what is called "fern-stained" wool?—Yes.

300. Do you think the pollen which gives that stain is harmful to the wool in the way of heating?—If it was put in damp I suppose it would.

301. Even though the skin was soaked?—Oh, yes.

302. To what extent does stain go?—I have only seen it on the tips?—On the necks it goes right down to the pelt sometimes—the fern does.

303. Where do you get it?—I have not seen much of it?—There is plenty. Our worst trouble in drying wool is the piripiri. We had a large quantity of that wool in the winter-time, and I suppose it lay for four or five weeks outside. I think there is a tendency to heat with that stuff, if the shearing is a little late: the natural sap is in the seed, and it is the seed that is damp. We have had that experience these last two winters, and with the drying of that stuff we have had to put it on the machine twice.

304. *The Chairman.*] You put it on twice—why is it necessary?—Well, after lying seasoning it does not feel dry.

305. Well, does not that arise from the fact that you have taken it off hot and thought it was dry, and then found afterwards it was not dry, and had to put it on again?—But the wool is perfectly dry.

306. The wool is perfectly dry, and yet after it remains for a while you think it necessary to put it on the machine again?—If the shearing has been a little late and the wool gets the piripiri and horehound-seed in it. It is the seed in it which does not dry.

307. Then it is dry when taking it off?—The wool is dry, but the seed is not dry.

308. Would it not be possible under certain conditions that when pushing that wool along, you might have pushed it through and baled it up when that piripiri was not actually dry?—We do not push that wool along.

309. How long do you let it dry? It is only a few hours in some places after it is passed by before being baled?—I refer to the special lot of wool—we do not push that, but let it lie till the last.

310. *Mr. Foster.*] I understand that when you get seedy wool you keep it by itself?—Yes, keep it back together.

311. *The Chairman.*] That is the stuff you may have to put through again?—Yes.

312. *Mr. Foster.*] Do you receive wool by road and rail at your fellmongery?—No, not now.

313. It generally comes from the town?—Yes, sometimes a short distance by road.

314. You are not so much troubled from water-damage?—No.

315. Had you any wool in trouble on these ships that took fire recently?—Not that I heard of. We had some sixty-odd bales in the "Pitcairn Island"—that is the only one I know of.

316. Do you think it is likely yours was the cause of the trouble?—I do not think so.

317. You have had no advices of any other mischief from the recent fires?—No. That sixty bales was all scoured wool, and not likely to heat very readily, seeing it was in the summer-time and mostly put over the drying-machine.

The Commission adjourned to Wellington.

WELLINGTON, TUESDAY, 23RD OCTOBER, 1906.

The Commission sat in the Upper Court, Magistrate's Court House, Wellington, at 2.15 p.m.

JOHN THOMAS ROLLS sworn and examined. (No. 121.)

1. *The Chairman.*] What are you, Captain Rolls?—I am a master mariner, and master of the steamship "Tarawera."

2. The Commission understand that a fire occurred in the cargo on board your vessel on your last voyage between Gisborne and Auckland?—Yes.

3. We think you might be able to give us something of your experience of that fire which might throw some light upon the questions with which we have to deal, and enable us to draw conclusions from your experience and observations?—I am willing to assist the Commission, but there is one aspect I would like to mention: anything I might now say may prejudice me in relation to the magisterial inquiry which may be held into the circumstances of that fire.

4. Why would it prejudice you?—Of course, what I say may be made public, and if my evidence is known before I give it later on it might interfere with the conduct of the inquiry later on. Anything apart from that which I can give I shall be only too pleased to give you, but I hope you will not press me to answer direct questions on the matter. I can give you my experience generally.

5. That is all we want at this stage?—Of course, there was no wool in the ship, and it is a very difficult thing to know what was the exact cause of the fire on account of all the cases surrounding the seat of the fire having been destroyed, and it is hard to say in what cargo it first broke out.

6. You have no indication of the probable cause?—No, there was no indication left. When we went down there it was all wiped out.

7. It wiped the slate itself?—Yes.

8. In a general way, apart from that, can you give us any information or experiences you may have had with regard to fires on ships arising from spontaneous combustion?—Yes, I can give you one instance which occurred some years ago which was caused by spontaneous combustion. At the time I refer to I was mate of the "Wairarapa," and on a voyage between Melbourne and New Zealand two bales of sheepskins took fire and had to be brought up on deck, and when they were broken open they burst into flames. The smell from these two bales during the day was very strong, and it continued to grow much stronger, and caused us to investigate the cause of the strange smell. When we had all the passengers comfortably seated at dinner we went down below, and, travelling over the cargo, the smell led us to two bales of sheep-skins which were away in amongst the cargo. We brought them along on top of the cargo, and had them yanked up on deck, and poured a great deal of water on them, and as that did not seem to do any good we broke open the bands, and they immediately burst into flames. We then threw them overboard.

9. It was clearly a case of fire from the interior?—Yes.

10. There could be no doubt that it might be due to exterior causes?—No doubt whatever, because the centre was charred, and as soon as the bands were cut they burst into flame.

11. Were these skins pressed or dumped?—I should say they were dumped, they were bound up so tightly with hoop-iron as they dump wool; skins pressed would be bound with wire. I suppose you would call them dry skins.

12. Not green?—No, I should hardly think so.

13. *Captain Blackburne.*] I suppose they were in the usual woolpacks?—No, not covered.

14. Was there any smoke coming from the hold?—No. The smell was what drew our attention to it first, coming up the ventilators and through the ceiling; that was where we smelt it first.

15. And it actually burst into flame?—Yes.

16. Notwithstanding that you put a good deal of water on them first?—Yes, we put a good deal of water on them.

17. The water would run off them, though, if they were dumped?—It did not go to the centre.

Captain Blackburne: That is a very extraordinary case.

The Chairman: It is very direct, too.

18. *Captain Blackburne.*] Yes, very direct evidence?—I cannot bring to my recollection having at any time seen wool burst into flame or catch fire.

19. Those skins had wool on them?—Yes.

20. With reference to the cargo on the "Tarawera," I suppose the ship was not full?—Not quite full.

21. Where did the fire break out?—In No. 3 hold.

22. In the lower hold?—No, in the 'tween-decks, away in the port wing.

23. What was the nature of the cargo?—Transshipment cargo, but mostly grain.

24. How long had it been in the ship?—The grain had been aboard since leaving Lyttelton, and the transshipments at this port.

25. What was the nature of the transshipment cargo?—I should say woollen goods.

26. Was that taken from the Home steamers?—Yes.

27. *The Chairman.*] In cases?—Yes. It is very difficult to say what was in the cases, because most of them were burnt, and we could see very little of it.

28. *Captain Blackburne.*] Were the 'tween-decks pretty full?—Yes, as far as the coaming of the hatch.

29. You were well loaded, then?—Yes, in the trunk-way, and each side of the wing.

30. When you took that cargo aboard there was no sign of heat in it?—None whatever. There was no sign of heat even when we were discharging in Gisborne that same morning.

31. *The Chairman.*] That was your last port of call?—Yes.

32. *Captain Blackburne.*] In your opinion, what was the origin of the fire?—I would prefer that you should not press that question at this stage.

33. *The Chairman.*] You have no evidence to show whether it was caused through spontaneous combustion or extraneous fire?—None whatever. Perhaps I might mention that we had some fire in the same hold in the centre of the cargo two trips ago, when there was nothing but sugar, flour, and pollard or bran. The fire was there, but I could not say in which.

34. Would it be more likely that it took place from extraneous causes?—I do not think so. It was too tightly packed, and there was no possibility of fire getting at it. I know the sacks were burnt for an area of about 6 ft. square. That started about a third of the distance from the lower part of the deck.

35. *Captain Blackburne.*] Have you ever before heard of cases of spontaneous combustion in such cargo as that?—No, never.

36. *The Chairman.*] Do you think it likely to have arisen from the covering or sacking?—They were mostly small bags of sugar. Of course, the flour was in a coarser sack.

37. *Captain Blackburne.*] Was the grain in bags?—Yes.

38. Was it wheat?—Yes. There is not the slightest doubt about it having originated in the centre of the stack.

39. Do you not think there is a possibility of smokers having been there?—No. There is always an officer in the hold during the time we are discharging cargo. That is a strict instruction, and it is carried out in the Union Company's ships.

40. And no smoking would be allowed?—Never. If by any chance the officer should be out of the hold there is always a leading seaman put down there during the officer's absence.

41. Have you been able to find out definitely the nature of the transshipment cargo?—No. The marks on the cases were destroyed, and we could not ascertain the marks of the cases.

42. Would you be able to find out from the manifest?—Later on, when it is all sorted out, they may be able to see which ones are missing. Of course, some of the cases were burnt, and the marks were not visible at all.

ALBERT THOMAS NORTON sworn and examined. (No. 122.)

43. *The Chairman.*] What are you, Mr. Norton?—I am chief officer of the steamship "Tarawera."

44. You had a fire aboard the "Tarawera" during your last voyage between Gisborne and Auckland?—Yes.

45. Can you enlighten the Commission as to anything you might consider likely to have been the cause of that fire?—I cannot give any idea whatever. When we searched the hold we could not find anything that would have been likely to cause the fire.

46. You know nothing about the contents of those transshipment cases?—No, beyond that they were, as far as we could see, cases of drapery—all sorts.

47. You had no reason to suspect that men had been smoking in the hold?—I am quite sure there was no smoking the holds, because I was in charge of that end of the ship; in fact, I was in charge of the whole of the ship, and was up and down the holds with the officers.

48. Have you had any experience in the past of fires on ships?—No; that was my first. I have carried wool for some years, but had no fires. Perhaps I have been fortunate.

49. Making trips Home?—Yes, in sailing-ships.

50. *Captain Blackburne.*] During your apprenticeship days?—Yes, and as officer. I made six trips with wool. I only had one small fire, but that was due to the heat caused by the boilers in a frozen-meat-carrying ship.

51. What was that?—The "Invercargill."

52. Have you ever found wool coming aboard wet at all?—I have seen wool taken in in the rain—raining heavily. I may say I have seen it taken into the ship pretty wet, particularly when loading at Napier, where we used to load from lighters. In the case of continuous rain we could not hang the ship up for a week or so, and I have seen it raining pretty heavily during the time we have been loading, but in the case of fearfully heavy rain we would stop for an hour or so.

53. And yet you have experienced no ill effects?—Never in my experience.

54. And you never heard of any damage to the cargo?—No, for as soon as we got Home we were paid off from the ship, and naturally we did not know much about the cargo or its condition. However, I have seen wet wool go into the ship.

55. *The Chairman.*] Would that wet be likely to penetrate the bales to any extent?—Not to any considerable extent; it might wet the packing. In the case of very wet bales I have seen them refuse to receive them aboard. I have seen them come aboard out of the lighters soaking wet, and they have been refused.

56. *Captain Blackburne.*] You did not do any dumping aboard during your apprenticeship days?—No; it was all done ashore.

GERALD STOKELEY DOORLY sworn and examined. (No. 123.)

57. *The Chairman.*] What are you, Mr. Doorly?—I am second officer of the steamship "Tarawera."

58. Have you been in ships carrying wool cargoes?—No, not carrying cargoes composed entirely of wool, only odd lines along the coast.

59. You do not belong to New Zealand?—Only of recent years.

60. I suppose you agree with the chief officer in saying that the rule prohibiting smoking in the holds is strictly enforced?—Yes.

61. *Captain Blackburne.*] Were you in the after hold of the "Tarawera" during the time she was loading at Gisborne?—Yes, almost all the time, except at Gisborne, where we were two hours discharging, and the chief officer was below. I was on watch until 4 o'clock and we arrived at 5, so the chief officer arranged with the purser to go into the hold.

62. You gather that the fire originated among some cases of drapery in the after hold?—Yes, it looked like it.

63. Was any damage done to the ship?—Just the deck over the fire.

64. Not in the fixed dunnage?—No. The fire seemed to start in the middle of the cargo, and the wooden deck overhead is burnt.

65. The beams overhead?—The beam-plate in the wing is a little buckled with the heat, so it must have been pretty hot while the fire lasted.

66. How far was that from the hatch?—In a line with the hatch in the wing, perhaps about twelve or thirteen feet from the trunk-way.

67. Did the fire spread much in the 'tween-decks?—No, it was confined to a small space; it could not have been more than four or five feet in area, although it spread through some cases.

68. Was there a great deal of cargo destroyed?—Not by fire, mostly by water.

69. You got it under control pretty quickly?—We had it under control in an hour's time.

70. There was a large volume of smoke, I gather?—Yes.

71. And no flames?—Yes, as soon as the hatch was taken off the flames spread. The flames soon found their way up, but they were quenched with the hose. Some holes had to be cut in the deck to admit of the hose and chemicals being put down.

72. Who discovered it first?—The engineer on watch noticed the smoke in the tunnel.

73. And it came up the ventilators, too?—Yes.

74. Was the fire anywhere near the ventilator?—No. That was the only vent for the smoke to escape.

75. *The Chairman.*] Have you had any experience of fire in any other ships?—Captain Rolls mentioned the fact of a fire having taken place aboard two trips ago. I do not know whether there is anything in this, but when that sugar was coming aboard I noticed that the bags were warm.

76. Was that loaded at the works?—No, from a lighter alongside. I generally feel the bags to feel if they are wet, and I remember at the time these bags were received they were pretty warm. I do not know if that had anything to do with what eventually occurred, but it would seem strange that the fire should occur at the last of the sugar and the first of the flour. You must understand that we knew nothing about that fire until we arrived here and found that there had been a fire. It appeared to have smothered itself. All the flour-sacks were burnt. The fire while it lasted must have been fairly fierce, because some of the pitch had dropped from the seams in the deck above on to the sacks.

77. I can imagine that sugar will burn if it gets a start, but I never dreamed of sugar starting a fire?—No. I cannot understand it, but there it was in the centre of the cargo. It started perhaps three or four feet up, and the bags underneath were quite intact.

78. None of the flour was burnt?—No; just the bags discoloured from the burning of the sugar.

79. Were many bags of sugar burnt?—About fourteen or fifteen bags.

80. Quite burnt up?—The bags were burnt, and the sugar was in a state of candy.

81. Had the flour got mixed with it?—No; the flour was alongside it. The sugar was stowed first and the flour next to it.

82. The flour did not get adrift and smother it up?—I do not think so. The sugar was burnt away and undermined.

83. It did not get sufficient air to keep it going?—That is about it; it smothered itself.

The Commission adjourned.

WELLINGTON, FRIDAY, 26TH OCTOBER, 1906.

The Commission sat in the Upper Court, Magistrate's Court House, Wellington, at 2.15 p.m.

WILLIAM LAUGHTON JONES sworn and examined. (No. 124.)

1. *Mr. Foster.*] I understand you are the secretary of the Seamen's Union?—Yes.

2. We thought it well to give you an opportunity of putting anything before the Commission on which you think might be of interest or of assistance to us touching the subject-matter of our inquiry?—Well, I have sailed in wool-ships, but I do not think I can give you any information likely to lead to a conclusion in the matter of the fires.

3. Have you had any experience of wool-shipments?—I have sailed in ships carrying wool between here and the United Kingdom.

4. Have you had any fires upon those vessels?—No, none at all.

5. Are there any suggestions you would like to make in the direction of preventing the recurrence of the fires?—No. Personally, I think it must be attributed to the condition of the wool.

6. There is nothing else you would like to say?—No.

WILLIAM THOMAS YOUNG sworn and examined. (No. 125.)

7. *Mr. Foster.*] What are you?—I am secretary of the New Zealand Branch of the Australasian Federated Seamen's Union.

8. I understand you can give us some information touching the causes of fires on wool-ships. Can you give us the benefit of your experience?—So far as my experience of fires on wool-ships is concerned, I might say I have never had any experience. At the same time, so far as fires are concerned, I should think they should be attributed to damp wool.

9. Have you any experience that would lead you to support that opinion?—No. I have had no experience beyond stowing wool on board ship; and so far as flax is concerned, I have worked the whole process through flax-mills.

10. Have any cases of spontaneous combustion in flax come under your notice?—Not directly.
11. Indirectly?—There have been cases where it has occurred through damp flax being shipped. As a matter of fact, I have seen it baled damp.
12. Have you known that to fire?—No; I could not say that. I have known it to have been taken from the field and passed through the scutchers in a damp condition, and baled right away.
13. But you have had no experience of spontaneous combustion resulting?—No; but I think there would be a certain amount of heat in the bales.
14. We have had considerable evidence on that point, and it has been stated that flax will not ignite in the pack, even if packed wet; it will simply rot. The temperature rises to a certain extent, and goes down again; but there has been no evidence of that being a danger. Is it your opinion that it would be dangerous?—I think so.
15. Have you ever noticed in the mills or on the mill premises any heating in flax which has been packed in the condition you mention?—Yes, I have placed my hand in a stack which had been damp, and a certain amount of heat had accumulated.
16. When you discovered an accumulation of heat, did you at once break down the heap, to allow it to cool?—Yes.
17. Did the heat go off?—Yes. The heat did not remain there when broken down.
18. From actual experience you cannot give us any instances of it having fired?—Not from my personal experience. So far as the wool is concerned, it is common complaint on the part of the shearers themselves that they have to shear wet sheep. In every agreement entered into by the shearers there is a clause guarding against that. You will find that in the shearing agreements of Australia and New Zealand.
19. Would it surprise you to hear that the trouble that has occurred has not been in the station wool? So far as we are advised it has been through the wool which has passed through the fellmonger's hands?—I have a letter here, which I received from two shearers at Akitio. I will read it: "Akitio, 17th November, 1903.—T. G. Young, Esq., Secretary, Seamen's Union, Wellington.—DEAR SIR,—I beg to state that there is sixteen of us shearing on this station, and through having signed a one-sided agreement we were compelled to shear wet sheep against our will. We have no union in this Island, and we either have to shear them or go away without our money, and there has already been too much of that sort of business. We have now shorn ninety-four bales of wet wool, and it is all pressed and dumped for shipment to England. I have the numbers and brands, which I will furnish you with. This is a crying shame to pack wool to ship which may take fire on the voyage Home, and the crew lose their lives through it. There is a heavy fine for such an act, and I believe the person that reports it gets half of the whole of the fine if it is proven; and we are positive that if the wool is tested it will be only too true. It will be shipped from here by the 'Kahu' to Wellington, and transhipped in Wellington for London. Now, we are ignorant of what course to take, and it struck us that you would know what steps to take—that is why we forward you the particulars. If you will report this matter to the proper person you can have any reward that may come from it, and if you do not wish to take part in it, send us the name of the proper person to report it to, and we will do it ourselves. Now, I trust you will give this your kind attention, and reply by return post. The brands are as under: A over 'Akitio,' with C, D, E, or H under 'Akitio,' which denotes the class of wool in each bale. Address, C. McDougall, care of J. Handyside, Akitio, East Coast.—P.S. This wool belongs to F. Armstrong, Akitio Station, East Coast, and may be shipped by Armstrong Bros." Upon receipt of that letter I consulted the Secretary of the Wellington Harbour Board, Mr. Ferguson, and he took the particulars of the brands. Subsequently, Lloyd's surveyor, Captain Bendall, was called in to make an examination of this wool, and out of the ninety-four bales ten bales were opened, and he passed them. He was of the opinion that the wool was fit to be shipped. I subsequently received another letter from the same people, dated the 1st December, 1903, which is as follows: "Akitio, 1/12/03.—W. T. Young, Esq.—DEAR SIR,—In answer to your letter of the 25th instant, we are very thankful to you for the trouble you have taken *re* wet wool, but I am doubtful about their having tried the right numbers, for I think that the bales that were worst were only loaded here on Saturday last, and some of the bales were discoloured after coming out of the dump.—The wet wool started from 316 to 401, ninety-four bales in all; but there were some lambs' wool amongst them, but not many, and we are quite confident that the fleece wool was too wet to ship. However, now that it has been reported to them they may watch the whole clip. It is no use going to Murray, Roberts, and Co., as they are partners with Handyside, and a river divides the two places, and we are shearing the two runs under the same agreement. . . . —We are, &c., CHARLES McDUGALL, H. C. FEELY." [Letters put in, and marked Exhibits Nos. 23 and 24.]
20. Is there any information you can give us beyond this? This is very interesting, and gives us sufficient data to follow up?—They are very specific, as you see, but whether the right bales were opened or not is a query. However, that goes to show that wet wool is shipped.
21. *Captain Blackburne.*] The ship got Home safely?—I cannot recollect if she did.
22. *Mr. Foster.*] You would not know by what vessel it was shipped?—No.
23. We shall have the matter followed up and ascertain by what vessel it was shipped. Is there anything else you wish to say?—I think, myself, there should be strict supervision over the shipping of wool, and that power should be given to the shearers to report the shearing of wet sheep, and on receipt of that report an officer should investigate and see that the wool was not shipped until that investigation had taken place.
24. Of course, that would be rather cumbersome machinery, because, at Akitio, for instance, the nearest officer might be miles away, and there would be considerable delay?—It is far better to have something cumbersome than having these lives lost at sea.
- Mr. Foster:* I think other means can be devised to reach the same end. However, we are very glad to have your expression of opinion.

25. *Captain Blackburne.*] Have you had any experience on wool-ships yourself?—Not in carrying wool, but in stowing wool. I worked one season here stowing wool.

26. Do you ever come across any heated bales of wool or flax?—I really never took that particular notice. Men in the vessel's holds stowing cargo do not take that much notice.

27. With regard to flax, you know that there is very close supervision in the nature of Government grading, so that it is practically improbable that any would be shipped wet, even now?—Of course, yes; but what I was speaking of was away back in the eighties. There has been a big alteration since then.

ARCHIBALD ALLAN THOMPSON SWORN and examined. (No. 126.)

28. *Mr. Foster.*] Your business is that of a stevedore?—Yes.

29. Can you throw any light upon the questions we are dealing with?—I am afraid I cannot say much more than has already been said in evidence. I think it is a matter more for scientific investigation than anything else.

30. In your actual experience, have you ever witnessed spontaneous combustion or other fires in wool cargoes?—No, I have not; but I have frequently come across bales heated. The heat has always been noticed by the way it shows the grease on the ends of the bales, and it always seems to come from the centre of the bales.

31. A great deal has been said about loading wool in wet weather and the danger of damage through surf loading. Does the water taken from the outside, if it amounts to saturation, lead to fires in wool-ships?—I do not think so unless it is thoroughly saturated, and it will take a lot to soak through a bale of greasy wool. In cases where I have come across heat in greasy wool it has been in the centre of the bale, where it has been impossible for water to penetrate from the outside.

32. Once it was dumped, would you suppose it would be possible for it to penetrate?—It might penetrate to a small extent, but very little.

33. Have you had any experience of flax?—Yes.

34. Have you observed any heating in that?—No.

35. Have you ever had wet flax in your hands for any length of time?—No, not to speak of.

36. Have you ever known wet flax heat?—No, never.

37. Do you think it would reach a considerable heat and then rot?—Rot. I think wool is much more dangerous to carry than flax as regards spontaneous combustion or heating.

38. *Captain Blackburne.*] It has been suggested that all flax or tow should be covered. Would that help to minimise the risk of fire?—I do not think so, because I think the gunny-bags in which wool is baled have a great deal to do with the causes of fires in ships.

39. *Mr. Foster.*] Would you say "caused the fires"?—If you take into consideration the number of fires that have occurred on ships carrying jute cargoes from Calcutta, I think there must be something in it.

40. But do you mean to say that when used for covering the wool it would be a cause of fires?—It is more liable to ignite than the wool itself.

41. In cases where you have had experience of gunny-bags firing, it has been through being packed damp, and the interior of this would be the same as the wool in the centre?—There have been more ships afire loaded with gunnies than with wool.

42. But these gunny-bags are in dumps?—Yes.

43. Would you regard it as a different thing where the gunny is stretched over the contents—say, for instance, over wool?—Yes; but friction to my mind has more to do with it than anything else. The way they load and throw the bales in any way causes friction, and I consider that friction has been the cause of these fires.

44. Is there much friction?—Yes, unless properly screwed up.

45. But in that case would not all the cargo swing together? If there was any movement at all, you would imagine that it would all move together?—Rubbing up and down together, and the friction between the bales would be considerable.

46. *Captain Blackburne.*] Have there been many cases of fires in ships with gunnies from Calcutta?—We had one case here last year, the "Aparima."

47. Was that supposed to be a case of spontaneous combustion?—I do not know how it originated. I remember several instances, and I fancy there have been more fires on these ships than on ships loaded with wool.

48. I think that in a conversation you had with me some weeks ago you thought the electric wires had something to do with fires?—Yes, that is very likely, because in some ships the electric wires come in between the deck, and they are liable to fuse.

49. What ships?—I could not name any particularly.

50. What ships do you stow?—I have stowed all the ships loading here except the New Zealand Shipping Company's.

51. Do the large steamers have the electric wires running through the cargo-spaces?—In the shelter-decks.

52. Mostly at the fore end of the ship?—Fore and aft as well. Those which have steerage accommodation for the voyage out carry cargo in that space on the Home voyage.

53. We have examined one or two of the ships—the "Rimutaka" and "Tongariro"—which have wires running under the shelter-deck, but they are very well protected, and it would be practically impossible for the insulation to be a danger. Do you think there would be any danger through sparks getting down the ventilators?—Very little.

54. Do they generally go down straight or have they a bend?—They have a considerable bend: they never go down straight, and many of them have gauze or wire down below.

55. Who is directly responsible for the stowage of the ships you have stowed? You or the officer of the ship?—The stevedore is responsible, but under the direction of the officer of the ship.

56. Do you get instructions from the superintendent?—It depends upon whether it is done by contract or not. If it is done by the companies it is done under the direction of the officer entirely.

57. Do you take it by contract?—Yes, altogether.

58. *Mr. Foster.*] I suppose the relationship is similar to that of a builder and architect in the case of a building contract?—Yes.

59. *Captain Blackburne.*] Did you stow the “Gothic”?—No, the company did their own work.

60. In stowing cargo on these ships, do you ever stow flax and tow on top of wool?—I never put wool on top of flax or tow, but I put flax on top of wool, with plenty of dunnage and protection in between—sometimes canvas or mats. I never stow flax or tow directly on top of wool.

61. Would you consider cargo consisting of rolls of tarpaulins or oilskins or American cloth particularly dangerous?—The most dangerous cargo you can carry. That is usually stowed on deck, or in open spaces where it is readily got at.

62. You would not stow it yourself in a hold without drawing the attention of the officers of the ship to it?—No.

63. We have had cases brought under our notice of such cargo being stowed in the hold from London out here?—Well, I have seen cases, but as a rule it is stowed in the shelter-deck or ’tween-decks, but I have never comes across any cases of it being stowed down below in the hold of a ship.

64. Do you think there are risks of fires through smoking in the holds of vessels?—Most decidedly. I do not think men should be allowed to smoke about the ships at all except in the proper cabins for the purpose, but never about a ship’s deck while loading.

65. Is smoking ever carried on in a ship’s hold while cargo is being stowed?—I have seen it.

66. Would you dismiss a man if you caught him?—I have done so. I dismissed a man for smoking at a winch over the hatch.

67. Do the winchmen and deck hands come under you?—Yes, the hatchman and the winchman.

JOHN JAMES CAMERON sworn and examined. (No. 127.)

68. *Mr. Foster.*] What are you, Captain Cameron?—I am at present chief officer of the “Turakina.”

69. I understand you were commander of the “Rimutaka” last voyage Home?—Yes, last voyage.

70. Can you give us any information that may enlighten us as to the causes of fires on board ships carrying wool?—Well, I can tell you about the “Rimutaka” fire. The fire occurred in the lower hold, close to the square of No. 4 hatch, but not in the square of the hatch; it was under the angle of the deck, and was discovered about half past nine o’clock on Saturday night by the smell of the smoke. We had the hatch covered up, and the hold practically hermetically sealed, and the Clayton fire-engine was run for about two hours. I believe the fire was then out, but the fire brigade came and insisted upon opening the hatches and pouring water down the hold. After that you could not tell how the fire was caused, because they pulled the bales about and burst them open and made a terrible mess of the hold, and flooded the cargo.

71. How many bales showed signs of fire?—I do not know the number.

72. Do you remember the position of the bales in relation to the hatch?—Yes, they would be the next tier to the opening of the hatch.

73. Horizontally?—Yes, towards the end of the ship forward of the hatch.

74. Was there any possibility of a leak through the deck?—There would be no possible chance of that. I left the ship at 4 o’clock on Saturday afternoon, and there was no suspicion of any burning, because hearing of the other fires we took every precaution to see that there was no sign of fire in that hatch or in any other.

75. Had you discharged any of the cargo at that time?—Yes, the two decks above that.

76. And can you account in any way for the delay in the ignition?—No. I think the wool had been ignited some time before that, and when the lower hatch was exposed—the hatch was covered with boards only, and on top of that was stowed wool, which practically sealed the hatch up, and when this wool was taken off and the hatch removed, the air was allowed access to the wool below, and combustion set up rapidly. I think it must have been smouldering for some time.

77. Did you see the damaged bales?—Not after they were taken out; I saw them at the time.

78. Were the woolpacks consumed?—Yes, the whole thing was charred; the outside was too.

79. Were any other bales burned on the outside?—Those which were over the fires were charred.

80. And the contents of these bales—were they absolutely gone; were they consumed?—I do not think they were entirely consumed.

81. What was the appearance of that which remained?—Blackened, stained, and wet.

82. Would that charred mass break apart freely? I assume if part of the contents was burnt the hoops would have nothing to hang to and they would collapse?—It was a blackened mass, but it appeared to be still wool.

83. *Captain Blackburne.*] Did it appear as though the fire had been inside the bales?—That I do not know. I think that some of them were entirely consumed. The original bales probably were, but I did not hear if they were or not.

84. We have had the evidence of the chief officer of the “Rimutaka,” and he practically covered the same ground as you have done. Have you noticed much loading of wool in wet weather?—No, very little.

85. Would you imagine that any serious results might accrue from the loading of wool during rain such as is usual in Wellington, for instance?—No, I do not think it would be a danger, for the bales would never be exposed for any length of time in the rain, and in the case of dumped bales there would be little chance of it penetrating.

86. As a matter of fact, the high temperature of the hold would dry it?—I think that is a difficult point, for there is nowhere for the water to evaporate to. The air would carry very little, and there is very little air-space in a full hold.

87. There is always a little circulation in the broken places and between the bales?—Very little.

88. How do you trim ventilators, back to the wind?—Yes, one down and one up. It is dangerous to trim ventilators other than back to the wind; it might not be the best ventilation, but it is certainly safest. There is always a possibility of a spark from the galley entering if they are trimmed otherwise.

89. *Mr. Foster.*] Have you had any experience of flax?—I have been carrying flax for about ten years, and I have never had any trouble at all with flax.

90. Do you think it would be an advantage if flax and tow were covered?—I have never seen it covered. I have never carried it other than uncovered.

91. Nearly all the tow shipped from Wellington is covered?—Then I should not recognise it as tow. Of course, the chief officer is not a cargo officer, and I should not be likely to recognise it as tow if it was covered like wool.

92. Would you think there was any safety in covering it when it is generally supposed that the material is more highly inflammable than the contents? It is only a precaution against the possibility of outside fire?—And that is only likely to occur during the short time the vessel is loading. I think it would be much better if uncovered.

93. Is there anything further you can tell us?—Of course, there has been a lot of talk in London about these fires, and different opinions have been expressed. Our marine superintendent in London told me there had been-slipe wool in each of the vessels that took fire, and he was of the opinion that they must be using some new chemicals for slipping the skins, and that may have been the cause of the fires. Of course, he is not a chemist—he is a seaman; but that has been talked about a good deal.

94. Did he give you to understand that it was caused by the chemicals and the dampness in the wool?—It was attributed to the chemicals themselves.

95. But the chemicals used in the colony are sulphide of sodium and lime. Both, of course, are safe so long as they are kept perfectly dry?—Has no one brought out new things, because there are always new dips and suchlike preparations being put on the market.

96. In the case of dips, they are used months before the sheep are shorn?—Yes, and as they bring out new dips, might there not also be new washes?

97. We have particulars of the brands of the “Rimutaka” wool, and we know what was used in the slipping of that wool. In both cases it was sulphide of sodium and lime. However, it is being investigated, and we have samples of all the dips and solutions, and it will be thoroughly investigated. In your ship have you any knowledge of the position of the electric installation?—Yes, in the “Rimutaka” I know none of the wires were anything near the fire. We are always very careful about the position of the wires, because we know there is a probability of fusion. I was at the building of the two new ships just before I joined the “Turakina,” and the installation was one of the things I was to watch. I do not think it possible that the electric wires would have anything to do with the outbreak.

98. *Captain Blackburne.*] Have you experience of other steamers on fire?—No, only in coal cargoes. When I was second officer of the “Waikato” we found after discharging No. 2 hold that there had been a fire in the general cargo from Home. What was most burned was a cask containing empty medicine-bottles packed in straw. It had been afire and had died out.

99. Could you say what was the origin of the fire?—I should say the damp straw in which the bottles were packed. There is another matter I might mention. We carry coal in bags on deck. These coal-bags are of the same material as the covering of wool-bales. When we empty these bags after leaving New Zealand they are continually wet with rain and spray, and until they are dry we know it is not safe to stow them away. If the weather continues wet we cannot stow them. I have seen a heap lying on the deck exposed to all the ventilation possible and saturated continually, yet I have seen them so hot in the middle after twenty-four hours that I could not put my hand on them.

100. You were not on the “Waikato” in 1896?—No; but I have heard a lot about the “Waikato” case, and I understand the most eminent chemist expressed the view that a little ventilation in a hold carrying wool was a very bad thing.

101. I mean when coming out to Auckland from London. There was a case of fire supposed to have originated in some tarred canvas stowed about 8 ft. from the side of the ship. That was pretty conclusively a case of spontaneous combustion?—Oilecloth is one of the very worst things you can carry—it heats rapidly.

102. There was a somewhat similar case on the “Matatua,” which originated in two cases of oilskins. They were put up on deck and started burning. These cases were stowed near some cases of matches and cases of spirits. It does not look as though the stevedores in London recognised the danger in such stowage?—All such inflammable goods should be stowed on the shelter-decks.

103. *Mr. Foster.*] I understand you had a conversation with a passenger relative to some damp wool?—Yes, it was only a conversation though. I was speaking to Mrs. Martin, the wife of a squatter in a large way at Martinborough, in the Featherston district. We were speaking about the prevalence of fires, and she told me her husband told her he had seen a person on an adjoining station pressing wool quite wet, and he said it was a disgraceful thing to do, for it endangered the ships and lives of the crew and passengers.

104. I wonder if the ship carrying that wool got Home all right?—Probably she did.

105. That wool might have been pressed for scouring?—No; most likely it was pressed for shipment. Mr. Martin would know what he was speaking about. If it was only pressed for scouring he would not have made such a remark. Of course, that is an old story, and there is no knowing what became of that wool.

The Commission adjourned *sine die*.

PROOFS OF THE EVIDENCE OF WITNESSES TAKEN BY DIRECTION OF THE COMMISSION BY THE SECRETARY (MR. O. F. DUNREATH-COOPER).

NAPIER, MONDAY, 15TH OCTOBER, 1906.

GEORGE M. MORRIS, manager of the Napier branch of Murray, Roberts, and Co., will say:—

1. I have been in the wool business for over twenty years, and during that time have had considerable quantities of wool passed through my hands.

2. You have had an opportunity of perusing the evidence which has already been given before the Commission?—Yes, I have read through that portion of the evidence which has been given so far, and, while I might criticize portions of it, I do not think I can give you anything fresh.

3. In your experience have you come across wool in a state of ignition?—I have seen locks and pieces in such a state that you might call them “red hot,” but never in a state of actual ignition.

4. Your exports from the Port of Napier are considerable?—Yes; Napier is the third largest exporter of wool in the colony. Our exports from the port last year totalled 60,243 bales of wool, and with all that we have had very little trouble in the way of heating, and as for fires—apart from the “Waimate”—we have had none. I think in the case of the “Waimate” that must clearly be attributed to extraneous causes. Mr. Butcher had considerable experience of the “Waimate” wool, and will be able to tell you something of the condition in which it was.

H. F. BUTCHER, resident partner of the firm of Bowron and Butcher, wool-scourers and fellmongers, will say:—

5. I am a wool-scourer, and have had many years' experience of the trade, and have passed considerable quantities of wool in all conditions through my hands.

6. You had some experience of the “Waimate” fire?—Yes, I was present when the “Waimate” was on fire in Napier roadstead. The vessel was pumped almost full of sea-water, and the whole of the cargo was covered before the fire was finally extinguished, 30 ft. of water being in No. 4 hold when the fire was eventually extinguished. The wool was thoroughly saturated with tallow.

7. Do you know if the tallow was stowed on top of the wool?—I do not think so, but when the holds were filled with water the whole lot was mixed together. The wool we had for reconditioning was thoroughly saturated with tallow right through the dumped bales, and it was a very difficult thing to get the tallow out of the wool. It was scoured three times before it was finally passed.

8. Did that wool heat at all after being taken out of the ship and before being treated?—Yes, it did heat, and I can tell you that the wool which seemed to be freest of tallow seemed to get hottest; the wool which was saturated with tallow did not seem to suffer much. The tallow was extracted by the hydro extractor. They would not allow that wool to go away until it was passed by two inspectors appointed for the purpose. Some of it was all right, but some of it while having the water extracted showed traces of tallow still remaining in the wool.

9. Was there any heating after reconditioning?—Several of the bales showed signs of heating. The wool heated through being wet with sea-water.

10. Did the sea-water penetrate the dumped bales?—Yes, it went right through the dumped bales. You must remember that the “Waimate” was full of water for three days. The water penetrated right through the dumped bales. They were opened up within a week.

11. Have you had any other experience of heating in wool under any other circumstances?—Yes, we had some of the wool from the “Jessie Osborne.” Mr. Burke and I had the wool to recondition. She had also been pumped full of water, and the packs were saturated. They had to carry it on deck. That was the worst line of wool ever I handled; it actually went into dust when we attempted to handle it.

12. Had that wool been burned?—Yes. I have never seen wool actually flame, but it has smouldered away—rotted away like a heap of manure; that is as near as I can describe the condition of the wool when we got it.

13. You do not think it would reach the point of ignition?—No, I do not think it would actually flame. Some of these bales were a week or ten days before being opened—that is, taking the time it took to bring it up to Napier, and I had it out in the paddock for several days before I could open it up. It must have been quite ten days.

14. Have you had wool to recondition which has been wet on the coast?—Yes; we handle the wool which becomes wet through surf loading or other causes. I have not had any cases of heating, although I have had it very wet indeed—perhaps it was too wet to heat. However, the “Jessie Osborne” wool was thoroughly saturated.

15. And you say the water penetrated to the centre of the dumped bales?—Yes, right to the centre of the dumps. The wool had been lying under water, and it was absolutely saturated. We have had wool to recondition owing to the floods which are prevalent in this district. We have had a lot of that water-damaged wool about our works, and have never had any signs of fire—that is, not burst into flame—although the wool will get very hot. My experience is that it would rot away before it would burst into flame.

16. Have you had any experience of flax or tow?—Yes, we had some of the flax out of the “Waimate,” but that was not hot at all. Some of that flax had been packed green, but it showed no signs of heat whatever. As regards fleece wool, I am of the opinion that if you were to pack several wet fleeces inside a bale of fleece wool and dump it the moisture from the wet fleeces would be absorbed by the surrounding dry wool, and the moisture would become evenly distributed

throughout the bale. What the result of close confinement might be I could not say, but I think if the wool was very wet the tendency would be more in the nature of rotting away than firing. I remember a fire taking place up at Wairoa. We had eighty bales of wool from that fire for reconditioning. Some of it had dropped into the river, and some of the bales had been scorched, but none of the wool was burnt. Those bales which we recovered out of the river were all right when we had reconditioned it.

17. How long had that wool remained in the water?—We just pulled it out and brought it down to the works here at Napier. It was just dried in the grease, and we had no trouble with it whatever.

18. Have you had any experience of slipe wool?—Yes. Slipe wool is never as dry in winter as fleece wool. However, we have never had any slipe wool reported from London as having been heated or damaged in any way. Of course, our climate is drier than in South Canterbury, for instance. Another point that occurs to me is that last year on some of the runs they had an extra amount of piripiri, and it occurred to me that that addition of vegetable matter in the wool might have something to do with causing fire. It is almost impossible to scour them out, and they would be present in the slipe wool and retain moisture when to all appearance and feel the wool might appear dry. I think that is worth taking into consideration.

19. Have you known of any heated wool being found in the wool-stores?—No, we have never had any heated wool in the stores. The only wool we have had heated would be that which came down in the railway trucks or became damp while being loaded on the beach.

20. Have you had cause to complain of the condition of the sheeting of the railway trucks?—Yes; and I have written many letters about that.

21. Do you mean the condition of the sheets?—More particularly with regard to the careless tying of the sheets.

22. That would be from flag stations particularly?—And some of the large stations too.

23. Have you suffered any hardship through having to load a certain number of bales in "L" and "La" wagons?—No; but sometimes it might happen that there might be a few bales left over, and they might not have kept sufficient back to make a ridge. We are never compelled to put a certain number of bales in a truck.

24. That would be a matter of careless loading of the trucks?—Yes, and there are instances of defective tarpaulins too.

25. Do you think if the system of inspection which obtained prior to the withdrawal of the underwriters' inspectors was restored it would minimise the risk of fires in wool-cargoes?—I really do not think it is necessary. We never had any inspection here, nor did Gisborne have any.

26. Captain Davidson was the inspector at this port?—That may be so, but all the wool could not be inspected. The bulk of the wool shipped from the port comes to the wharf at Port Ahuriri, but a considerable quantity is put aboard the large steamers in the roadstead. The wool is dumped at the coast stations in single dumps, and does not come alongside the wharf at all.

27. Is there a probability that there might be danger of damage through lightering the wool to the roadstead?—There is the possibility of its getting wet, but it is always well sheeted on the lighters. I am of the opinion that the woolpacks are more liable to heat through moisture than the wool itself. I have noticed when woolpacks have become wet that they have heated considerably on the outside, while the wool inside has been damp and cold. I think the jute bale is more liable to heat than the wool. If several damp bales are stacked you will observe steam rise from the bales in two or three days, while the wool is comparatively cool. As for wool burning, I do not think it would. In the case of the Wairoa fire the wool-shed was burnt, but the wool was not burnt—it was only scorched. A couple of inches on the outside of the wool was charred, but the interior of the bales was sound.

28. The scourers in this district do most of their drying on the green by the sun?—Yes, nearly all the wool is sun-dried. We invariably let it cool down to its natural heat after bringing it off the green. I think the artificial driers are to be deprecated unless they are well manipulated and the wool is given every opportunity to cool off after coming through the driers and every care is taken to ascertain that the wool is thoroughly dry. The Hawke's Bay climate is warm and dry, and as we are able to do all our drying in the sun there is little chance of heating or moisture being retained to any extent. The fact that we have never had any damage points to the supposition that the artificial driers must be responsible for a lot of the trouble.

29. It has been suggested that all tow should be covered with scrim or other covering. What do you think of that?—I think it is a most foolish proposition, for the very reason that the scrim is more inflammable than the tow itself.

30. It is contended that the scrim will protect the tow from extraneous fire?—Not at all. The scrim is as liable to fire from extraneous causes as the tow, and I am further convinced that there is no such thing as spontaneous combustion in tow or flax. As for wool, I do not think it will burn—I have never seen it.

31. Have you considered that it may require a certain period of time in which to generate sufficient heat to bring about combustion?—Yes. Well, take, for instance, Scales's boat, the "Jessie Osborne." She was ready for sea. She must have been a month or six weeks—and perhaps two months—and by the time they got the fire out it would be another week or ten days before that wool got up here, and although it was wet there was no sign of fire in it.

32. Do you know the cause of her fire?—No, and I do not think it has been definitely found out. I do not think it was spontaneous combustion. There was another boat of Scales's (the "Makrehanish") afire in Wellington. I saw the wool taken out of her. That was four or five months before the "Jessie Osborne" fire in the same season: one was in December and the other in March.

33. Those are cases of fire occurring before leaving New Zealand?—Yes, and so was the “Waimate.”

34. In the case of the “Waimate” can you account for the tallow getting into the centre of the bales of wool?—The ship was pumped full of water, and the heat of the fire made the water almost boiling hot. The tallow casks, wool, and everything was floating, and the tallow was afire on the top of the water. The “Waimate” was afire for three days. I never saw such an extraordinary mixture of stuff coming out of any ship in my life as that which was discharged after the fire. The wool in the centre of the bales was in a state of black rot, which went into dust when it was dried. That was in the centre of the bales; the outside was not so bad, but the centre of the bales was worst.

35. That is the “Jessie Osborne” wool you are speaking of now?—Yes.

36. Would not that seem to suggest that there was nothing in the theory that she was set afire?—Yes, for a lot of that wool would not have been wet at all.

37. From what you say it would be gathered that the heat originated near the centre of the bales?—Yes, the wet wool was all heated in the centre of the bale, for the cooler atmosphere outside would tend to drive the heat to the centre. Every one of them was heated. I think in such a case as that, if the heat rises to a sufficient temperature to start the vegetable matter, such as piripiri, in the slipe wool, it would burn, but it would require to be fed by the vegetable matter.

38. In the case of sheep-skins, do you consider there is any danger to be feared through dumping them for shipment?—All our sheep-skins are dumped for shipment from this port and baled up in packs. We have never had any trouble with them.

Captain RICHARD TODD, Marine Superintendent in New Zealand for the Tyser line of steamers, stationed at Napier, will say:—

39. I was in London at the time the “Gothic,” “Rimutaka,” and other vessels were on fire, and from what I know of the circumstances, and having read the evidence which the Royal Commission has collected here, I am convinced that you will only get the conclusive information by going to London for it. To my mind the Commission has started at the wrong end of the world; they should have investigated the matter in London first of all while the matter was fresh. In London the surveyors of the underwriters and the surveyors of the shipping companies were examining every one of the bales as they were recovered from the vessels; those are the men from whom evidence is required. The evidence of men who did not see the actual event is not of much value.

40. The Commission has taken steps to procure that evidence from London. Do you know if a Board of Trade or other inquiry was held in London?—No; their surveyors’ evidence was sufficient. The evidence of practical men on the spot who saw every bale taken out of the ship was quite sufficient.

41. Can you give the Commission the benefit of your own observations while being on the spot?—They will get sufficient evidence from those men. It is useless my repeating merely what I heard. I have heard all sorts of absurd theories by people who did not see the wool at all.

42. And what is your own theory?—My opinion is based upon what I heard from the people who saw the wool as it was brought off the vessels, and the unanimous opinion was that the fires had originated in the slipe wool.

43. Do you remember any of the brands?—Well, yes. However, that is not for me to say.

44. Do you know if it was “CFM”?—Well, yes, that brand was mentioned; but I do not want to cast any reflection upon the “CFM.” However, there was every evidence that the fires originated in the centre of the bales, for the bales which were opened up were charred right through from the centre to near the outside just like burnt leather, and when it was opened and exposed to the air it used to go into flames.

45. You do not think that would be the jute pack?—More likely vegetable matter which was in the wool. Jute packing will go into flame quickly enough if there is sufficient of it. After these bales had been taken out of the hold when the fire was extinguished some were left exposed to the air, and they burst into flame through the packing. The packing took fire, while the wool only frizzled. I never saw the wool burst into flame without the pack on.

46. You might have observed in the evidence of Captain Moffatt that the wool itself burst into flame when opened up?—Yes, they told me that when it was landed on the pier and the bands cut and the contents exposed to the air it burst into flame; but that is hearsay as regards the wool itself.

47. Captain Moffatt was in the docks at the time, and actually saw the wool blaze?—Yes, he might have seen it; what I got was from the underwriters and owners of the vessels. It was a general topic of conversation, and that is what I heard from those who did see it. If you want some evidence about flax we can give it to you here. We have had ocular demonstration that no amount of moisture will make flax heat. Captain Davidson, late surveyor to the underwriters, will give you positive evidence on that point. There were no signs of fire in any of the flax in London, but there were a few bales charred on the outside through the burning wool, but no evidence of any fire through the presence of flax in the ship’s holds.

48. *Captain East*: They put the loss of the “Blue Jacket” down to flax. She had a considerable quantity of flax on board, and they put the fire down to the flax. I believe some of the crew of the “Blue Jacket” were saved, but they did not know the origin of the fire. What did they attribute the loss of the “Marlborough” to?

49. *Captain Todd*: To ice, I think.

50. *Captain East*: I have heard it said that the danger during the frozen periods was in carrying the weight too high up.

51. *Captain Todd*: They made several voyages before with the same class of cargo, and nothing was ever thought of fire. To come back to the recent fires; of course, we know very well that at the time these ships were loading the company was putting an enormous number of sheep through their works, and the natural assumption is that they were trying to put more wool through their drying-machines than they were capable of dealing with.

52. It has been said that some 600 bales were in the works at one time?—Yes, because they were killing enormous numbers of sheep, and it seems to point to the fact that they were aware of it, because that company has sent to Wellington and ordered two improved wool-drying machines.

53. You were here when the "Waimate" was burnt. I understand the tallow was stowed in the bottom of No. 4 hold. Then, how did it get into the wool?—Easily, because the wool and flax burned right down to the tallow, and when the tallow casks burned the tallow floated. I was aboard the "Waimate" myself during the fire, and tried all sorts of means of putting water on to the seat of the fire. I used carbonic-acid gas, and had to flood the hold at last.

54. It has been difficult to understand how the tallow got into the wool, and it appeared to the Commission that tallow may have been stowed on top of the wool?—No, it was not. When the boiling water reached the tallow-casks they burst, and the tallow floated on top of the hot water in the hold. Hot water and melted tallow will easily find its way into wool even if it is dumped. I saw the stuff myself after, and it was shocking. Even after the fellmongers had dealt with it they did not make a good job of it. There was water left in and tallow.

55. Did any of that wool heat when going Home eventually?—I never heard of any of it being shipped. I think Mr. Cato (manager of the shipping company) would be able to say if any of it was shipped. I know Bourke had most of it to deal with.

56. You approve of inspection of wool before shipment?—Yes; all wool should be inspected before shipment, and any reported to be damaged or unfit for shipment should be sent to the fellmongers to be scoured or repacked. Wool coming to the port coastwise is sometimes damaged. Captain Davidson did the inspecting for the Underwriters' Association, and any bales which he considered unfit for shipment were sent to the fellmongers right away. During his absence I surveyed for him, and I understand his system of inspection.

57. Did he test for heat?—No, only for surface damage by salt water.

58. Have there been cases of damage through the trucks?—Yes, from fresh water sometimes in the trucks.

59. That would all be surface damage?—Yes. In connection with wool packed wet we have no means of discovering whether it has been packed wet or not. I cannot see where inspection is going to be effectual unless it is at the wool-sheds where the shearing is carried on.

60. Can you suggest any method of examining here at the port of shipment?—No, not to be effective. You would require to go to the centre of the bale to ascertain the condition of the contents for moisture or heat.

61. Thermometers, pricklers, tubes, and many other devices have been suggested to the Commission?—You would not have time to fiddle with those things in the wool season at its height. You would require a staff of inspectors. I cannot suggest any means of testing the centre of a bale. My own opinion is that it must be inspected before being packed, and certainly before being dumped. A lot of our wool is dumped on the stations, and never comes through Napier at all.

62. As many as thousands of bales?—Yes, ten thousand bales a year. All the Wairoa wool is taken straight on board the ship, and never comes in here at all; all the stations down the coast dump their own wool. There are certainly 10,000 bales that are never looked at.

63. Could one inspector cover the whole of the port?—How are you going to inspect dumped wool? A lot of wool is exposed for local sales: that might be inspected, of course, but an inspector could not inspect the wool in the eight dumping-stores and the wool which was being put over the ship's side at the same time. It could not be done.

64. Have you known of any station wool being packed damp?—I only heard of one case in this district, and that was some two years ago. However, I need not refer to that.

Captain T. Q. EAST, Marine Superintendent for the Tyser line, stationed at Napier, will say:—

65. I was present during the time Captain Todd was giving his "proof" of evidence, and I agree with him so far as my knowledge of the facts goes. I have read through some of the evidence which has been given before the Commission, and in it I notice that Captain Moffatt said the "Indraghiri" was on fire. As a matter of fact, we have never had a fire on any of our steamers. We had the "Indradivi," and the "Mimiro" last voyage had some flax caught fire alongside the wharf, but we never had a fire through wool on board our ships, so that evidence of Captain Moffatt on that point is altogether wrong. I have been going carefully through the evidence, and I remember some one said that in the Shaw-Savill line they never stow wool and flax together; then all I can tell you is that the Tyser line do.

66. But not in immediate contact?—In the same compartment, but with dunnage between. If you ask my opinion, I agree with Captain Todd that you are commencing at the wrong end of the world; this is not the place to get evidence, but you require to go to London and there get the evidence of those who were closely connected with the whole trouble and the evidence of the best experts in the world. I have considered this matter from the outset, and having been between twenty and thirty years closely connected with the trade I have come to the conclusion that the fires have originated from two or three causes. In the first place, I put it down to locks and pieces. I said that before I saw any evidence at all, and I also think the slipe wool is the cause of trouble. Fleece wool, if damp-packed, must also be considered a danger. I heard that a lot of wet wool was shipped from the coast ports down to Wellington.

67. Wet through being surf loaded?—No, not wet with salt water; station wet. Another thing I think is a source of danger is wet wool being stowed on top of casks of tallow, for I know that if a bale of wool is stowed in ordinary cases on top of tallow it will soak 3 in. of tallow out of a cask, and I know that the inclusion of tallow or such animal fats in wool causes it to be highly inflammable. I have heard people argue against that, but I know it is the case.

68. Do you mean it will suck it through the cask?—Yes; if wool is stowed directly on top of casks of tallow it will suck 2 in. or 3 in. of tallow out of the cask into the wool on a voyage Home.

69. You had some experience of the "Waimate" fire?—I was not here when the fire actually took place, but I came up here after, and the New Zealand Shipping Company asked me to hold a survey on the ship to determine what repairs were necessary. While going through the ship I had an opportunity of seeing the damaged stuff. I noticed that a lot of the wool had been completely burnt, and a lot of it was charred; in fact, you would not know, to look at it, that it was a bale of wool at all. I observed that a good portion of the most badly charred wool was immediately under the ventilators. This led me to consider the possibility of extraneous fire having entered the holds through the ventilators. As a result of that theory I have invented and patented a ventilator trap which is called "The Tyser Fire Cone and Plug and Tyser Combined Fire-plug and Water-trap." I will hand over to the Commission the plans and specifications, and if it is thought of value I am prepared to also hand over the patent and allow the Commission to judge of the merits of the invention. [Plan and specifications are attached hereto.]

WALTER MALENOIR, under-storeman of the New Zealand Loan and Mercantile Agency Company's wool-stores at Port Ahuriri, Napier, will say:—

70. Have had over fifteen years' experience in wool-stores, and during that time have passed large quantities of wool through the stores for local sale and for shipment.

71. Have you in the course of your experience come across wool in a heated condition in the stores?—Yes, I remember a case particularly about two years ago of some locks coming in which had been packed damp. They were in so hot a condition that it was impossible to place the hands in the bale. We have had more or less in a heated condition at different times, and in such cases the wool would be sent away to be scoured at once. In the case of scoured wool showing any heat we immediately sent it back to be dried and reconditioned.

72. Do you in such cases open the bales and sun-dry them in the stores?—No, we do not open the bales. We send it right back to be reconditioned. Others might open up the bales, but we do not. We open the bales for show for local sales.

73. Are locks and pieces shipped from the port in any quantities?—Some are shipped, but most of it is bought by local scourers. Some of the small men ship the whole of their clip, but they are so few it is hardly worth considering.

74. Do you think larger quantities of locks and pieces in the grease were shipped from this port last year than in previous years?—I do not think so. There are some men who will always ship; but in most cases I keep the locks and pieces back until final instructions are received and there is no probability of their being sold locally.

75. As to the handling of the wool in your stores, what is the practice?—The wool comes here by train and by boat; it is carted from the wharf at the Spit and sometimes from the breakwater, but very seldom from the breakwater, as most of the wool coming in comes by the small boats, which are able to enter Port Ahuriri.

76. A good deal of it comes by small coastal boats?—Yes, a considerable quantity.

77. Have you observed much of that wool wet externally through surf loading?—Sometimes the pack is wet outside through sea-water. We would notice that immediately by the appearance of the bale. In such cases we would ascertain the extent of the dampness, and if the wool was wet we would send it away for reconditioning. If the wool is wet with salt water we reckon it will not dry, and it is invariably scoured. If any bales are observed to be damaged we immediately report it to the Napier office and receive instructions from there.

78. All your wool coming to store is carted by dray?—Yes; we have no siding. We receive by dray *ex* wharf, and by dray *ex* rail.

79. Have you had any wool wet in cartage by drays owing to wet weather?—No; they are always well covered over, and the drays back into the dock in the shed to unload. Some wool comes direct from the stations by wagons.

80. Does it ever occur that wool thus carted becomes damaged externally through fording creeks or wet weather?—Sometimes a few bales may become wet through crossing a creek, but we would observe it by the grease marks on the bales.

81. But if the damage had been done some days before the team arrived here the bales would appear dry outside?—Yes, but the wet would show a stain on the bale if it is greasy wool, and the stain will remain on the pack.

82. You do not think there is much possibility of it escaping your notice, even in the rush of the season?—No. We always give a receipt for all wool, and you may be sure we are particular never to sign for a bale in which we are in doubt as to its condition. I hardly think it would be likely to get past us—not if it had been wet externally. If it had been wet at all it would show, and experience teaches one so that we could not be deceived. Of course, there is a large quantity of wool which is dumped at the stations, and gets wet between the station and the shipping port. That wool is sometimes shipped direct in the roadstead to the foreign vessels, and we never see it.

83. How long do you generally retain the wool which comes into your store for shipment?—Generally from a day to three months. It may be held for a considerable time owing to the desire on the part of some owners to have all their wool in the one bottom. That is distinct from sale wool, of course. Our sales in the season are six weeks apart, and the wool coming in for sale would be opened up within six weeks at most. We open up about a week before the sales.

84. Then, as to shipment after sale, what is the practice?—We send it down by dray to the wharf, from the wharf to the lighters, and by lighter to the roadstead, where it is shipped on the Home boats.

85. Have you ever any trouble through leakage by defective tarpaulins?—No, I cannot say we have. Sometimes a little water may get through under the sheets or through a pin-hole, but our troubles in that direction are very few. The owners invariably attend well to the sheeting of it themselves.

86. Have you no complaints on the score of faulty sheets on the railway?—No. I would not blame the Government; they give good tarpaulins, and if they are put on badly it is the fault of the owner of the wool, but we have had very little trouble indeed through the railway.

87. Have you in all your experience ever seen wool on fire?—No, never. I have seen it smoking in the ship's hold when Captain Tonkin's boat was afire alongside the wharf.

88. Did you see any of the "Waimate" wool?—Yes, I saw some of it on the wharf. Some of it came in here after being scoured.

89. What was its condition then?—It was all right. It was brought in here, and Captain Davidson and Captain East came and examined it, and stuck a knife into it to see that it was all right. We could not dump a bale of that wool until they had seen it. It was all minutely inspected before it was allowed to leave here.

90. Have you any opinion yourself as to the probable causes of fires in wool cargoes?—No, except that I think it is the very dirty wool containing a large quantity of vegetation. No doubt, dirty locks if dumped would cause fire. I have never seen fleece wool warm like the other sorts, such as locks and crutchings and stained pieces. I do not think there is much fear of fleece wool if it is dry.

91. Do you think it would be a hardship if the exportation of such pieces as you mention was prohibited?—It is so seldom that they are shipped. If a man likes to ship them we will ship them for him, but he is paying for the carriage of dirt. I should never ship them myself, as it will never pay to send Home dirt and dags. However, there is so little of it shipped that the prohibition of it would not be a hardship.

92. You get through a good quantity of wool in the height of the season?—Yes, we have had as much as thirteen trucks a day—400 bales a day in the season.

GEORGE TIMLIN, storeman, of Murray, Roberts, and Co.'s wool, grain, and general stores at Port Ahuriri, Napier, will say:—

93. I have had over thirty years' experience in the wool trade. I have been reading the evidence which has been given before the Commission, and I do not believe that wool will burn. I would like to see it proved. You could not burn wool if you put a fire under it. It might burn to a certain extent, but it will not blaze up like other fabrics. As to spontaneous combustion in wool, I do not believe in it. I have seen bales of wool very hot, but they have always cooled down again after a time. We have had a good deal of damaged wool one way and another through fire, but they have all been externally damaged, and have been all right inside.

94. As to your system of handling wool for sale and shipment?—It all comes by rail and by wagons from the country. We have a railway siding into the shed here, and the wagons are brought into the shed and unloaded under cover.

95. You dump that wool here?—Yes. The lighters lie alongside the breastwork across the road, and the wool is rolled or wheeled in hand-trucks across the road into the lighters for despatch to the roadstead.

96. How do you get on with that process in wet weather?—We always do it in dry weather. We have to get receipts from the lighterage company who own the lighters, and they take no risks, nor do we. The lighters will not take any wool in while it is raining. The receipts must be for wool in good order.

97. Have you much trouble with wet wool?—Where we get wet wool in nine cases out of ten it is from the coast. Of course, if we get any in here wet I immediately call Captain Davidson's attention to it. If it is greasy wool it will show a stain on the bale. Of course, in the case of scoured wool we are unable to tell its condition; it might be quite dry and clean outside, yet the interior of the bale may be quite wet.

98. How would you ascertain the condition of the interior?—We could not, unless we open up the bale.

99. What would raise your suspicions in that case?—Nothing whatever.

100. What about the weights?—Yes, that would raise our suspicions, but it would have to weigh very heavy to do that.

101. But you can judge the weight of a bale to a nicety?—Yes, but even then it is difficult to detect it.

102. Do you find much of that?—No. All the Hawke's Bay wool is green-dried in the sun, and is not likely to retain much moisture or heat. As I said, however, it is hard to detect moisture in scoured wool. It must be left to the scourer to do his utmost to put his wool up in proper condition and take no risks. Of course, greasy wool if wet will never escape one if he is at all careful.

103. Do many of the stations do their own scouring in this district?—Yes, several large stations scour their own oddments—that is, merino wool—and it comes down by wool wagons a distance of over forty miles.

104. Do you pass much slipe wool through your store?—Yes, we get a fair amount from Butcher and from Nelson Brothers. I think the dumping of wool is more likely to be a preventative of fire than undumped. I have seen slipe wool pressed and go into a cake through being dumped, and go quite cold. That wool had been damp at the time it was dumped, and I am of the opinion that dumping keeps the heat down.

105. At what pressure do you dump here?—We dump at 2 tons to the square inch—that is, the ordinary full-size bales. The double dumps are somewhat smaller bales.

106. Have you had any cause to complain of the defective sheeting or defective tarpaulins on the railway?—We have had such cases of wool being wet in the trucks, but the railway people are not responsible. If you send for a loading of trucks the Railway Department will load for you and charge 3d. per bale for loading; if you do not wish to pay the loading charge you may load yourself and put the sheets on, and the Department is not responsible.

107. Do you come across faulty sheets?—Yes, sometimes, but they never trouble you. I invariably put two double sheets on before allowing the wool to leave here.

108. Are you not compelled to put a certain number of bales in a truck?—No. That may be so down south, but we are not asked to put a certain number of bales in any truck. We have never had any of our wool damaged in transit on the railway. We always load with a ridge and please ourselves how many bales we put in a truck. I know that is the invariable practice in the district.

109. Have you known of station wool being shorn wet?—Yes, stations in a hurry to catch a market will very often shear wet sheep. I have known the shearers growl at having to shear wet sheep. I have known men strike through having been compelled to shear wet sheep; that was two years ago, in the Hawke's Bay District here. The shearers struck and would not shear. It is a difficult matter to tell when the wool is really dry if heavy in yolk. Take any ordinary wool in damp weather, it takes in a certain amount of moisture if it comes in in wet weather and is weighed and stored in the shed; then, after some of our hot westerly winds, if you weigh that wool again you will find it has lost 3 lb. or 4 lb. weight per bale in three or four weeks' time. We check-weigh all our wool, and we invariably find a difference, as the wool takes in a certain amount of moisture in wet weather and loses it again in dry weather.

110. In opening sale-wool for display would you detect any dampness which might be present?—Supposing we have twelve bales of one class of wool we would only split open two bales; in that case we would hardly open up more than one or two bales of the class.

111. So that would not eliminate the possibility of some damp wool escaping you?—No. We might miss a damp bale, but, on the other hand, we might just strike one. However, I do not think we have much to fear from dampness in fleece wool. The trouble is more likely to occur in slipped or scoured wools.

FRANK COGSWELL, wool storeman for Messrs. Williams and Kettle, Port Ahuriri, Napier, will say:—

112. I have been for twenty years in charge of the wool stores here. We have had experience of excessive heating in wool on many occasions. This has been brought about by dampness in the wool, and on such occasions the wool would be immediately sent away to be reconditioned or scoured, as the circumstances might warrant.

113. In what classes of wool is the heating usually present?—Scoured pieces and slipe wool.

114. More particularly in slipe wool?—Yes, and in scoured crutchings and scoured pieces.

115. Have you noticed it to any extent in fleece wool?—I remember a line of some 266 bales which passed through my hands some two years ago, and in which I detected dampness and a tendency to heat.

116. To any great extent?—Yes, to a considerable extent. That wool had been purchased by a Dunedin firm privately for Home shipment, and dampness was detected. The sale was cancelled, and the wool had to be reconditioned and shipped Home on the owner's account. The whole clip had to be reconditioned. The fleece wool was shipped, and the pieces and locks were sold locally. During the spring there was considerable wet weather, and I believe it was owing to the sheep having been shorn wet. The whole of the 266 bales came into our store within a fortnight.

117. Was the dampness present in all of it?—Yes, the dampness was present right through the clip, and we would not keep it in the store. Last season some eight bales out of a line of 120 bales were just caught in time; they were very damp and heating, and were sent to be reconditioned.

118. You think there is a danger through dampness in fleece wool?—Yes, it certainly heats to a very great extent, and I believe it would ignite, but I think a good deal would depend upon the extent of grease in the wool. I think a certain fixed amount of dampness is necessary to bring about combustion, and, of course, pressure combined with that moisture. We have had some slipe wool in a very heated condition, and have had to send it for reconditioning. I think there is more likelihood of danger in the slipe wool than in any other, for the reason that there is animal matter present, and lime remains in the tips.

119. Have you noticed particles of sulphide of sodium and lime adhering?—Only in the third qualities, not on the first or seconds. I have observed particles of the lime adhering to the tips of the wool.

120. Through being insufficiently slaked?—Yes, the small particles would crumble away.

121. Do you think there would be any heating properties left in that?—I hardly think so. I think any heat would have been expended. Still, there is the possibility that with moisture present there might be a danger. With regard to the big lines from Nelson Brothers' works, we have never the slightest doubt or suspicion as to their condition, and we put through over a thousand bales every year from those works alone. Some of the smaller works may not be so careful with the get-up of the slipe wool. I am positive that pressure intensifies the possibilities of heating in such wools. The greater the pressure the more likelihood of generating heat; that has been my experience. We had a line of 120 bales which had been station-pressed. We had put a small portion of it through the dump when we observed dampness in the wool. We had the whole lot examined, and found dampness right through it.

122. Do you think one inspector could inspect all the wool from this port before shipment?—He would require to be pretty nimble, for it would keep him going. We export about 60,200 bales a year, and nearly all the coast wool is transhipped in the bay. A good man could do the inspection right through the sheds, but I do not know about the coast wool, which is dumped on the stations and is being transhipped into two or three holds at the one time in the roadstead. However, an inspector would receive every assistance from all the storemen and shippers. I have always been most careful with regard to the inspection of all wool passing through my store, and I am sure the same may be said of the others. I have always had the underwriters' inspector examine any wool about which there was the slightest doubt with a view to the prevention of fire as

well as to remove the possibility of claims being made. I have realised from my very earliest days that wool will heat under certain conditions, and if I have ever had a doubt I have telephoned for Captain Davidson, who acted for the Underwriters' Association. He is a man with a long experience, and is most careful and takes every precaution. I have read a good deal of the evidence which has already been given, and I can see nothing for it but inspection to prevent the possibility of fires taking place. I think the practical experiments the Commission is making is the best class of evidence that could possibly be obtained. One point which has occurred to me to mention is the fact that the presence of piripiri in slipe wool must be a source of danger. We know that it is difficult to get such wool thoroughly dry owing to the piripiri retaining so much moisture.

123. Do you think the inspection for sale is sufficient to safeguard any negligent packing?—I think so. If there was moisture present in any quantity it would be noticed when being opened for valuation and lotting.

124. Provided you open sufficient?—Yes; but almost every bale offered is opened for inspection and valuation.

125. Your weights run a fair average throughout the season?—Yes; a fair average for fleece is 3 cwt. 3 qrs.; scoured will go about 2 cwt. 3 qrs. to 3 cwt.; locks and crutchings will run heavier, while slipe wool goes about 3 cwt. 2 qr. to 4 cwt.

126. Have you had any heating in sheep-skins?—Yes, I have had sheep-skins here heated very badly, and have had to have them opened up for local treatment. I think there is considerable danger if they ship them dumped. I think there is more danger to be feared through dampness in sheep-skins than in the wool itself owing to the presence of fat and other animal matter and vegetation.

ALFRED WEAVER, of "Riverslea," Hastings, wool-scourer, will say:—

127. I have had over thirty-two years' experience as a wool-scourer, and have passed considerable quantities of all classes and conditions of wool through my hands. I have read a portion of the evidence which has already been given before the Commission, and from my own experience I am convinced that the cause of the fires in wool-cargoes must be attributed to the low-quality wools. Moisture in the low qualities will bring about heating, while the same amount of moisture in fleece wool would only become warm. It is a most difficult matter to find belly pieces, breach pieces, or locks in a thoroughly dry state. They can carry 5 per cent. of moisture without much damage resulting, I believe, but any excess of that amount is certainly a danger. I have had belly pieces and breach pieces in my works in a very heated condition, and in several instances I have had such wool come in, and on opening it out I have found that it has been charred to a cinder in the centre of the bale—to such an extent that you could take out a handful and blow it away like dust. I am firmly of the opinion that if such wool had been confined in such surroundings that the gases could not escape it would take fire. I think the shipment of breach pieces and belly pieces, locks and crutchings in the grease should be prohibited. I do not think you have much to fear from the fleece wool if it is in a fairly dry state. It is only within the last ten years that there have been any fires to speak of in wool-ships, and it is only within the last ten years that the greasy pieces have been shipped Home to any extent. During that time the country has been more opened up, and a class of men have gone in for sheep-farming who know little or nothing about the business, and through want of experience are unable to tell when wool is dry sufficiently to eliminate any possibility of danger. In the years gone by the runs were in the hands of large holders, who invariably employed competent wool-classers to watch over their clips, and the low-quality wools were invariably scoured. I think the greatest danger lies in the slipe wool if it is not thoroughly dry and aired. I think it should never be pressed within two days of its being brought in from the sun, for there is always the possibility of its "going back," and the dampness enters the wool again. I think regulations should prescribe the mode of preparing the sulphide of sodium and lime for painting skins for fellmongering, and there should be a guarantee that the lime has been thoroughly slaked and the wool well and sufficiently washed to remove all traces of the lime, and sufficient time allowed for the heat to leave the wool before being baled and pressed.

128. During all your experience have you ever seen wool actually in a state of ignition?—No, I have never seen it on fire, nor do I ever expect to, because I think that certain conditions are required to be brought about before it can actually fire, and those conditions are only likely to be present when the wool is dumped and closely packed in a ship's hold. I believe wool will spontaneously ignite, because I have had wool in this shed so hot that no man could put his hands upon it to shift it. I have come to the conclusion that it is only the low qualities of wool that cause fires, because in several cases where there have been fires in wool-sheds the wool which has been rescued and which has been soaked with water and brought out here for scouring and reconditioning will always show greatest heat in the low qualities.

129. You know the Commission is now experimenting with low-quality wools?—Yes, and I am positive that the result will be that they will find the wool charred in the centre. If there is a large quantity of dags present it will be found that the interior of the bales will have rotted away like a manure heap. I think it will be found that the heat has left the dags within about six weeks of dumping. I think it is a mistake to think that wool which has been country-damaged can be properly dried in the stores. The tendency in every case is for the moisture to penetrate into the interior rather than be drawn out by the sun, and for that reason I think there is danger to be feared through damp in railway trucks or loading in wet weather.

130. Do you favour inspection before shipment?—I do not see how you are going to reap any benefit by inspection. Wool is sent down as a rule in a hurry, the merchants are anxious to get it dumped and aboard the first boat possible, and the cursory glance an inspector could give the exterior of the bales would not be of much benefit. What I do think would minimise the risk of wet wool being shipped is for each sheep-farmer to be compelled to have a consignment-book, in

which he must enter every consignment of wool, and at the foot of each form he should make a solemn declaration—under pains and penalties—that he declares the wool to be dry and in a fit and proper condition to be shipped. This should be particularly insisted upon with every fellmonger and scourer. These consignment-notes could be issued by Government, and the butt would be a permanent record which must be kept for inspection if necessary. The note would pass with the wool, and may be indorsed by each consecutive holder of the wool. The first buyer would hold the seller's warrant that it was in good condition, and the seller in turn would indorse the note to the effect that the wool continued in a proper condition for shipment under similar penalties.

131. Would that prevent the shearing of wet sheep?—Yes. There are always wet sheep shorn. There are lots of shearers who will not shear wet sheep if they do not want to get along to another shed, but if they want to get away they will shear wet sheep quickly enough. This is more likely in the case of ewes and lambs. If the ewes are brought in damp the farmer is anxious to get the ewes through as quickly as possible to save dis-mothering the lambs. They will shear them if the farmer has to do it himself to allow the ewes to get away to the lambs as soon as possible. Here, in my shed, at the present time, is a lot of crutchings which I have just bought. This wool was ready for shipment to London; I made an offer for it, but the offer was refused, and the owner had instructed it to be sent to London. I sprung my bid, and it was accepted, and the wool has just arrived in my shed, and you can see for yourself that it is really wet and is heating. I am going to scour it at once. I can tell you of another case that occurred recently. Three bales of wool were put up in the local sales and knocked down to me at 8½d. per pound. If I had not purchased that wool it was going to be shipped. On opening bales No. 1 and No. 4 it was found that they contained damp wool in the centre of the bales, and I threatened to cancel the sale and return the wool to Napier unless a reduction of 2½d. per pound was made on No. 1 bale and 2d. per pound on No. 4, making a total reduction on the two bales of £8 16s. 5d. The owner refused to make the reduction, and I told him through his agents that I was returning the wool to Napier, and threatened to have him prosecuted under the Act for putting up wet wool. He accepted my demand and made the reduction, if I would keep the wool. That is an instance of what really does take place. Do you think that owner would forego £8 16s. 5d. on two bales of wool did he not know in his own heart that the wool was damp and falsely packed? He knew it was not in a condition to ship, and if I had not taken it he would certainly have shipped it. I have the whole of the correspondence and the marks and numbers and invoice and credit notes here before me, and will give you the whole of the facts if you wish them. I think every shipper of wool should be compelled to carry part of his own insurance, and the insurance companies should not be allowed to insure up to the top value. This, I think, would make the shipper more careful as to the condition of his wool. I think the greatest safeguard is to be found in the system of consignment note which I have advocated. No man could thereby plead ignorance of the law, for it would be clearly put before him when making every consignment.

S. H. KNIGHT, Hastings, Hawke's Bay, will say:—

132. I have had over thirty years' experience in the wool trade as a fellmonger and scourer. I am not in the wool trade now and have no axe to grind when I say the prime cause of the fires in wool cargoes is the shipping of daggy and dirty locks and pieces. From my experience of wool-classing in different sheds in New Zealand I certainly can assert that much wool is shipped in an unfit state, and especially when the tempting high prices are obtaining. In a wet season farmers are naturally in an excited state to get their clip to the market, with the result that sheep are shorn when there is a doubt as to its dryness. The farmer will say, "Oh, the fleece is perfectly dry, but I will skirt heavily and scour the pieces." This intention may be good, but the object often miscarries, with the result that after shearing this doubtful wool the pieces are packed and the bales mixed up with the balance of the clip, and sent to the brokers for sale or shipment. Very often, too, a buyer will ship instead of scouring, as was originally intended. Therefore I maintain that all low qualities should be compulsorily scoured before leaving the colony. Regarding slipe wool, it is very hard even for an expert to tell when slipe wool is dry. It may feel warm and dry in the sun on the drying-grounds, but on leaving it in the packing-shed in bulk it is often found to "come back"—that is, it shows a strong tendency to attract moisture when cooling down. I have known a case where a large stack of some three or four hundred bales awaiting scouring had heated very badly. We found that the bales had been stacked together indiscriminately, irrespective of contents or quality, and in every case where the wool was most damaged it was in the low-quality wools, and they had a great influence on the general result of treating. I have read portion of the evidence which has so far been given before the Commission, and I have come to the conclusion that a great deal of it does not get to the root of the evil. I think if the practical men, such as fellmongers and scourers, would give their unbiassed opinion it would be to the effect that not sufficient care is taken when preparing wool for the market, both by the growers and scourers. What Mr. Burrige says on the whole is pretty convincing, but lacks weight owing to the fact that he has always been in the employ of large firms where conveniences were always at his hand and has had everything to assist him in the conditioning of his wool; but, take a small man in a small way of business, who has to rely upon the elements for drying and conditioning his wool, probably pushed to catch a certain vessel—as many of them are—does that not suggest that that man may overreach himself and ship when under other circumstances he would not think of doing so? I have seen wool (and have done it myself hundreds of times) taken straight from the drying-grounds and packed straight away, fortunately with no bad results, probably owing more to good luck than good management; but nevertheless the fact remains that it is done, and in many cases one never hears any more of it till his returns show discrepancies in the weights, which is convincing that considerable evaporation has taken place on the voyage Home. I agree with the evidence of Mr. Walter Hill, particularly questions 105, 110, 111, 120, and part of 123, as to observing

a flash of flame. To my mind sufficient care is not taken by the wool-grower to ascertain that the man who is going to class his clip has sufficient knowledge of his subject to guarantee that the wool will be put up in a proper condition for shipment. Very few growers realise the great responsibility of getting up their clips. They go to no end of trouble and expense all the year round to get a well-grown clip of wool, and at the last stage—that of shearing and classing—they leave it to some one who may have been recommended as a wool-expert who really knows little about his business, but is anxious to get away to the next shed. I do not mean that sheep are shorn wet wilfully, or that wool is shipped wet wilfully, but I do maintain that growers are not sufficiently careful—from my own experience of them—who they have in their sheds to superintend the get-up of their wool. Shearers, I maintain, are the best judges of the dampness or dryness of wool; but if there is the slightest doubt the wool should have the benefit of the doubt, and should not be shorn.

ALFRED COKER, wool storeman for the New Zealand Shipping Company at Port Ahuriri, Napier, will say:—

133. I have had many years' experience in the wool trade, and have never had any experience of fires in wool. I have read a good deal of the evidence which has been given, but do not think I can throw any fresh light on the subject. We receive all the wool for shipment from this port by drays from the railway or country. It is dumped here in the sheds and carted across the road to lighters, and we are particularly careful to guard against any damage through wet or otherwise. We are perhaps more careful than other people on account of the wool going into our own ships. I have had some bales of wool pass through the shed become so hot that it could not be touched, but have not seen it actually on fire; in fact, I would not believe that greasy wool would burn. I have tried it without success. In cases of damage through surf-loading or wet with rain-water we invariably send the wool to be scoured. We have never had any complaint against the Railway Department owing to defective or insufficient sheeting. I have heard that others have had cause for complaint, but we have always found the sheets sufficient and in good order. I think the system of inspection, if reverted to, would be a safeguard against a recurrence of fires, providing the inspection is thoroughly carried out.

THOMAS TIMOTHY MCCARTHY, wool storeman for Messrs. Dalgety and Co. (Limited), at Port Ahuriri, Napier, will say:—

134. I have for thirty-five years been closely associated with wool in every stage. I think the question of the cause of fires is more a matter for scientific experts. I have seen a great deal of heated wool, discoloured by chemical action brought about by heating through the presence of moisture. I have seen it so hot that you could not touch it with the hand; steam would rise from it, but not actually afire or smoking. We get many bales here wet through coast loading, and it is necessary to send them to the fellmongers or scourers for reconditioning. Fellmongers' wool—particularly the slipe wool—very often shows heat and moisture. In some cases when the bales have been opened up the wool in the centre has been found to be discoloured. A few years ago, when the "Jessie Osborne" was burnt at Wellington, the cargo of wool was submerged in water to get the fire out; nearly all of that wool was brought up to Hawke's Bay and distributed amongst the local scourers for reconditioning. I was employed on behalf of Lloyd's and the underwriters to go out at regular intervals and inspect that wool to see that it was properly scoured and dried. When that wool reached Napier it was very wet. It was taken to the fellmongeries and thrown in heaps and put through as quickly as possible. Considerable portions of that wool were in hand for from eight to ten weeks, lying in the bales. Much of it was highly discoloured and heated, the fibre had deteriorated and rotted away, but no fire was present. It was dumped when it came up here, but the bands were cut and the wool was lying in pressed bales.

135. Were the bands cut to prevent heating in the wool?—Well, partly for that reason and partly for convenience. They were double dumps, and it was easier to handle them in single bales. I think if you could reproduce the conditions prevailing in a ship's hold and make experiments you might be able to get at the cause of the fires. We never have any on shore, and I do not think they would take place. It has occurred to me that there must be considerable danger in stowing flax and wool in the same compartment. There is always a certain amount of resinous dust dropping from bales of flax, particularly when there is any friction. That dust, I know, is highly resinous and inflammable. I think there is more opportunity for friction in the present methods of stowing ships than there was some years ago.

136. Do you think the system of inspection, if revived, would minimise the danger of fires?—I think it would be a great help, but even since the inspector has been withdrawn we have relaxed none of our vigilance; the only thing is, we use our discretion, and are as likely to detect wet wool as the inspector.

137. Do you think the small grower is more careless than the larger sheep-farmer?—No; my experience does not help me to that. I have some actual experience bearing on that point, because my work is intimately connected with the classing of the small people's wool for sale here, whereas in many cases the larger clips are not offered for sale here, but are sent to London. It is very rarely that I find any of the small farmers' wool sent in damp. Another thing I would like to say is that within the past two or three years an increased proportion of low-quality wools has been shipped in the grease, such as was never thought of being shipped before. The Japanese war created a great demand for cheap blankets, which were produced from low-grade crutchings. Hitherto these crutchings had been scoured and shipped dry, but during the past few years they have been shipped almost entirely in the grease; even after being purchased by the wool-sourers they have found it better to ship them in the grease, the demand was so great. My experience shows me that locks, pieces, and crutchings are far more liable to generate heat than the general

run of fleece wool, even if damp. The farmer will send in locks and crutchings knowing them to be damp, because they know that those qualities are nearly always purchased by the local scourers; but, as I have said, the conditions have altered, and a great proportion of them have been shipped without being dried or scoured. I do not think it would be well to make the law prohibitive, but if a little more care could be insisted upon it should provide against any reasonable risk. I think the inspectors should be appointed at the principal ports. I think it is very desirable that flax and wool should not be stowed in the same compartments. Of course, the farmer insures his wool from the sheep's back to London, and—except for common decency—he does not care what becomes of it. It is, therefore, a matter for the insurance companies to safeguard themselves and the public by inspection as before, perhaps with some assistance from the Government. I think the conditions of the last two seasons have been extraordinary, and are not likely to occur again—firstly, through the demand for locks and crutchings in the grease; and secondly, through last season having been extremely wet at the time of shearing and shipment. Those conditions combined are not likely to occur again. Locks and crutchings have gone down within the past few months; they have fallen in value about 30 per cent., and when they get down to what we call “normal rates” it pays better to scour in the colony and ship them clean. Of course, increased rates of insurance will touch the shipper more directly. There is not the same care or horror at shipping wet wool as there was many years ago. It must be acknowledged that this is remarkable, and has great bearing upon the subject of fires and the fact that the fires have been coincident with the enormous expansion in the export of flax. I think it must be considered from that point.

138. Have you had experience of sheep-skins heating?—Yes; I have seen bales of sheep-skins when dumped generate great heat and exude oil in a very marked manner. I had a dozen bales of dumped skins in the shed here standing just here; they became very heated and exuded a considerable quantity of clean oil, and there are the marks plainly to be seen on the floor. That, I think, is a source of great danger. There has been a large increase during the last two years in the number of butchers' sheep-skins exported. By that I mean sheep-skins as they come in from the stations or meat-works with the wool on. These may be improperly dried and have particles of fat and blood adhering to them. I think they should be inspected as carefully as wool, for I realise there is more danger in them than in clean fleece wool.

JOSEPH HALLETT, wool-classer, Taradale, Hawke's Bay, will say:—

139. I have classed and worked amongst wool for over thirty years. I have known fire to be caused through the heating of wool packed in a damp condition, and have seen wool so hot on a number of occasions that I feel sure it would have eventually taken fire had it not been opened up to allow the gases therein generated to escape in time. From my observations I would say that, seeing that the majority of wool ships have taken fire when nearing Home, the heat of the tropics must be the cause of the bacteria rising with the temperature after passing through the tropics; it would appear, therefore, that not only is moisture requisite in a certain quantity, but there must be a high outside temperature to bring about the point of combustion. From my experiments I find that dry scoured wool will take fire at 230° Fahr., and flax at about 250° Fahr. To my mind there have been many causes for the recent fires, viz.: the high price of wool, the wet seasons, and the great haste to get ships loaded on account of the rush for freight and competition, the indiscriminate insurance at high values. To my mind slipe wool is the most dangerous; locks and crutchings are also very dangerous, and should never be shipped in a greasy state. I would suggest as a means of prevention—(1) Appointment of inspectors at all ports; (2) heavy penalty for shipping wet wool; (3) scour all second crutchings, locks, and bellies; (4) prevent insurance companies from insuring up to full value—in other words, insist upon the shipper carrying part of his own risk.

JOSEPH TIDSWELL, wool foreman, Messrs. Nelson Brothers (Limited), Taruheru, Poverty Bay, will say:—

140. So far as I can see, two points of vast importance have been omitted in evidence already given before the Commission. I have had many years' experience in London as a large buyer of wool, and I have often seen from 50 to 150 bales of damaged wool offered per day.

141. How were those bales damaged?—In no way but on board ship through the water in some way getting into the holds. The bales in water would not, of course, heat, but those adjacent would absorb moisture from them, and I have seen them taken out of the holds of the vessels in such a heated condition that you could not bear your hand to be buried in the wool. Very often I have received those damaged bales, after purchasing and ralling them to Yorkshire, in such a hot state that I have refused to put them into the warehouse until opened out or “cased.” I am sure, therefore, that the bales get wet in transit. Look in any London catalogue and you will see that my statement is reliable. If the brokers find bales that contain wool which they consider has been shipped damp, they specify it as “country” damaged; but bales damaged on board ship they specify as “damaged,” and I have never seen one of those “damaged” bales that was not damp, and many very wet and heated at the time of sale. I say it is utterly impossible for bales to be shipped damp in the colony and not show signs of firing long before the vessel arrived even at Rio. The more compression you apply to wet wool the sooner it heats, and, of course, wool is more tightly packed on board ship than even in the dump. As regards scoured and fellmongers' wool, the wool is often taken in at night into the shed when not quite dry; but it has the heat of the sun in it, and it is concluded that that heat will finish it off before morning. If there is, say, 10 per cent. of moisture only in it it will “finish itself off,” but if more than 10 per cent. it will not. On the other hand, supposing that same wool was baled up with only 5 per cent. of moisture in it, and it had been dried up to that point by artificial heat, it would prove disastrous. If the wool was dry and yet contained vegetable matter, or pipiri seed, in large quantities in a damp state it might be safe to pack

it when sun-dried, but it was almost sure to fire if artificially dried and the slightest heat was left in it just as a basis to start. If damp wool remained in the shed after being dumped for four days it would show moisture on the floor where it stood, so quickly does it heat under compression. I thoroughly approve of inspection and the testing of bales with the steel rod. If that were thoroughly carried out I think it would be impossible for damp bales to escape.

J. B. RELLS, of Messrs. Common, Shelton, and Co. (Limited), Gisborne, will say :—

142. The evidence already given before the Commission has interested us considerably. We have received from our London agents (Messrs. R. T. Turnbull and Co.) a letter to the following effect: "With reference to fires on wool ships, we took this matter up with the well-known chemist to the Royal Agricultural Society, Dr. J. A. Volcker, who paid considerable attention to the details and samples we laid before him. We submitted three samples—one fire and water damaged, one water damaged, and one from the steamer which was on fire but the parcel was not damaged. The undamaged parcel's moisture was 8.92, the others were between 10.50 and 10.96, so that there is considerably less moisture in the undamaged than in the damaged wool. Both of the damaged lots had been treated with lime, while the undamaged was comparatively free, and Dr. Volcker writes to say, 'I believe that the whole is due to the treatment the wools undergo with the lime process, and their being turned out relatively too quickly—that is, without being thoroughly dry'; and in corroboration of this we have been told that on account of the prices ruling here every step was taken to get the wool on to the London market at the earliest possible moment, and no doubt this haste has been the cause of the fires breaking out on board—damp wool shipped in hot holds under great pressure."

G. W. TIFFEN, sheep-farmer, Wheturau, Gisborne, will say :—

143. There is no tendency to heat in the natural grease (or yolk) in wool, but if it gets damp it is dangerous. Thus damp wool is the generally accepted theory of wool fires. There may be several causes. It appears to me that the use of shearing-machines is an indirect one, and this I will explain. Last year one of my friends fitted up machines in his shed. On calling on him after his shearing I was shown over the shed. The machines are self-oiling, and this they appear to do pretty freely, for the shearing-board was saturated with oil. On my inquiring where the oil had come from I was told "from the machines." It then struck me that a considerable quantity of oil must have got into the wool also. In this way the machines are indirectly the cause of fires, the lubricating-oil causing the wool itself to fire, and also the woolpack, by soaking it with the yolk of the wool. It is well known that cotton-waste will fire if saturated in oil. When kept at a temperature of about 200° Fahr. cotton-waste treated with various oils fires spontaneously as under: With boiled linseed-oil, in an hour and a quarter; with raw linseed-oil, in four hours; with lard-oil, in four hours; with olive-oil, in six hours; with refined rape-oil, in nine hours. It was found that when a mixture of any of these oils was made with a mineral oil (50 per cent. of the mineral oil) that spontaneous combustion was entirely prevented. With 20 per cent. of mineral oil it was only retarded. Is it not likely, therefore, that the pack itself may catch fire spontaneously if saturated with oil? It is easily understood how the pack becomes oily, for if wool heavy in yolk be pressed into a 4½ cwt. bale (leaving out the subsequent dumping) the yolk is squeezed through the bale, and the shed-floor under it will be found to be greasy. This does not indicate that the wool is damp, but only that the wool is heavy in yolk. I have seen this often with shear-shorn sheep. In the case of machine-shorn sheep there will be oil mixed with the yolk that has soaked in the bale. The machines themselves conduct the oil down the "gut" core to the combs and cutters and lay it on to the wool. As to the heating of wool in connection with oil: in carding, manufacturers have to be careful what oil they use, not only because some oils are not so good for the purpose as others, but also on account of the danger from spontaneous combustion. Thus animal and vegetable oils are more dangerous than mineral oils, and the tendency to firing is increased if the wool be damp. Spontaneous combustion has caused the destruction of many woollen-mills. A case on record is given thus: In one of them a person noticed a pile of oily waste wool; he thrust his arm into it and found it hot; he mentioned this to the proprietor, and advised that the wool be got out at once. The proprietor laughed at these fears, saying, "You could not burn it if you tried; it is too damp to burn." About ten days afterwards the mill was destroyed by fire, the presumption being that the fire was caused by the oily wool-waste. I say, "the presumption," because the fire occurred on a Sunday during church hours, when every one was, naturally, absent from the mill. A useful experiment for the Commission would be to saturate a few pounds of wool in the various lubricating oils, and keep the saturated mass in a water bath or other suitable contrivance at, say, about 200° Fahr., in order to ascertain which sorts are the least likely to cause spontaneous combustion. If the cause is not found in the lubricating oils, then the only place I know where to look for it is in the show-ring at our A. and P. shows, where it is a common thing to see oiled sheep in their wool. That the wool did not fire until the vessels were near the end of their voyages is, I think, to be accounted for by assuming that oily wool, if kept at a sufficiently low temperature (as in a cooling chamber for instance) will not fire spontaneously, but that when the tropics are reached the oxidation process is increased by the heat. As some time must elapse before complete combustion takes place, a fast steamer would naturally be near its destination before this happened. As wool itself burns rather by fusion than by flame, it is probable that most of the flame is produced from the bale. If bales could be made practically fire-proof by soaking them in some solution it would be of great advantage. I would like to suggest that the Commission, if they visit Gisborne, should visit all sheds where machines are used, and secure a bale of wool from each one that uses either a different lubricant or a different class of machine direct from the shearing-board and for experiment.

EVIDENCE TAKEN BY COMMISSION—*continued.*

WELLINGTON, TUESDAY, 5TH FEBRUARY, 1907.

The Commission sat in the Magistrate's Court House.

JOHN PALMER FORSDICK sworn and examined.

1. *The Chairman.*] You have written to the Commission, and desire to give some information? —Yes. I am master of the New Zealand Shipping Company's steamer "Orari." I was master of the steamship "Waimate" in January, 1905. On the 16th January, 1905, a fire broke out in the starboard wing of the No. 5 'tween-decks in the cargo, which consisted of flax and a few bales of tow. Whether the fire originated in the flax or tow I am not able to say, owing to both the flax and tow being burned more or less. The flax and tow were burned in the centre of the bales and outside as well. We left Wellington on the 6th January, and we were ten days out from Wellington when the fire was discovered. So far as I can remember, there was no bad weather during the time we were loading cargo at Wellington. Where the seat of the fire appeared to be was some 20 ft. from the line of ventilators, and was not near any wool or other cargo. Wool was stowed in the square of the hatch, but the seat of the fire was some distance away from the wool. After opening up the hatches I had the cargo brought up on to the shelter-deck in order to allow access to the seat of the fire. So soon as the hatches were opened up the flames burst out, and in doing so set fire to wool which was in line with the hatch before it could be got out—that is, it set fire to the outside of the bales, but the fire in the wool was extinguished with water. The fire was first discovered by the smoke coming out of the ventilator. As the seat of the fire was 20 ft. away from the ventilators it was necessary for the smoke to travel over the top of the flax for this distance before it reached the ventilator. For that reason I say that it would have been impossible for any extraneous fire through the ventilator to have caused the outbreak. Again, if the fire had been caused by any extraneous application it would have evidenced itself before ten days had elapsed. I have on more than one occasion observed flax being dumped on to the wharf at Wellington on top of tallow stains. Tallow has been allowed to stand upon the wharf in the heat of the day, and, leakage having occurred, the wharf has been smeared. Flax and tow being thrown upon this grease would add to any danger there might be. I have insisted upon planks being put down to protect the flax. Only within the past few days I have drawn attention to the presence of tallow on the wharf to such an extent that I have scraped it up with my thumb-nail. The wharf officials have contended that sawdust is applied in such a case, but there is a far greater tendency for the flax and tow to lift the grease and sawdust too than for it to be any protection. More care is certainly necessary in this direction. At the other ports this difficulty does not present itself, for flax and tow is invariably loaded direct from the carts or trucks, but in Wellington I have seen it thrown on to the wharf and rolled out of the sheds without any protection against the possibility of picking up grease or tar, which is frequently present. In the case of the "Waimate" fire I carried about a hundred bales of flax and tow on deck all the way to London. These bales were brought up from below, and those which were badly burnt were thrown overboard, but the others, which were water-and-smoke damaged, were carried on deck with a tarpaulin covering them. Another matter which tends to satisfy me that this fire could not have been caused through extraneous fire was the fact of the seat of the fire being two bales away from the square of the hatch. The square of the hatch contained wool, and two bales of flax occupied the space between the wool and the fire, so that the fire was the distance of three bales away from the square. The fire was first discovered at 10 o'clock on a Saturday morning, and by 4 o'clock in the afternoon it was all out. However, we worked till 6 o'clock in order to make a passage-way through the bales. I cleared away a corridor all round to the other side of the seat of the fire in order to allow circulation of air and the opportunity of observation. I examined the spot twice every watch, and instructed each officer that before coming off watch he should examine the hold and report to me personally that all was safe. The amount of water put down saturated many of the bales, and heating was evidenced in a very short time among the flax, but as these bales were continually turned round the temperature in the individual bales receded. In the case of the wool-bales which were damp the heat was most noticeable between the bales, and at one period I got a temperature of as much as 98°. However, so soon as the bales were removed the temperature would return to normal. I would say that some 120 or 123 bales of flax were damaged by fire and some 500 or 600 bales by water and smoke. The heat generated by the fire was so great that it was necessary to have two or three plates in the 'tween-decks taken up and replaced. I feel positive that that fire could not have been caused by extraneous application, or it would have broken out earlier than ten days after leaving port, and the damage would have been more serious if it had been burning for any length of time before being discovered. On the last voyage Home, when I was in command of the "Waimate," I left Wellington on the 21st April, 1906. On the 31st May, at midnight, we discovered that the vessel was on fire by seeing smoke coming out of the ventilators and also through the fresh-water-tanks space. The engineer on watch reported that the smoke was finding its way through the water-tanks space by way of a man-hole in the bulkhead. At the first sign of the outbreak there was very little smoke—so little that I could remain in the hold, but there was a strong smell of ammonia and evidence of wool-burning. I closed up all ventilation, and started the fire-engine to work in the hold. The Clayton machine had not been completely fitted up, as it necessitated the time of two voyages to complete the work without laying up the ship for the purpose. However, I was able to make temporary connections by cutting holes through the bulkhead and wedging and caulking up the entrance for the hose carrying the gas. By this means the gas was carried to the hold and the fire subdued. I have read part of the evidence given before the Commission, and I observe at question 47, page 40, Captain Moffatt, of the s.s. "Mamari," is reported to have stated that the "Waimate," when she was on fire, had to put into port to get supplies to charge the Clayton machine, thereby leading the public to believe that she had no means of extinguishing the fire although she was fitted with the Clayton machine. By the Chairman's reply it is quite evident the Commission accepted that version. Now, as I was in

command of the "Waimate," I would like to state that when I left New Zealand I had 2 tons of rolled sulphur on board for use in the fire-engine. As ten days elapsed from the time the fire broke out to arrival in London I had used the greater part of this, and I put into Plymouth for 6 cwt., but it was not required, as I had 4 cwt. of the original sulphur remaining on board on arrival. Had Captain Moffatt taken the trouble to compare the difference of damage to the three steamers on fire with wool and arriving in London about the same time he would have found out that we had the supplies required. For a company to fit up their fleet with a fire-extinguishing appliance and not put the means on board to use it is really too absurd, and, I think, ought to receive official contradiction. I also notice that Captain Moffatt had no doubt the CO₂ machine was the best. I do not dispute the point, as probably he prefers all the elements of combustion with it when the hatches are opened. The SO₂ is good enough for me, as the hatches can be opened with all safety after cooling down. While I was at Teneriffe on the voyage I speak of I had the hatches opened and got into the shelter-deck, and I could not smell any signs of fire. However, I had the hatches battened down again. We left Teneriffe on the 2nd June, and on the 5th June, at 7 a.m., the fire broke out again in the same hold. Dense volumes of smoke found their way up the ventilators and from beneath the tarpaulins covering the hatches, even driving the men out of the bunkers. The temperature rapidly rose to 104°, and by 9 a.m. I had started the fire-engine. By 6 p.m. the temperature had receded to 92°, and the smoke abated rapidly; then the temperature receded to 88°, while the deck temperature was 64° in the screen-thermometer. By next day the temperature was down to 80°, and I am sure if the fittings had been completed I could have cooled down the hold. As there was no further rise in temperature I was convinced that the fire was out. On opening the hatches in London it was ascertained that the seat of the fire was right down on the floor in the wing on the port side in the lower hold in the bottom tier, beside a staunchion which was somewhat buckled. The wool in that hold was nine tiers high—double dumps. The particular wool which was at the seat of the fire was taken aboard at Lyttelton, and of this five bales were burnt almost completely through. I do not myself know the brands of the wool, but I was told that it contained slipped wool. When one of those bales was brought up on deck it burst into flame and had to be put out with the application of water. When the balance was brought up and put into a lighter alongside the ship it was covered with a tarpaulin prior to being taken up to London. I have been told that in the early morning of the following day it was discovered to be on fire, and a hole was burnt through the tarpaulin covering the wool.

2. *Captain Blackburne.*] With regard to the fire in the flax, do you think it had anything to do with the presence of tallow on the flax or tow?—I am not prepared to say. I did not see any tallow on the flax, but I might say that I have seen tallow shipped in Wellington leaving stains on the wharf, and, the tow or flax being wheeled over this, it might sweep it up.

3. *Mr. Foster.*] You noticed some casks of tallow on the wharf recently, and you say a considerable amount of tallow had exuded from the casks?—When I was here last week I observed several casks on the wharf, and the tallow had run across the wharf quite 6 ft. from the casks.

4. Were they stowed on their ends?—Yes.

5. Was there not some water on the top of them?—No.

6. That is neglect. Were they bright new casks?—Yes, bright new casks, but as the staves are all machine-made now there is more likelihood of leakage if they are not well coopered. You could scrape it up from the wharf where the casks had been lying.

7. You did not notice the brands of the tallow?—No. I was discussing the matter with the men on the wharf. I referred to the fact that no one had referred to the presence of the tallow on the wharf when giving evidence before the Commission. I have complained about it myself, and have had tarpaulins sent for owing to my refusal to allow the flax to be landed on the wharf. I have had covers put down on several occasions. But I will say that I have not seen the wharf cleaner than it is just now.

8. You have no recollection as to what might have been the condition of the wharf when you were taking in the flax which was the cause of the fire on the "Waimate"?—No. For many years I have noticed the tallow stains, and have gone to look at them.

9. Could you say with any confidence there could be no tallow on that flax?—I do not think so. I have on previous voyages seen tallow stains upon the wharf, and on my complaining about it they have put sawdust and straw down when we were taking flax and tow in.

10. So far as the evidence has gone, it has been in the direction of proving the non-liability of flax and tow to spontaneous combustion?—I have read that.

11. We have not had a scrap of evidence to the contrary?—Ever since I have read the evidence I have been wondering, because it has not been due to extraneous causes in my case.

12. Having come to my conclusion that it was safe from spontaneous combustion unless there happened to be grease mixed with it—still, we have not had any strong evidence that it does ignite from the admixture of fat—I had made up my mind that it was free from danger?—I have been nearly thirty-one years in the New Zealand trade carrying wool and flax, and have always felt a dread of it in a ship's hold in case it might heat and fire, and have been most careful to watch the flax and ask my officers to do the same.

13. To show you what helps me to my conclusion I will refer you to a load of hay. If you put it up damp it will heat and spontaneously ignite, but when dry and stowed with water added to it it will rot down?—A ship's hold is quite a different condition. You cannot put it so tight in a ship's hold, and there is always a certain amount of draught passing through the tiers owing to the motion of the ship.

14. No doubt the conditions would be as you say, but if you take, for instance, a stack of hay, the lower portion gets the pressure of the upper; still it will not fire. Flax and grass are of a class akin; yet one is open to wonder if the addition of grease would have the effect you suggest?—I have had that idea, and have been particularly careful to see that the flax or tow was never allowed to be placed upon the wharf without covers having been put down.

15. Would you consider that flax, being graded as it is now, would be perfectly safe?—Yes.
16. But they do not grade tow?—That is it. I do not know whether it was flax, but I had tow all round the seat of the fire.
17. Was the tow burnt?—Yes, before I could get it out. There were 120 bales of flax and tow burnt. While we were getting it up to throw it overboard it was falling down on top of our heads.
18. Would you assume that the fire commenced in one bale?—I could not say, because before I could get down there was so much of it afire. It was got up on deck and thrown overboard. The seat of the fire was quite 20 ft. or 25 ft. away from the ventilators. Besides, there were covers on all the ventilators. I make a practice of covering them up every night between here and the Horn.
19. Was the flax stowed over the wool?—No; right on the 'tween-decks. The fire was not in the bottom bales, but in the second tier.
20. Might it have been the bales of wool underneath?—No; there was the iron deck underneath. Wool was in the lower hold, but we had no damage to that.
21. *Captain Blackburne.*] The wool was only scorched?—There was nothing wrong with the wool internally. There were about a dozen dumps with the pack burning, but we did not put any water on them.
22. *Mr. Foster.*] So you say that wool had nothing to do with the start of it?—I am absolutely certain.
23. Did you notice any of the flax burnt inside?—I could not say. It was burnt half through some of the bales.
24. From the outside?—It is hard for me to tell that. It was burnt half through some of the bales.
25. If that ignited spontaneously one would imagine that the fire would come from the centre to the outside, and would spread evenly all over towards the outside?—That was not the case, because many of the bales were burnt on one side only, whereas the other was perfectly sound.
26. Do you think you lifted out every bale which was burning?—Yes; every bale was lifted out on deck.
27. You did not find any empty hoops?—There were no hoops. It was wire round them.
28. Were there any wires with nothing in them?—No.
29. Would that not lead you to think it might have been extraneous?—I cannot see how it could get at it, and I do not think it would take ten days to develop.
30. Might not this be possible—I am only putting it as an argument—say the workmen stowing the hold dropped a match; it might lie there, and owing to the motion of the ship it might be rubbed against a band or the deck or stanchion and ignite?—In this case it could not rub the iron deck because the bottom bales of flax were not damaged.
31. On the other hand, if dropped amongst the bales might it not be rubbed between the bands or wires?—I have never seen such a thing. I remember discussing the matter with my second officer, and he remarked that he had seen matches struck by stevedores in the hold, but I think if these men were prevented from taking matches into the hold the danger would be lessened.
- The Chairman:* I think I made that suggestion in Christchurch, and the idea was scouted.
32. *Mr. Foster.*] In the ammunition factories the workmen are absolutely prevented from taking matches with them?—It is done for the protection of the careless. Careful men need not resent such an order. They should be prohibited from taking pipes or matches into the hold. They could get them when they came up from work.
33. Yes, I think every precaution should be taken. However, to get back to the point, if no bands or hoops were found empty it would seem to me that the fire must have commenced on the outside of the bales, because if it were spontaneous combustion the whole thing would fall in and the band would be left loose?—A lot of these bales fell down in pieces when the grips were put on them to lift them up.
34. It would have been interesting if you had noticed if the inside was burnt?—To tell you the truth, they were all blazing, and we were in that position that we could not get to the seat of the fire. One officer was playing the hose upon me and another upon the fire, and as soon as we got them up on deck overboard they went as fast as we could dump them. We had no time to look at the centre of the bales.
35. The first and only object was to get the fire under?—Yes. I do not think it would have been possible to have saved the ship if we had not had the helmets available—those which we use for the frozen plant.
36. As far as I can conceive it, I think I should have looked for some other cause than spontaneous combustion. We know that grease and tow will ignite—and has ignited—but we have no evidence that the mere presence of moisture will start it. On the contrary, Captain Blackburne found a bale of tow on the wharf wet, and it was put into a close confined box. That went up to 160°, and then receded and rotted?—At the time when this fire was over I said I should like to know whether it was water or grease. There was not a great deal of pressure there. I think there were about four tiers on top.
37. That would be nothing compared with the dumping pressure, where you get 90 tons of pressure. There would be nothing like that in a ship's hold?—Does it need pressure for grease to start heating?
38. No. Tow and grease will start if open?—With the two bales lying together is that going to be sufficient to combust?
39. It might be conceivable that a bale that would heat up to a point of ignition in a ship might be quite safe in the open air?—Yes, that is conceivable. After I put the water in the hold it was surprising how the heat generated. It was necessary to keep turning round these bales from day to day owing to the heat which generated between them, but it was surprising how soon the heat receded after the air got at them. The heat at some time was so great that you could not bear your hand on it.

40. Have you formed any idea of what temperature you could not bear your hand on it?—I could not say.

41. You might have observed a bar of metal lying in the sun; it gets unbearable to the hand, but that heat would be far short of that required to produce combustion?—Yes. I just mean from one day to the other. The wool was the same. If anything the wool was more heated than the flax. I put a thermometer in between two bales of wool, and it went up to 98°. The air then was about 50° or 54°.

Mr. Foster: This tow we got the other day went up to 160°; yet that was a long way from the point of ignition, although we do not know what the point of ignition is.

Captain Blackburne: Dr. Von Schwartz says, "Tow is dangerous, inasmuch as it will glimmer at even 257° Fahr., and is therefore one of the most easily kindled of fibres. When oiled it has a greater tendency to take fire spontaneously than the purified fibres, and is specially dangerous as regards retaining heat if piled up in somewhat larger heaps than usual." We know that wool is more, because it will frizzle as long as fire is there, but flax-fibre will go right off; so we know it ignites at a lower point than wool. I can imagine that wool will not ignite until it gets over 400°.

The Chairman: 460°.

Mr. Foster: So that the fact that a man could not bear his hand upon a bale does not mean that it is at a very high temperature.

Captain Blackburne: When we put the rod in the bale of tow which registered 126° you could hardly hold the rod in your hand when it came out of the bale.

42. *Mr. Foster.*] After what we have said do you think there is anything in the suggestion that it could not have been caused by anything extraneous?—I cannot realise that it could be. I cannot see where there is the possibility. If it had been in the square of the hatch or any other place.

43. Are there any rats in your ship?—I suppose we all have rats more or less. As far as my next fire was concerned in the wool, after getting to the bottom tier in the ship's hold we took out two bales, and in getting out the third it burst into flames all round us—into pure flame; still, I have been reading in the evidence that wool will not burn.

44. Was it the wool-pack?—There was no wool-pack left. It had been charred away previously. It was blazing all round us.

45. That would convey to you that the whole of the inside wool had first of all been burnt?—Yes.

46. Did the same conditions exist in the case of the flax?—I could not say. There was part certainly only charred from the flames.

47. Would you say that, having hoisted every bale out, it must have started on a dump of flax or tow?—It seemed to me quite possible, because it had not gone round the bale.

48. Then, would you say that it could not have been caused by spontaneous combustion, only by grease on it?—Yes, seeing what I have seen in the nature of so much evidence that flax will not combust with water. I discussed it at the time, and I thought it must have been grease.

49. I am inclined to think it must have been something extraneous to the flax?—Whatever it was, I feel positive that it did not take place on the ship from leaving Wellington. There could be no cause on the ship for it. It was away from the ventilators.

50. *Captain Blackburne.*] Were some of the bales consumed entirely?—The tow was worst. We could only get it out in two or three pieces; it got so loose in the wire band.

51. *The Chairman.*] What we want to get at is this: did any bales collapse?—I did not see any bale that had collapsed.

52. It was simply consumed?—Yes, and fell out of the bands.

53. *Mr. Foster.*] If it had started from the centre of the bale it would have been a red-hot mass in the centre, and you could not have lifted it out?—Yes.

54. Would you say, supposing you dropped a bale of wool into the water and dragged it out again after it had absorbed a certain amount of water, that if it created heat that heat would work out?—No.

55. So that flax and tow, if wet outside and not in the centre, would dry with the conditions of the hold?—Yes; but I think it possible to be very hot where they lie one on top of the other. It would surprise you to know the heat which generated between the bales after they were wet.

56. Yes; and the same with flax. You say that a certain amount of air circulates in the hold, and if the flax is wet outside it would give off the heat all the time, and therefore could not combust?—Yes. I have always thought it would spontaneously combust, but since reading the evidence which has been given before the Commission I feel much easier in my mind.

57. You do not know the brands of the wool which was the cause of the fire on the "Waimate" last voyage?—Well, I could not say—

58. You might have some hesitation in naming it?—I have no hesitation, but I do not know of my own knowledge. Our deputy superintendent in London told me just before I came away that they had been able to trace the marks on one of the five bales, and he told me the brand, but I cannot think whether it was the Canterbury Frozen Meat Company's or the Christchurch Meat Company's. I remember he told me it was slipped wool.

59. Do you not think it desirable to make a regulation that where possible notice should be taken of that sort of thing?—We are all very wise after the event. There will never be anything of the kind happen on board ship again without a detailed investigation.

60. The evidence has pointed to one or two brands?—I thought my case was an isolated fire until I got in and saw the "Gothic" afire at Plymouth and later on heard of the "Perthshire" before I left.

WELLINGTON, FRIDAY, 22ND FEBRUARY, 1907.

The Commission sat in the Magistrate's Court House at 7 p.m.

WILLIAM WARDROP WADDILOVE sworn and examined.

1. *The Chairman.*] What are you?—I have been for the past two years a seaman.
2. We understand you were aboard the "Pitcairn Island" when she was burnt at sea?—I was.
3. Where did you join the vessel?—In Liverpool, England, on the 11th September, 1905, as an ordinary seaman.
4. From Liverpool you sailed for?—For Wellington direct.
5. When did you arrive in Wellington?—On the 11th January, 1906.
6. Then, did you discharge cargo here?—So far as I can remember, we discharged some 1,100 tons of cargo.
7. Do you remember anything special about any portion of that cargo that was landed here, and about which there was a dispute?—A lot of whisky was landed, some of which had been broached; some beer also had been broached. It was extremely improbable that it could have been broached by the crew of the ship.
8. Do you know anything about a law case about any other part of the cargo?—No.
9. Anything about any acetic acid?—No.
10. Did you hear anything about it?—No.
11. Do you know that any acetic acid was aboard the ship?—No.
12. Do you know anything about the state of the lower hold?—I only saw that when we were cleaning it up in Dunedin. At that time the floor was quite clean.
13. Was anything put aboard here?—Yes; we took in a number of bales of tow.
14. Where was the tow put?—It was stowed in the 'tween decks.
15. Was that a permanent stowage or only temporary?—No; it was screwed into the ship afterwards. We sailed from here direct for Dunedin and took that tow with us.
16. At Dunedin what did you do with the rest of the inward cargo?—It was all landed there.
17. Then, could you tell us what happened to the lower hold?—Well, as the ship was cleared we swept it up, and a great deal of chipping was done, and the skin was painted with red oxide.
18. Why was it chipped?—The iron was chipped; the sides were pretty rusty. It evidently had not had any attention for a long time.
19. Was it rust?—Yes, rust; and whitewash had been put on it.
20. Do you know why?—I have no idea.
21. Was there any sign of acid about the lower hold?—No. There was a considerable amount of treacle-coloured stuff in the bottom of the ship between the limbers themselves.
22. You do not know what it was?—I was given to understand it was sheep-dip that had leaked out of cans.
23. Was it washed in any way with water?—No, merely brushed with straw whisks.
24. Not even with brooms?—It would be impossible to get it out with brooms, owing to the timbers lying across the ribs.
25. What became of what you brushed down?—It would all go into the bilges.
26. How far did that brushing down extend? You began at the fore part of the ship?—We did it abaft the main mast.
27. No further aft than that?—There was a little done aft, but owing to taking in scrap iron ballast we discontinued.
28. Was she fully brushed out before the scrap iron was put in?—No.
29. Was any bilge-water taken out of her?—Yes; when we scraped up that stuff a few buckets of water were put down. The second mate was going to have it washed down; but a few buckets of water were put in, and then baled up in the buckets and thrown overboard. A few buckets were thrown up in the limbers, but they found it was too big a job, so they ceased it.
30. What became of the water you put in?—It was all baled out.
31. Not pumped out?—No.
32. *Captain Blackburne.*] Was it baled out dry?—No; only the fore part where we had thrown the water in. The water would not go far on account of the limbers. We only threw water in the limbers directly under the fore hatch.
33. Were the other limbers dry?—I did not see the boards taken up further aft. The other boards were taken out, because I was down there baling it out with a tin into a bucket.
34. *Mr. Foster.*] Did that stuff get on to your hands?—Yes, a great deal.
35. Did it burn you?—I cannot say that it did.
36. Did it leave a dark stain on your hands?—Yes, my hands were stained for some days with it.
37. When you got that far that you gave up baling, when did you put in the scrap iron?—It was going into the after hold while we were cleaning up the fore hold.
38. That ballast was distributed in all parts of the ship?—From the forward end of the main hatch up to about the fore mast it was built up about 6 ft. high. Also, from about the forward end of the mizzen hatch up to the water-tanks, which were abaft the main mast.
39. Was there anything laid over that scrap iron in the nature of a tarpaulin or in the nature of dunnage?—No, I did not see any dunnage put over it.
40. What cargo was placed in that hold in Dunedin?—Bales of wool.
41. Do you know what went lowest?—Almost entirely wool in the lower hold.
42. There was nothing between the iron and the bales of wool?—No. After the cargo was discharged we were not down the hold again.
43. Who took charge in putting the cargo down below?—The stevedores. I was not down after the cargo was discharged. I was down while the cargo was being discharged to see that the men did not broach any of the whisky or beer.

44. You cannot tell us of your own knowledge what was done with the cargo in the lower hold—as to whether anything was placed between the ballast and the wool?—No.

45. But you know that wool did go down the lower hold?—Yes.

46. Do you know of anything else but wool?—I believe a couple of casks of brass filings went down the lower hold.

47. Do you know anything about the tow which was taken in on the 'tween decks?—I believe it was all screwed into the 'tween decks when we got back to Wellington.

48. Was it put into the lower hold at Dunedin?—I do not think so.

49. From Dunedin where did you go to?—To Wellington direct.

50. Can you say what happened to that tow in Wellington?—I was down the hold on one or two occasions while in Wellington, and I remember seeing them screwing in bales of tow amongst the bales of wool right aft, in the 'tween decks.

51. Were you sent down in the ordinary course of your duties?—I fancy it was to take some straw mats out of the 'tween decks. The mate was present, and two other seamen were present.

52. From what you saw here in the stowage of the vessel, what was she filled up with?—Wool, the majority of it.

53. And no other tow except that was put aboard here?—No.

54. You know nothing of any acetic acid having escaped from the ship on the voyage out here?—No, I did not know there was anything of the kind on board. I understand that if it was acetic acid the proper thing would be to stow it on deck.

55. But we know there was acetic acid on board, and it was not stowed on deck; but I only wanted to know if you knew there had been acetic acid, which was put ashore at Wellington, and that a claim was made on the ship on account of the leakage of four casks of acetic acid?—No.

56. And what you described as having taken place at Dunedin was all that was done in the way of cleaning it up?—Yes.

57. *Captain Blackburne.*] How many watertight compartments were there in the ship?—None at all. There was a bulkhead between the cable locker and the fore hold, but the rest of the holds was a clear run.

58. *Mr. Foster.*] Was there a bulkhead near the lazarette?—That was merely shutting off the sail locker from what had been the 'tween decks proper. It was only about half-inch planks.

59. *Captain Blackburne.*] So this treacle-looking stuff had a free run the full length of the ship?—I do not think so.

60. Were the limbers pretty dry: they would never have more than 3 in. or 4 in. of water in them?—The ship never leaked.

61. But you would generally get 3 in. or 4 in.?—I saw her sounded two or three times, and never saw any water in her.

62. You never saw the limber-boards taken up?—Only at Dunedin; only a small amount.

63. *The Chairman.*] Do you know when you left Wellington?—On the 19th March, 1906.

64. And when was the fire discovered?—On the 3rd May.

65. With regard to the voyage after leaving here, will you tell the Commission anything that occurred as peculiar, and possibly leading up to the fire?—A circumstance did occur, but I would not connect it with the fire. About a fortnight previous to the fire, it being my watch on deck, in the forenoon we were called to clear up the lazarette. I was told to trim the bull's-eye and bring it down into the lazarette. There was a small hatchway or man-hole open in the deck of the lazarette—

66. I do not follow you. Did that man-hole always exist, or was it cut in the deck?—This lazarette is the store place right aft in the heel of the ship, and this was a permanent hatchway, and the covering was lifted out with some trouble, as it was evidently not used much. The mate went down with the bull's-eye lantern, and only remained down a few seconds, and he then came out and handed the lantern to the captain, who went down, but the lantern went out repeatedly, and he did not seem to get any satisfaction, and he came out again. About two days after that I had occasion to go down to get some boatswain's stores, and I observed that a big hole had been cut in the floor of the lazarette, about 5 ft. by 3 ft. It was pretty dark, and I very nearly fell down the space. I complained about it being left open, and a big box was thrown down. I could see the railway iron placed on top of the lighter scrap iron and the pressed bales. This was in the after end of the ship.

67. Did you feel any surprise that the mate should go down first of all with the bull's-eye lantern, and then that the captain should follow him? Did you wonder at the time?—No. We were given to understand that the ship was sailing very badly, and that it was the intention of the captain to take ballast out of the hold aft and put it right forward, to put her down by the head.

68. In your opinion, would it be necessary for the captain—who ought to know his ship—to go into the lazarette first before deciding?—I think he went down to see if it was possible to get it up.

69. Were any of the crew engaged cutting the hole?—I believe the carpenter alone did it. I was not present at the time.

70. Is there anything else that occurred to you as possibly having any bearing on the subsequent fire?—The cabin-boy would be the last person there, and he would be down with a candle—there were never any lamps used for that purpose. I do not know if that is material.

71. Were you down in the lazarette the day before the fire?—I do not know. I was frequently down; perhaps I was.

72. Do you know if any one was?—The cabin-boy would be down every day to get biscuits and flour.

73. Was there any indication of high temperature in the hold when you were down there?—I never heard any remark to that effect.

74. Had you reason to know that there was any high temperature in the hold?—No. I had been down, but I did not notice that it was the least warmer.

75. You did not notice the least warmth?—I cannot say that I did.

76. Where did the fire break out?—From where the flames broke out I should say under the after deck-house in the 'tween decks.

77. It would not be in the lower hold, near where that 5 ft. by 3 ft. hole was cut?—No, I would not think that possible.

78. Then, if the fire was in the position you say it was, could the cabin-boy have got to that particular position with the candle?—The cabin-boy could never get forward of the bulkhead. The biscuit-tanks were right against the bulkhead.

79. There was no possibility of the candle he was carrying reaching the tow accidentally?—I could hardly say.

80. Was there tow stowed right up to the bulkhead?—I merely saw one bale stowed.

81. What height did the biscuit-tanks stand as against that partition?—3 ft. 6 in.

82. And the space above it empty?—Quite.

83. Did you look across at the partition?—Yes, I was frequently on top of the tanks.

84. Did you see any of the tow sticking through the cracks?—No, never. I should have noticed it if it was.

85. Would you be able to say if the candle could set fire to the tow?—It might be so, as there were two big diamond holes cut in the bulkhead about 2 ft. from the beams, and possibly the cabin-boy, standing on top of the tanks, might have touched the tow through these holes.

86. What time elapsed between the time of his visit and the breaking out of the fire?—Eight hours I should say from the time I think he would be down.

87. When he goes down in the daytime he gets up his supplies?—He goes down the last thing at night to get up the biscuits for the crew at 5 the next morning.

88. What time did the fire break out?—At twenty minutes to 4 in the morning, about seven hours after he would have visited the tanks.

89. Do you think it likely that it was started by the candle touching the tow?—I would not think so.

90. Was there anything lying about in the lazarette that might burn slowly and then catch anything else?—I do not think there was.

91. Did it ever cross your mind as to whether it was started intentionally?—No, I never thought so.

92. Did anything ever lead you to suppose that such a thing was contemplated?—No.

93. Did you give any evidence before the Court at Valparaiso?—No; I was too ill at the time.

94. Were all the crew ill too?—No; the second mate could walk about. Two Russians attended the Court of inquiry.

95. Did they speak English?—A little.

96. Could they understand being before the Court?—Yes.

97. The second mate, two Russians, and the captain gave evidence; were there any English or Scotch members of the crew who were able to give evidence?—I was not well enough to remember. I understand that two men were going to go down, but in the afternoon I happened to be very bad, and I do not remember whether they went down or not.

98. When the ship caught fire, in what order were the appliances for suppressing the fire?—Buckets were in use for about an hour and a half before they contemplated getting the force pump out.

99. Was it then a big fire?—There was a fair amount of smoke, but we did not think the fire was very great. I should think from a fire of that nature there should have been a great deal of smoke.

100. From the fact that there was a great deal of smoke and not much fire would you say it was in the tow?—I do not know how tow or wool will burn.

101. Wool is generally understood to be a slow-burning article, while tow is highly inflammable. Would you think that there being a good deal of smoke and not much flame that the fire was in the tow?—No; I think the wool caught first, and afterwards the tow, which caused so much flame in the latter part of the time.

102. Was the wool stowed under the deck-house, or the tow?—I should think both.

103. The wool and tow was stowed together?—Yes, touching.

104. When you took to the boats were they provisioned?—So far as possible, but it was quite impossible to get to the biscuit-tanks. The cook and carpenter tried, but it was quite impossible; owing to the smoke they could not get below.

105. You had some provisions?—We had two bags of biscuits which we had saved in Wellington and Dunedin from our daily allowance.

106. The actual property of the crew?—Yes. We had saved them from our allowance.

107. *Mr. Foster.*] Anything else?—About twenty tins of tinned meat and salmon.

108. Were those stores equally divided between the crew and officers?—Yes.

109. Was there anything extra for the officers?—I had reason to believe the officers had a little more than the men had.

110. They needed more, I suppose?—Yes.

111. Were there any wines or spirits?—Yes. I think about six bottles went aboard each boat.

112. And did the crew participate in those?—I participated in four, but I could not say as to the others.

113. Was there a feeling among the crew that the officers were specially regaling themselves?—I cannot say. I think we thought the second mate was getting more than us, but we thought he deserved it.

114. Was there any effort on the part of the men to get more than was served out to them?—We were crying out for water constantly.

115. Was there any ill feeling between the captain and the first officer on the voyage?—Yes, I understand there was a great deal of ill feeling between the two.

116. Was the mate's boat provisioned any better or worse than the other?—No; they would have exactly the same, as two seamen were told off to equally divide all the stores brought on deck.

117. You think that the visits of the captain and mate to the lower hold with the bull's-eye was properly accounted for?—Yes.

118. Was the carpenter's work cutting that hole known to everybody—it was not done in secret at all?—No, it was not done in secret.

119. *Captain Blackburne.*] Had you no other fire appliances except the force pump?—No.

120. Did the fire gain on you quickly?—I should think about five hours after we discovered it that the flames broke out.

121. And you were baling up water over the side with buckets?—Yes.

122. *Mr. Foster.*] Were you able to pass the water down to the seat of the fire?—No, it was only thrown into the hatch. We were passing it down the after hatch.

123. Could you see the fire?—No; the smoke was too thick.

124. You dipped the water out of the ocean and poured it into the ship, but did not know if it was putting it out or not?—No, we could not know. The forward hatch was taken off and the water was thrown down, but it was quite impossible to tell where the fire was. Holes were cut into the deck with an adze to try and find out where the fire was. A hole was cut in the deck between the hatch and the bulwarks. We could then see the flames, and water was poured down the hole.

125. Could any one have got down below?—No; she was full right up to the hatch.

126. Do you think if you had got the force pump on first that it would have been more effective than the buckets?—I understood that the force pump was not working at all. There was a great deal of trouble in getting it up. It was right down at the bottom of the ship; then they could not find the hose or the nozzles. The nozzles were found after some trouble in the carpenter's shop.

127. It is evident you had not much fire-station drill on board.

128. *The Chairman.*] In the lazarette was there any loose provisions about—the biscuits were intact?—Yes, the biscuits were in tanks, but the flour would be in barrels, and peas in barrels.

129. Was there anything else about?—No, only in the sideboard in the cabin, which were tins of meat and salmon. Those we got out.

130. *Captain Blackburne.*] You think the fire was confined to the 'tween decks, not in the lower hold?—Yes.

131. *The Chairman.*] You said there was a free run of the holds fore and aft. Have you anything on which to base your opinion that the fire might not have started in the lower hold and then become communicated to the 'tween decks, and it was then discovered?—I cannot say that might not be so, but it was my opinion that it was in the 'tween decks.

132. When was it discovered?—At 3.40 p.m. it was discovered.

133. And when did you actually have to leave the ship?—About twenty minutes to 12, eight hours after.

134. The ship was then aflame from stem to stern?—No, not by any means. There were a few flames coming out of the after hatch and a great deal of smoke coming from the after hold near the after deck-house, and we thought the fire was burning through there. That happened after we left the ship; the after deck-house was completely on fire.

135. Was she down by the stern?—Yes, a little.

136. *Captain Blackburne.*] Was there a good breeze at the time?—No, a dead calm. She had been under short sail all night, as the captain was anticipating bad weather. She was under fore and main topsails and foresail.

137. The mainsail was hauled up?—The mainsail was in the buntlines.

CLAUDE RAYMOND LAMBERT sworn and examined.

138. *The Chairman.*] What are you?—I am working at the carpentry now. I joined the "Pitcairn Island" on the 22nd January, 1906, as an ordinary seaman.

139. At the time you joined her had she discharged any of her inward cargo?—Yes, she had discharged nearly all of her inward cargo.

140. Were you aware of any trouble with the inward cargo?—No, except that I heard that some whisky had been broached.

141. Did you hear that there had been an action against the ship in respect of the leakage of some acetic acid?—No.

142. You were not aware that there was any acetic acid on board?—No.

143. Do you know if anything was taken aboard here?—Some seven hundred bales of tow were taken on board here.

144. Where was that tow put?—Stowed in the 'tween deck.

145. Was it stowed permanently or temporarily?—No; we moved a few bales when taking in wool in Dunedin.

146. When the inward cargo was discharged in Dunedin was anything done to clean the ship out?—We started aft to chip the sides in the hold, and then we gradually worked our way forward. We started chipping in the after hatch and worked our way to the forward hatch. The sides were rusty, and looked as if they had not been done for some time.

147. Was it ordinary rust?—Just the colour of ordinary rust. It was painted afterwards with red oxide.

148. Did you brush the floor?—It was brushed and cleaned.
149. What was the appearance of the bilge-water?—It was blackish and very oily.
150. Did your hands get discoloured?—It left a black stain.
151. It perished the skin a bit?—I did not notice it.
152. How long did it take to work off?—I suppose about a week.
153. You could not wash it off with soap?—No.
154. You could not rub a little grease on your hands and then wash it off?—No.
155. What did you do with the bilge-water?—It was taken out and thrown over the side.
156. Was it all got out?—Yes. There was not much water. We shovelled it out and wiped it up with straw whisks.
157. Do you mean you got it all out and wiped it down, and it was quite dry when you left it?—Yes.
158. Then they started putting down scrap iron?—Yes; they put it in the after portion of the ship, and then extended up to the water-tanks and forward of the water-tanks, nearly up to the foremast.
159. Do you know what went into the lower hold?—Two or three cases, which I was told were brass filings and several cases of lead type, that went into the fore peak.
160. In the general run of the lower hold what was put in?—Mostly railway iron, scraps of wheels, and such like. Wool was then put in the lower hold on top of the scrap iron.
161. Do you know of your own knowledge that the wool was put on the scrap iron, or on top of dunnage?—I saw dunnage being put on top of the scrap iron.
162. Did you see if any of the wool went against the skin of the ship?—We just laid the dunnage and then we came on deck. I do not remember any wool against the skin of the ship.
163. Who filled the lower hold? The crew did not?—The crew laid the dunnage, but had nothing to do with the wool. The stevedores and their men did that. We came up and went on with the scraping and painting of the ship.
164. Was there any flax or tow aboard?—I fancy the tow was stowed on the 'tween decks. I do not remember any tow going into the lower hold.
165. What was done with the tow that was taken aboard in Wellington in the first instance?—It was screwed in in Wellington.
166. *Mr. Foster.*] Before you left Dunedin you saw the condition of the hold after you attempted to clean it up. What would you think of a statement to the effect that she was in a filthy, dirty state—that she had not been cleaned up properly?—I think, to my idea, she was clean.
167. Generally, you have heard the evidence of Waddilove. Do you think he has given correct evidence right through?—With the exception of the pump. I was told off to fix up the pump. We had considerable trouble to get it out of the fore peak. When at last we did get it up and fixed it was of no use, and never drew an ounce of water. The caps could not be found, and we had not the right hose, and we had to tie it up with rope yarns, and it was not watertight or airtight.
168. Would you tell the Commission that, in your opinion, the use of the buckets was because the pump was no good?—They started using the buckets.
169. Until you got the force pump up?—The force pump was no use.
170. But they began using the buckets?—Yes.
171. You had orders to get the pump up, and you discovered that it was no use, so they continued to use the buckets; so in the absence of the force pump it was buckets or nothing?—Yes, buckets or nothing.
172. Do you know of anything that occurred on board the ship that would lead you to suppose that the fire had started accidentally or wilfully—from a light or anything of that sort being carried in the hold?—Only when we went into the lazarette we had to take a bare light; we never had lamps, but always took naked lights.
173. Have you made any statements in Wellington, in the nature of a remark to the effect that you had suspicions that the fire was started intentionally?—No, I have not. It was my watch below when the hole was cut in the lazarette. I had never seen the hole, but I knew it was there. I know they went down with the light. I was told that it was cut so that they could get down to the ballast to see if they could shift it forward to put her down by the head.
174. Can you tell the Commission if any other members of the crew other than the Russians could have given evidence at Valparaiso?—I was under the impression that all except Waddilove and myself were at the inquiry. I thought they all gave evidence.
175. You are not of the same opinion as Waddilove that only the two Russians gave evidence?—No, I always understood they were all present.
176. You are quite sure that you have not on any occasion in Wellington made any statements that could be construed into meaning that the ship was intentionally set afire?—Quite sure.
177. You are quite sure that you never said you had such suspicion?—Yes.
178. Did you notice where the fire was on the ship?—The first signs I saw was flames coming up between the planking. I should judge it burst out about the sail locker, about that portion of the ship.
179. Where was the sail locker?—A house which was used as an after deck-house; we used it as a sail locker.
180. Was the fire in the deck-house?—When we left the ship the fire came through the deck-house.
181. The sail locker was the deck-house. Was the fire in the deck-house or underneath?—Underneath the deck-house.
182. *Captain Blackburne.*] Where was it situated—abaft the mizzen mast?—Alongside the mast, well abaft.
- At this stage, owing to the indisposition of the witness, further examination was suspended.

WILLIAM WARDROP WADDILOVE, previously sworn, was recalled and further examined.

183. *Mr. Foster.*] Have you at any time since you returned to Wellington said anything to any one that might be construed to mean that you had a suspicion that the ship had been set on fire?—No. I have always done my best to upset that theory.

184. Is there a theory to that effect?—Yes, I have heard it.

185. Have you any knowledge of who might have advanced that theory?—People have asked me in a casual way, "Do you think the ship was set afire," and I have said, "Most decidedly not." The Commission adjourned *sine die*.

WELLINGTON, SATURDAY, 2ND MARCH, 1907.

The Commission sat in the Magistrate's Court, Wellington, on Saturday, 2nd March, at 11 a.m.

FREDERICK ERNEST HAYWARD sworn and examined.

1. *The Chairman.*] What are you, Mr. Hayward?—I was an able seaman on the barque "Pitcairn Island."

2. *Mr. Foster.*] Will you tell us in your own words what occurred from the time of the ship commencing to load in New Zealand for her home port?—I joined the vessel in Wellington. She had nearly completed her loading at the time—that was two or three days before she left Wellington finally. We were six weeks out before the fire took place. I was below in my bunk when the fire took place. I was called up by the captain, and we were started putting water on the fire. We took the hatch off, and commenced putting water down for six or seven hours. Ultimately we saw it was useless trying any further, and the captain sent some of us to get the boats ready for launching, and the remainder worked at the fire. We ultimately left the ship.

3. *Captain Blackburne.*] Which hatch did you open up?—The after hatch.

4. Did you take all the hatches off?—No; a booby-hatch went on top of the other hatches. The fire and smoke was too dense, so we put the hatch straight on again.

5. *Mr. Foster.*] That was the main-deck hatch, not the 'tween-deck hatch?—No. This was a hatch covering the main hatches, and by which you could go down below without taking off all the hatches and covering. This was a sort of covering-hatch, and could be taken right off. We took off one of the forward hatches, but had to put it back again. Holes were then cut in the deck, and water was poured down through the holes.

6. By what means?—By buckets.

7. Had you no pump?—We had a force-pump, but it would not work.

8. What was the matter with it?—I expect it had never been used for some considerable time. It would not work when it was tried.

9. The Court of inquiry at Valparaiso found, "That the pumps were found in good working-order"?—I was at the inquiry, and told them that the force-pump would not work at all. That is the pump they refer to in their finding.

10. Did you see anything of the stowing of the cargo?—I saw a little of it in Wellington, but not in Dunedin.

11. From what you saw in Wellington, would you say that wool was stowed right fore and aft?—Yes.

12. Would that apply also to the flax and tow?—The tow was stowed right along on top of the wool.

13. Did you see if any flax or tow was stowed where the fire broke out?—Yes, tow was stowed right where it broke out.

14. Did you form an impression whether the fire started in the wool or tow?—I think it originated in the wool, because when we took the hatch off we could see fire right down to the bottom of the bales. I think it started right down at the bottom of the ship in the lower hold.

15. After you left New Zealand were you ever down in the lazarette?—Yes, after we left here.

16. What was your mission down there?—I went for biscuits once, and on another occasion I was sent down to clean up the lazarette.

17. Did you use a light?—Yes; we had a candle, and one of those oil-lamps without any glass on it.

18. Naked lights?—Yes.

19. Do you know the position of the biscuit-tanks?—Yes.

20. Behind them there was a space and a bulkhead?—Yes.

21. What sort of a bulkhead was it?—I never examined it.

22. From what you know of the stowage of the cargo, is it likely that there would be any tow against that bulkhead?—Yes, right up to the bulkhead.

23. Do you know anything of a hole being cut in the floor of the lazarette?—Yes. I believe they were going to carry ballast forward from that hole.

24. Do you know if it would be possible for any one going down there to get any further forward along the hold?—No.

25. When you were down in the lazarette did you notice if the temperature of the hold was any higher than usual?—No, I never noticed any heat.

26. How long before the fire were you down there—that is, on the last occasion?—I expect, a week before.

27. What sort of weather had you just before the fire?—We had it very cold just before the fire.

28. For two or three days before the fire was it very calm?—We had a good deal of wind, and the water was always on the decks. For about a week before the fire we had it pretty rough.

29. So far as you know, there would not be much likelihood of any water getting into the wool?—That would be impossible, I think.

30. There were no leaks in the deck?—The only way that water could get down might be through the seams in the deck, but I hardly think that would be possible.

31. *Captain Blackburne.*] What sort of ventilators were there?—I do not think there were any into the hold. I am not exactly sure, but I do not remember any.

32. Were the masts iron?—Yes, the lower ones.

33. There would be a slight ventilation through the masts?—No, I do not think so. There might have been some ventilators, but I did not notice any.

34. You are quite sure that you did not notice any increased temperature from the time you were down previous to your last visit to the lazarette?—No, it was just the same.

35. Did you notice no smell of ammonia or fire?—No. The night before the fire broke out we were working right on top of the spot. We were waiting for three hours to put the ship about, but there was no wind. We were sitting on that hatch for about three hours before 12 o'clock, and three hours after that the fire broke out.

36. Was the hatch closed down?—Yes. We would have had a hard job to smell it through the hatches and the coverings.

37. How long before the fire broke out was the hole cut in the floor of the lazarette?—I should say about a week before the fire. I know it was more than a few days—perhaps a week, or over.

38. Would it be possible to touch the cargo from that position in the lazarette?—I do not think so. I think the bulkhead goes right down to the ballast.

39. *The Chairman.*] You have not been below the ballast?—I do not know if they could get down to the cargo.

40. *Mr. Foster.*] Have you had an impression that the fire was caused intentionally?—No, I do not think it could have been.

41. You have never said anything to lead any one to suppose that you imagined that it was so?—No, I do not think so.

42. Can you be sure?—I am sure I never have said anything about the fire being started intentionally.

43. Would it be possible to have started the fire intentionally from where it did start?—I do not think anybody could have started it there without being seen.

44. I think you said when the hatch was taken off the fire appeared to be deep down in the hold?—I think it was well down in the hold.

45. Do you think you would have been likely to have noticed the difference in the smell of flax or wool burning?—Yes, I think it was wool that was burning, by the smell at that time.

46. It more resembled the smell of burning rags as against the smell of such as string?—I could not tell you what it seemed like.

47. You know the smell of your pocket when your pipe sets fire to it?—Yes; but I did not notice very particularly at the time. The fire looked deep down when the hatch was taken off, because I looked down myself. It looked all red, although we only had the hatch off for a minute.

48. What led you to think it was in the wool, and not in the tow?—It seemed to be all afire down below, lower down in the hold than the tow was stowed.

49. Did you notice if the sides of the ship were hot?—No. When we cut the holes in the deck and were putting the water down it was very warm, as we could see right down to the side of the ship through the holes.

50. Might that not have resulted from the cutting of the holes—an induction of air drawing the flame?—I think it must have helped it to burn better when the air got in. At the time we were getting the water down all round the square of the hatch appeared to be on fire. Wherever we cut a hole there was fire.

51. *Captain Blackburne.*] Was it actual flame?—Yes.

52. How could you see through it?—We could only see there was fire.

53. What led you to believe it was in the lower hold?—We could see so far down that it must have. The fire looked low down in the hold.

54. *Mr. Foster.*] Some of the top cargo was consumed?—Yes. It might have burnt it out first.

55. Was it all wool in the after part of the ship?—I believe so.

56. *The Chairman.*] You imagined that the fire started deep down. Do you think that the fire had sunk down, and was still blazing down below?—Yes.

57. You think the fire started deep down and consumed its way up to the inflammable material?—Yes; but I did not think very much about it at the time, but I thought of it afterwards.

58. You were at the inquiry, and you were quite satisfied that the pumps would not work. You know what the Court found?—I am absolutely sure that the pumps were not in working-order at all.

59. You had plenty of buckets?—Yes; we were using the buckets because we could not work the pumps.

60. Do you know anything about the provisioning of the boats?—They were as well provisioned as they could be under the circumstances. As soon as the fire started the captain sent men down to get up biscuits, but they could not get to the biscuit-tanks for the smoke, so all we had was some we got out of the fore-cabin belonging to the crew.

61. These you had saved out of your allowance?—Yes.

62. *Captain Blackburne.*] Were there any provisions in the boats before the fire broke out?—No, not any.

63. *The Chairman.*] The boats were not equipped and provisioned previous to the fire?—No, they were not.

64. You had to rely upon what you had saved?—Yes. We could not get any provisions from down below, only those biscuits, and a few tins of meat and salmon which were kept in the cabin.

65. Had you any cause for complaint as to the division of the food?—No.

WILLIAM WARDROP WADDILOVE, previously sworn, was recalled and further examined.

66. *Mr. Foster.*] You have heard what Mr. Hayward said about the temperature prior to the fire. Did you observe any indication of a rise in temperature prior to the discovery of the fire?—I must say I did not notice any increase in temperature, not at any time.

67. When was the last occasion that you were in the lazarette?—The day before the fire.

68. And you observed no indication of any fire?—No, not the slightest indication.

69. You heard Hayward say he thought the fire was down in the lower hold. Did you have an opportunity of coming to that conclusion?—When thinking over the matter afterwards I came to the conclusion that it occurred in the 'tween-decks. I could not swear to it, but that was my personal opinion.

70. What did you come to that conclusion on?—I think if the fire originated above the 'tween-decks the smoke would have burst through the seams in the deck. If it had started at the top and then burnt down into the lower hold there would have been smoke before.

71. You would have got an indication before?—Yes, if it had started at the top. I think the fire would burn quicker up than down.

72. *The Chairman.*] I suppose you came to the conclusion because you had no outward symptoms earlier: you came to the conclusion that it must have begun in the 'tween-decks in the lower hold?—Yes. The first thing we did was to get the booby-hatch off. That was no easy job, because it was heavy teak wood.

73. Had the cargo dropped much—was it any distance down from the hatch?—I did not see anything but smoke. At that stage I did not see flames.

74. *Mr. Foster.*] Where did you first see the flames?—The first place I saw the flames was immediately alongside the coaming of the hatch, at the forward end of the hatch. That would be abaft the after end of the deck-house.

75. Did you hear the captain express any opinion as to the cause of the fire?—He frequently stated that it occurred in the tow.

76. Did the second officer express any opinion?—I cannot remember any statement he made.

77. Did the captain say it occurred in the tow from spontaneous combustion or from accident?—He mentioned that it was spontaneous combustion in the tow. He said it was a most dangerous cargo to carry. He repeated that often. While in the boat he was bemoaning his loss of his ship, and said it occurred in the tow.

78. *Mr. Foster.*] Did you notice if there was any dunnage placed between the wool and the tow?—I could not say.

79. *Captain Blackburne.*] I think you told us before that you could have free access to the cargo in the lower hold through this hatch in the lazarette?—Yes.

80. Was the bulkhead of the lazarette iron?—Wooden—light planks.

81. And there were two diamond holes cut through it?—Yes.

82. Through which any one could drop a light?—Yes, that is quite possible. Bales of wool were right up against it, and you could put your hand on it. I did not see the flax; I saw wool against the holes.

The Commission adjourned *sine die*.

CHRISTCHURCH, SATURDAY, 16TH MARCH, 1907.

WILLIAM MURRAY sworn and examined. (No. 131.)

1. *The Chairman.*] You are manager of the Christchurch Meat Company. You wrote a letter to the Commission in January last. Are you prepared to confirm that letter?—Yes, I confirm it.

FREDERICK WAYMOUTH sworn and examined. (No. 132.)

2. *The Chairman.*] You are managing director of the Canterbury Frozen Meat Company?—Yes.

3. There was a fire recently in the fellmongery section of the company's works at Belfast?—Yes, on the 6th instant.

4. Are you aware of your own knowledge what was the nature of the wool in the part of the building where the fire took place?—No. I had not been on the premises for more than a week before the fire occurred—at least, not in that part of the premises.

5. What is the nature of the wool that goes into that part of the premises?—It was all slipped wool. In the intermediate floor it consisted of wool in bales, and in bins ready for baling, and in a heap about the bins. I did not get to the scene of the fire until it had been burning three-quarters of an hour, and the roof had fallen in and part of the sides of the building.

GEORGE ARTHUR ELLIS sworn and examined. (No. 133.)

6. *The Chairman.*] What is your position?—I am foreman at the fellmongery works, Belfast.

7. A fire occurred at the works on the 6th instant?—Yes.

8. At what hour did the fire occur?—About a quarter to 7 o'clock in the evening. I went to the Addington yards at about noon, and on my return in the evening I noticed from the road that the place was in flames.

9. Were men at work in that part of the fellmongery on that day?—Yes. We fancied that the fire started on the top floor. No one was supposed to have been working on the top floor on that day.

10. What was the nature of the wool in the part of the building in which the fire originated?—The wool was spread out over the floor from 2½ in. to 3 in. in depth, partly for drying. There were some small heaps about. Several English buyers had been examining the wool during the week, and they had pulled it about.

11. It was all slipped wool?—Yes.

12. How long had that wool been there?—Some of the wool had only been there a day or so. The heaps might have been there a week; but they had all been pulled about by the English buyers.

13. *Mr. Foster.*] Have you or any of your men any knowledge as to what class of wool the fire started in?—No. There was one man who told me that after the alarm he ran into the building where the pelts were; that he went up the stairs, and he saw that the fire was dropping from the top floor down to the second floor. He tried to get to the top floor, but the heat was too great. He could, however, see that the fire had started on the top floor.

14. What sorts of wool were there?—All sorts, mostly top sorts; but there would be some seconds.

15. Amongst that would there be any of low quality?—No.

16. Are you able to say that positively?—Yes; there was none of the skin stuff up there.

17. The building was of brick?—Yes, with battened floors for the draught to go through.

18. There was nothing in there of a nature to start a fire?—No.

19. Have you any theory as to the origin of the fire?—No, I cannot account for it.

20. Have you thought whether it might have been incendiarism?—No, I do not think so.

21. If it was not incendiarism, what are the possibilities, in your opinion?—There is the possibility of a spark from the chimney having got into the room. The men on the middle floor were pressing wool all day. It was on the top floor where the fire started. That was the first day this season the men did not work till all hours. Up till the strike we had about thirty-six men in the building till about 9 or 10 o'clock at night, and from that hour ten or twelve men worked all night till the morning.

22. Is there any possibility of the fire having been caused by smokers?—No; there were only two men working there who smoked.

23. Are they permitted to smoke?—No, not in the building. The men go outside to smoke. No one is allowed to smoke inside. It could not have happened in that way unless somebody got up into the loft after the men knocked off work.

24. If any one went up there after the men knocked off work, he must have gone there for a mischievous purpose—at least, one must assume that. No one would go up there to smoke?—That is so.

25. Then, you free from your mind incendiarism and smoking?—Yes.

26. What are the other possibilities?—There is, of course, the suggestion of spontaneous combustion; but it must be remembered that the wool was spread out, and the few bales there had been handled by buyers.

27. How long had the wool been spread out on the floor?—Two or three days.

28. There was no heap of any size?—No; the wool was spread out.

29. Were the men able to say whether the wool was burning, or was it the timber, or what was it?—They said the floor was burning, and the fire was dropping through to the floor below.

30. Was there any likelihood of there being any grease or oil mixed with the wool?—No; it was all washed.

31. There was nothing in the room but the wool?—No. There were eighty-odd black skins lying drying on the rafters.

32. They were spread?—Yes; and they were nearly all dry, too.

33. In what direction was the wind blowing from the chimney?—The wind was blowing the other way that night. If there had been a spark from the chimney it could only have been blown in the night before.

34. *Captain Blackburne.*] Did you find any of the wool burned through?—No; there was smouldering going on in the wool. When we opened up the wool it was like a lot of tar running.

35. The bales of wool were not consumed?—No. Where the fire had got into the wool it was all black like cinders.

36. *The Chairman.*] I cannot understand how the fire developed so rapidly that nobody saw it till the whole place was in a blaze?—The fire seemed to be all over the place in a few minutes. The men who left at 6.15 said there was no sign of fire when they left.

37. And yet in less than an hour it was all ablaze?—Yes, at 6.45 it was all ablaze.

ALISTER McLEAN WRIGHT sworn and examined. (No. 134.)

38. *The Chairman.*] What is your occupation?—I am chemist for the Christchurch Meat Company.

39. You wrote a letter to the company on the 21st January. Do you substantiate what you said in that letter?—Yes, the statements in that letter are correct.

CHARLES STEWART EDWARD sworn and examined. (No. 135.)

40. *The Chairman.*] You have written the following letter to the Commission: "About thirty-two years ago I was employed at what is now the Kaiapoi Woollen Mill, which was at that time a flax and woollen mill. I was engaged in cutting the ends off bales of flax which had been wet in a flood. I believe it was in the month of March. The ends of the bales were cut off—about 12 in. off each end. The bales weighed about 3 cwt. or 3½ cwt., and they were iron bound. I think there were between 150 and 200 bales. The bottom tiers of the bales were the only ones damaged by the flood. The portion which was cut off the bales was stacked in a heap, and amounted to about 8 or 10 tons. After this heap had lain for some time it was observed to collapse, and

steam was observed to rise from it. The heap was broken out, and I observed a distinct red glow in the centre of the heap, whereas the outside was untouched. I am positive that the heap was burning in the centre, for there was a pale reddish glow just as you might see a heap of rubbish which had been burnt and allowed to stand when covered over. This could not have been caused by outside fire, for the centre of the heap only was afire, whereas the outside was perfectly intact. When working at the Kaiapoi Railway-station I remember distinctly one of the men saying, 'Feel this bale of wool.' The iron bands were quite hot, and the bale also; and if that bale had been shipped amongst other bales it must have been the cause of fire. It was shipped in the 'Merope,' about the month of June or July, at Lyttelton." You state that the fire took place in the interior of the flax?—Yes.

41. Was all of it consumed?—No, only the interior was burned.
 42. *Captain Blackburne.*] Was it inside a shed?—No; it was in a paddock.
 43. There was no blaze?—No.
 44. You say it collapsed, and there was heat inside of it. Did you put water on it?—No.
 45. It did not burst into flame?—No; it was a sort of glassy steam.
 46. *Mr. Foster.*] A certain amount of air must have got into it when you examined it?—Yes, a certain amount.
 47. *Captain Blackburne.*] Did you not consider it dangerous?—No.
 48. Surely it would be dangerous in the way of sparks flying?—No.
 49. You kept putting damp stuff on it?—Yes.
 50. What became of the flax eventually?—I do not know. I have never had the least doubt that a certain amount of moisture and pressure will produce spontaneous combustion. I do not think that spontaneous combustion would occur if the flax were in small quantities; but I think in the case of a large quantity of excessively wet flax being stowed in a ship's hold it might burn. That was the condition of the flax I refer to.

HENRY JOHN SMALLRIDGE sworn and examined. (No. 136.)

51. *The Chairman.*] What is your position at the Belfast Freezing-works?—I am engaged in pelt-scudding.
 52. Were you at work on the 6th instant, on the day when the fire took place?—Yes.
 53. When did you work up to on that afternoon?—5 o'clock.
 54. Where were you working?—Scudding pelts on the ground floor.
 55. How many others were there working there?—I think about eight or nine.
 56. Did you all go away together?—Yes.
 57. Were any of you smoking in the building before you went out?—No.
 58. When did you learn anything about the fire?—About half-past 6.
 59. How far do you live away from the place?—About 300 yards away.
 60. How was your attention drawn to the fire first?—I heard the whistle blown.
 61. It was daylight?—Yes.
 62. Could you tell at once that it was part of the works that was on fire?—I could tell it was coming from the fellmongery.
 63. I presume you got there pretty smartly?—Yes.
 64. When your attention was first drawn to the fire, where was the fire located?—The fire seemed to be coming from the top story.
 65. Was it smoke or flames?—I think it was flames and smoke.
 66. Where were the flames and fire coming from?—From the second floor. The timber was falling down from the second floor on to the first floor. It was coming from the top story, I mean, on to the middle floor. The fire was burning up above there.
 67. The top floor had been burnt through already, and the fire was falling through on to the middle floor?—Yes.
 68. Did you go into the building?—Yes.
 69. Where did you get into the building?—Into the paint-shed, where they paint skins; then through the pulling-shed, and then round and through the pelt-shed. That is all on the ground floor.
 70. Did you go up above at all?—No. I went half-way up the stairs, but could not get up any further.
 71. Did you see anything that would give you any guide as to where the fire took place?—No; but, to the best of my knowledge, it came from the top story.
 72. How did you come to the conclusion that the fire originated in the top story, as distinguished from the centre story?—Because the fire was falling from the top floor.
 73. Did you actually see it yourself?—I could see it from the stairs.
 74. Could you actually see timber from the top floor falling down to the middle floor?—Yes.
 75. At that time had anything happened to the floor of the middle story—was it burnt through?—No, I do not think it was.
 76. Do you know anything as to what work had been going on on the middle and top floors?—No.
 77. You know of nobody being up on the top floor?—No.
 78. I suppose you saw the result of the fire afterwards?—Yes.
 79. There were, we are informed, about 250 bales of wool on the middle floor. Did you see anything of them afterwards?—Yes, I could see where the wool had been.
 80. Were the packs burnt off the bales, and a considerable quantity of the wool burnt?—Yes, and the wool was smouldering away.
 81. Have you any suggestion to make to the Commission as to how the fire took place?—No.
 82. I suppose you know nothing about the electric wire?—No.
 83. *Captain Blackburne.*] Were you the first on the scene?—I could not say.

84. Was any one attempting to put the fire out when you got there?—No.
85. The fire-brigade had not arrived?—No; but the company's fire-brigade were at work.
86. You did not see any one there before you arrived?—I saw two or three chaps rolling casks of pelts out.
87. Who gave the alarm?—I could not say.
88. *The Chairman.*] You cannot give us any indication as to who first observed the fire and caused the engineer to blow the whistle?—I think it was the locomotive engineer. He lives on the premises.
89. *Mr. Foster.*] When you got to the fire you went upstairs towards the top floor?—I could not get up to the top floor.
90. I understood that one of the men put his head through the top floor?—No, I do not think so.
91. Did you take any notice of where the fire was?—It was going through from the upper floor to the lower one.
92. Was any lighted wood falling?—The thin battens were falling down on to the first floor.
93. Where did you imagine the seat of the fire was?—It was throughout the wool.
94. Was it anywhere near the wool-press?—No; it was clear of the wool-press altogether.
95. *Captain Blackburne.*] How far away from the wool-press?—From 15 ft. to 20 ft.
96. Was there any material on the packing-floor that would be likely to catch fire?—Not that I know of.
97. *Mr. Foster.*] Do you know of any low-quality wool being there in heaps?—No.

GEORGE ARTHUR ELLIS recalled and further examined.

98. *The Chairman.*] It has been stated that there were about five bales of skin-pieces upstairs. We understand now that there was none of that?—The skin pieces really consist of scoured wool. We do not call that low-quality wool.
99. *Mr. Foster.*] Is not that the same wool that there was trouble with before?—No; shanks from the slaughter-yard. It is a different wool altogether. The wool that was up there is wool that fetches 1s. 3d. per pound.
100. It is sweated off the skin?—Yes; but it is all scoured afterwards.
101. It was the shank wool that was in the previous trouble?—Yes; but we do not call this wool low-quality wool.
102. *Captain Blackburne.*] We understand that this wool had been there probably for some considerable time, and that it was added to from time to time?—Yes, we kept adding to it until we got enough to pack.
103. Do you think the fire occurred anywhere near that heap?—No, I do not think so. I would be less afraid of the heap than anything else, because it was scoured wool.
104. *The Chairman.*] That wool comes off at a pretty good temperature?—It was only a loose heap of wool.
- 104A. That is not the first outbreak?—It is the second, I think.
105. Can no explanation be given as to the cause of the fire?—It is hard to get at. There is nothing in the wool that I have the slightest doubt about.
106. Was it a spark that got under the roof, or was it spontaneous combustion, or was it a thrown-down match, or would there be any other reason?—No one was supposed to be up there on that floor at that time of the evening. I feel certain there was nothing there that there was any danger about. There was no bulk of wool.
107. But the fire developed so rapidly?—Yes; the packers were working there all day, and if there had been any wool smouldering they would have noticed the smell of burning. If the wool had been in the process of combustion the men must have known about it. I do not think there was anything in that suggestion as to the heat of wool.
108. *Mr. Foster.*] Have you never had any heating amongst this piece wool—that is, this sweated wool?—No. I cannot make it out. We have had no trouble with it. It is such light wool.
109. Have you heard of fires in the low-quality wool about here?—No.
110. You have not heard that one of the local fellmongers had a fire in a heap of that wool?—No. The only time I ever knew of a chance of fire from wool was in the case of greasy merino. That is the most dangerous wool you could have anything to do with. I refer to greasy merino slipped. It is full of grease, and lies very solid. We had none of that in the shed. We wash that stuff through. I do not see how there could have been anything wrong with that wool, which we were adding to from day to day.
111. What would you understand crossbred washings to be?—Pelt washings are very hard to dry, because the wool lies so close.
112. Would you consider that a dangerous wool to have?—Yes, pelt wool is hard to dry. Low-quality wool is bad.
113. Had you any of that sort of wool where the fire was—cross pelt washings?—No, because we have had to dry that out in the paddock. Very little pelt wool is put through the machine. I would like to explain that that low-quality wool that has been referred to was shank wool. It was down on the middle floor, and not where we supposed the fire started.
114. Were any of the men able to say whether there was any fire on the first floor?—No. I understood from Smallridge that the fire was in the top floor. If the wool had been burned in the heat at the back of No. 10 bin it would have been the first thing Smallridge would see on going up the stairs.

HENRY JOHN SMALLRIDGE recalled and further examined.

115. *Mr. Foster.*] Do I understand that you were not far enough up the stairs to see the whole distance of the shed?—I did not go up to the floor.
116. Did you get your head above the level of the floor so that you could see the whole length of the building?—Yes.

117. Were you sufficiently far up the stairs to see the whole length of the floor?—I could just see straight in front of me.
118. Could you see the whole of the ceiling above you?—Yes, where the press runs.
119. Was that free of fire?—The timber was falling down from the top.
120. There was no fire underneath at all?—No.
121. You are positive the fire originated above?—Yes.
122. Was No. 10 bin reserved for a special class of wool?—Mostly pieces.

HUGH EDWIN MORGAN sworn and examined. (No. 137.)

123. *The Chairman.*] What position do you occupy in the Belfast Freezing-works?—Foreman in the wool-shed. It was my duty to look after the wool-shed and the inside work.
124. What was in the top story that day?—I did not go up to the top loft that day, because there was no occasion to.
125. *Mr. Foster.*] Would you have a certain knowledge of the particular class of wool that was up there?—Yes. I had been up there the day previous, and the wool had not been moved. We spread the wool on the floor to dry. It was spread about 2 in. or 3 in. thick over the floor.
126. Do you ever put any low-quality wool there?—Nothing lower than 2nd. It is no use keeping wool up there too long. Our object is to get it fit for the machine.
127. Have you ever put up there any skin pieces?—No, not for a considerable time. There has not been any up there this season.
128. You are aware that the shipments of some of these skin pieces have been found to be rather troublesome?—Yes.
129. You are satisfied that there was none of that sort up there?—Yes.
130. Were you away from the premises when the fire was discovered?—Yes. We left work at 5 o'clock, and shut up the building.
131. Was any one left in the building?—No.
132. Was the building locked up?—No, because there was a man going back to do some work.
133. Any man who came back would have free access all over the building?—Yes.
134. Would the man who was going to return have any occasion to go upstairs?—No; he was coming back to do a special job, and when he completed his work he would go away. He had no occasion to go to the upper story.
135. Have you any suspicion of incendiarism?—No, I have not the slightest.
136. Have you any theory at all as to the cause of the outbreak?—I could not advance any theory, but I have no suspicion of incendiarism.
137. Do you think it is possible that smokers may have been up there at any time during the day?—No.
138. Is it possible that smoking may have been going on?—There was no one in the top loft that day. In the packing-loft there were two packers and two others. Two of those men do not smoke, and the others came down twice a day to smoke.
139. What do you think of the possibility of a spark from the chimney?—I should say that would be as likely as anything. Of course, it is only a supposition.
140. As the wind was blowing the other way that day, it would not likely be a spark?—Sparks might smoulder a day or two. I do not know of anything in the shed that would be likely to cause a fire.
141. What do you think of spontaneous combustion?—I do not think that is at all likely. There were only small heaps of wool. Every bit is shaken up before it is baled, and if there was any heat it would be detected.
142. You considered that the wool sent down to pack was dry enough to pack?—Yes, it was perfectly dry. I mentioned half-bred lamb's wool as the heap that was on the top loft, not what they were packing.
143. There were no woolpacks or sacks or oil likely to be on that floor?—No; the woolpacks were on the second floor.
144. Were you at the fire before it burned out?—No.
145. So that you know really nothing about the fire?—I left the place at 5.15, and everything was all right then. I think the weight of evidence is that the fire occurred in the top floor.
146. *Captain Blackburne.*] Were there any bales in the top loft?—No; they were standing on their end in the packing-shed.
147. Had they been baled up for any length of time?—Some had been baled since about November.
148. Who was the last man in the upper story?—As far as I can gather, there was not a soul there on that day.
149. When you went round you did not inspect that floor?—No.
150. Was the place locked up after the last man left?—No.
151. Is it not usual to lock the place up?—No. The night-watchman goes round every three-quarters of an hour all night. He must visit every room once in every hour. He is supposed to start his rounds about dark.
152. Was he on duty at the time of the fire?—I understand he was not there. It was not dark at the time the fire started.
153. In what way could sparks get down through the roof?—It is a corrugated-iron roof, and timbered underneath.
154. *Mr. Foster.*] Have you ever noticed sparks coming from the chimney?—Yes; and at various places in the paddock.
155. What would you say about the temperature in the middle story, where the bales of wool were? Is it pretty warm?—No, there is no heat there. It might be a little warm at the drying-room door.

156. Had you any electric wires there?—Yes; but there was no current through the fellmongery. It was shut off in the small engine-room.

157. I understand that you hold the opinion that wool will not burn?—It will only frizzle away gradually. I have often tried to burn wool. As long as the light is kept to it it burns, but take away the light and the flame goes out. Where the wool was in bulk in the store we saved a third of it, even after the three floors had been burning on it.

158. Perhaps it is greasy wool that burns so much better?—Yes, it burns better than slipe wool.

ARTHUR JOHN EASTERBROOK sworn and examined. (No. 138.)

159. *The Chairman.*] What is your position at the Belfast Freezing-works?—I am a wool-presser.

160. On the 6th instant—on the day of the fire—were you engaged at work on that day?—Yes.

161. Up till what time did you work?—5 p.m.

162. That was your knocking-off time?—Yes.

163. On which flat were you engaged?—The middle flat.

164. The wool-pressing is done in the middle story?—Yes.

165. Your press extends partially up to the top story?—It very nearly reaches the top story.

166. If a man is on top of the wool he can see the top loft?—Yes.

167. On that day were you pressing any particular class of wool?—We press many kinds in one day.

168. Was it a client's wool?—Yes.

169. We understand that in the middle flat there was a considerable amount of wool in bales?—There were a good many bales.

170. Roughly, about how many?—About 240 ready pressed and standing on end, and there was some wool ready for pressing. We spread the wool, and when it is dry it is always in heaps ready for dressing.

171. Do you know anything of the condition of the top flat?—I was not on that flat that day, but I can see it from the top of the press. There was not a great deal of wool there. There was some scattered on the battens, and there was a small heap ready for pressing.

172. You would not take any wool from the top floor to press?—It was put up there because there was no room for it elsewhere, and also so that they would not have so far to wheel it.

173. You were working with a mate up till 5 o'clock?—Yes.

174. Did you both leave at 5?—Yes.

175. To your knowledge, was anybody on the flat above you?—No.

176. Can you say that there was nobody there?—I could not swear that there was nobody there. I did not see anybody.

177. If anybody had been there up till 5 o'clock you must have seen them?—Yes, I suppose so.

178. Would it be possible for anybody to be there and you not see them?—Yes.

179. Is it probable that anybody was up there?—As far as I know, there was nobody up there.

180. Do you live at Belfast?—Yes; about a mile and a quarter away from the works.

181. About what time did you know anything about the fire?—I heard the factory whistle blow at quarter to 7, and I looked out and saw the fire. I went along on my bicycle, and saw it was the fellmongery department.

182. That was the portion in which you had been working?—Yes.

183. Where was the fire located in the building?—It was then burning in the middle portion of the building; the top roof had fallen in.

184. Your press does not go past the middle floor?—No.

185. You did have some loose wool about there?—Yes, a small quantity.

186. Was it low-class or high-grade wool?—It was mostly high grade. There were two or three small heaps of low quality.

187. Any skin pieces in it?—Yes, there were five bales of skin pieces. It was ready for baling.

188. How far is the middle floor from the drying-room?—About 12 ft. to go up the lift, and another 12 ft. from the lift.

189. Is the lift protected by wood or iron, or how?—It is all wood.

190. When you and your mate left at 5 o'clock was everybody away from that floor—the middle floor?—Yes. There were four of us there, and we all came down together.

191. Did you come down by the lift?—No; we came down the stairs.

192. As far as the middle flat was concerned, nobody was left there at all?—No.

193. As far as you know, nobody was upstairs?—No.

194. Do you know anything about the ground floors—as to what was being done there?—No.

195. You say the roof had fallen in when you saw it?—Yes.

196. Had you observed any increase in the temperature of the wool you were treating?—No.

197. Had you observed any excess of moisture beyond the natural moisture?—No; it was all perfectly dry.

198. *Mr. Foster.*] You said you made up five bales of skin pieces that day?—We never pressed it. It was ready for pressing.

199. How long was it lying there?—The biggest part of it had been there over a week.

200. Had you occasion to handle any of it?—No.

201. Was any of it put there within the week?—That wool comes in in small quantities, and the heap is built up till we get six or seven bales.

202. Do you think it likely that that heap was turned over during that week?—No.

203. Any increase in the quantity would be thrown on the top of it?—Yes.

204. Are you a smoker?—No.

205. Is your mate a smoker?—Yes.

206. Did any of the men smoke there that afternoon?—No.

207. Are they likely to have had matches about them?—I think all smokers carry matches. We are pretty well stripped off when doing that work, and simply have trousers and a singlet on.

208. Do you think it likely that matches could have dropped out of their pockets and thus have caused the fire?—No.

209. Have you formed any idea at all as to the probable cause of the fire?—No, I have no idea.

210. Do you know where the boiler-house chimney-stack was?—Yes.

211. Do you think it likely that a spark might have been carried from the chimney?—It might have been, because live sparks have been blown from chimneys before and set places on fire.

212. Have you seen any sparks being carried away from that chimney to any extent?—Yes.

213. Do you happen to remember whether on that night the wind was blowing from the boiler-house to the fellmongery?—On that day I think the wind was north-east, and that would send the sparks in the opposite direction to where the fire broke out.

214. Do you happen to remember whether the wind was in the same direction the day before?—I did not take any notice of the wind the day before, but I believe it was blowing in three or four directions. I believe it was south-west and north-east on that day.

215. Would you think it at all likely that a spark from that chimney might have been carried to the fellmongery the day before, and have lain there smouldering until the fire broke out?—That might have been so.

216. *Captain Blackburne.*] Do you think that if a spark got under the roof and landed on the wool or on the woodwork it would have started a fire?—No, it would not start on wool.

217. *Mr. Foster.*] Were you the person who tried to get into the top flat?—No.

218. Do you know who it was?—Yes.

219. Did you have any conversation with him?—Yes, and he told me that he went up the stairs, and he saw it was burning.

220. Whereabouts did he say it was burning?—He said it was burning in the roof in the north-west corner.

221. The person you refer to is here now?—Yes.

222. Some evidence has been given as to a condition of very great heat in the building: do you know anything of it?—I never felt any.

223. Not when the elevator is open, or the door connecting with the drying-room is open—does that make the rest of the building hot?—No. It soon escapes; there is such a draught there.

224. *The Chairman.*] But near the door it is warm?—Yes.

225. *Captain Blackburne.*] Where does the heat escape to?—In all directions.

226. *The Chairman.*] Within the building?—Yes.

227. *Mr. Foster.*] When you first got to the building had the fire got right down to the basement floor?—It was burning in the centre, and fire was coming out of the louvres.

228. On the first floor, where you were packing?—Yes; and the end of the brick wall had fallen in.

229. Was there any fire through the ceiling of the lower floor?—Yes.

230. So that by the time you got there it would be absolutely impossible to say where the fire started? You could not say it even started upstairs?—That is so.

231. *The Chairman.*] We have evidence that between a quarter past 6 and a quarter to 7 this place was a mass of flames?—Yes, as near as I can learn, it was.

232. It has been a very hot season. Was not the wood in a highly inflammable condition—was it not perfectly dry, so that if a wax match were put to it it would ignite?—I do not think you would want more than a wax match to set it going.

233. The wood was in a very inflammable condition?—Yes, when it got a start.

234. If somebody had thrown down a match, and that match had lain there, was not the wool in such a condition that it would actually catch fire?—The wool would not catch fire unless there was some small stuff round there to start it.

235. You had no small stuff there except wool?—Yes.

236. We know that if a lighted match was thrown on the wool it would go out?—Yes; and if you throw down a match on a bare floor it will naturally go out.

237. You do not consider that the woodwork was in such a condition that a lighted match would set it going unless there was some other material about?—Yes.

238. Assuming the match was thrown down along your lift, where there was a certain amount of draught going through, would not that assist it sufficiently to cause fire?—No, I do not think so—not on the bare boards.

239. Have you any theory as to the cause of this fire: this is the third fire that has occurred there?—I have nothing to suggest as to the cause of the fire. It is as big a mystery to me, I suppose, as it is to yourself.

APPENDICES.

EXHIBIT No. 1.

NEW ZEALAND.—LEGISLATIVE COUNCIL.
SHIPPING WET WOOL COMMITTEE
(REPORT, AND EVIDENCE TAKEN BY THEM).

REPORT.

THE Select Committee appointed to inquire into the subject of shipping wet wool have the honour to report that they have taken evidence on the subject from witnesses connected with the packing, dumping, shipping, and underwriting of wool, and have also had the advantage of scientific evidence from Sir James Hector, K.C.M.G.

The evidence shows that, in the opinion of experts, spontaneous combustion may arise in bales of wool shipped in a wet condition.

Your Committee have not, however, been able to obtain any direct evidence of wool having been seen in flames or in a state of glowing combustion, although some instances appear to be known of the inside of bales having been reduced to an almost charred condition through heat produced by compression while the wool was very damp.

The evidence taken appears to prove that in very few cases are bales of wool sent from sheep-stations in a damp condition, and that the danger arises mainly from wool shipped by certain firms of fellmongers who have not proper means of thoroughly drying wool.

An opinion appears to prevail that, besides the danger said to arise from the shipment of wet wool, there is a greater danger of spontaneous combustion to be apprehended from the shipment of flax stowed so as to touch and absorb the grease from greasy wool, and a still greater danger from the use of charcoal as an insulating material in ships which carry frozen meat.

The evidence taken by your Committee seems to show that there are very few cases of the shipment of wet wool, and they do not recommend fresh legislation on the subject; although they think that it would be of considerable benefit if those interested would cause experiments to be made on wet wool, flax, &c., placed in circumstances as nearly as possible resembling those in which the danger of spontaneous combustion is said to arise on board of ships.

16th August, 1894.

MINUTES OF EVIDENCE.

FRIDAY, 27TH JULY, 1894.—(HON. MR. SHRIMSKI, Chairman.)

Sir JAMES HECTOR, K.C.M.G., examined.

1. *Hon. the Chairman.*] You have received a summons from this Committee intimating the object for which you have been called to give evidence?—Yes; I have brought with me a memorandum on the subject upon which you require information, which I will read if you wish.

2. If you please?—The object is, I understand, to give the Committee some information as to the danger likely to arise from shipping wet wool during the voyage. Wool contains from 13 to 16 per cent. of moisture in its average dry state. When dry it consists of—carbon 51 per cent., hydrogen 7 per cent., nitrogen 18 per cent., oxygen 20 per cent., sulphur 3 per cent., ash 1 per cent. Wool consists of horny tissue, forming the fibres, and a complicated substance known as wool-grease. This is largely composed of lanoline or suint, which is a sudorate of potash—that is, a soap formed by the complex acid of perspiration combined with potash. This substance is soluble in water, and combines readily with water, and absorbs moisture. In addition, the wool-grease contains about 8 per cent. of fat that is not soluble in water, but is generally combined with lime and earthy matters, forming an insoluble soap. The wool-grease is liable to decomposition, and passes into a series of compounds, similar to those formed in urine, nearly all of which are soluble in water. The amount of the wool-grease—that is, the yolk and the fatty matters together—is from 21 to 27 per cent. in rough-washed wool, and about 44 per cent. in the unwashed clip. The grease is more liable to decomposition when in the fleece than when on the sheep's back. The damp wool—the soluble part of the yolk will become more fluid, and in dumping will be squeezed out, and soak into the coverings, which then become a source of danger. The compressing by dumping must raise the temperature of the bales as a whole. This, if localised, might raise the temperature to the incandescent point. Phormium consists of water 12, cellulose 61, oil 2, albumen 2, gum 22, ash 1; total 100. The Committee will perceive that in the yolk is the whole danger—that is to say, the oily part, or grease. The important point is that it absorbs moisture. The yolk is more liable to decomposition in the fleece than on the sheep's back.

In dumping—that is, in combining several bales together—it would be more liable to be squeezed so as to smear the covers. It then becomes a real source of danger. The temperature, if localised in any one part of the bale, would very likely be raised under pressure. Damp wool would be more likely to have the grease squeezed out. On two previous occasions I have reported on the danger likely to arise from spontaneous combustion, but not in the case of wool. On the 5th of June, 1889, I reported to the Hon. Mr. Richardson in respect of phormium fibre: “There is no record of any conflagration that was clearly proved to have originated from combustion of phormium fibre in bales. Flax-mills have in some instances taken fire, owing to the light dust and boon that is produced in the manufacture having ignited in contact with oily substance and hot machinery; also the green refuse lying in heaps has been known to ignite in the same way as any other damp vegetable matter does when undergoing putrefactive fermentation. It is possible, if the fibre is baled up in a rotting condition, or so damp as to supply the oxygen required to promote such fermentation, that the rotting would go on; but the rise in the temperature would be controlled by the compression that had been applied to the bales, as in the case of the manufacture of ensilage from green fodder, in which the temperature is kept at 135° Fahr., simply by pressure. If the fibre were in an oily state, and either accidentally or intentionally mixed with oily or fatty substances, there would be danger of spontaneous combustion from another and purely chemical process, it being well known that the temperature of vegetable fibres, if soaked or smeared with oil, grease, varnish, or such hydrocarbons, will rise sufficiently to ignite the bulk. The danger from this cause is so great that railway companies and shippers have refused to take the risk of certain mixed silken goods in the manufacture of which vegetable fibres and oils are used, and it is the same chemical action which causes the spontaneous conflagration of cotton when the bales are imperfectly isolated from other goods of an oily nature on board ship. In the case of the fire on board the ‘*Mariposa*’ there does not appear to be the slightest evidence that it originated from heat generated in the centre of the bale. If the outside of some of the bales had been accidentally smeared with grease and moisture it is just possible that heat might have been generated between bales tightly packed together in the hold; but the heat required to ignite the flax could not, in my opinion, have been generated in the short time that had elapsed between the taking-in of the flax and the breaking-out of the fire. It seems unfortunate that the question should have been raised, as there is nothing to show that the phormium fibre is more prone to take fire than such articles as coal, greasy wool, cotton, manila, sisal, jute, kauri-gum, and many other articles of commerce that are carried without question. If the matter is to be made the subject of an experimental investigation I think that in fairness to the New Zealand flax other substances should also be tested, and the results made comparative. The experiment would be costly, and extend over at least three months. It will be necessary to build strong brick or timber sheds, in which the condition in the hold of a ship can be imitated, and several bales of each sample to be tested would be required. Special thermometers must be contrived, and a special machine for applying graduated pressure; and, as there is no record of similar experiments having been previously made, so far as I can find, there might be many trials before a satisfactory method is arrived at and reliable results obtained. Under these circumstances, I think that a special authority for the necessary expenditure should be given, and perhaps it would even be desirable to appoint a Commission of experts to superintend the experiments.” I may here state that there was a curious case occurred at Home, where a cotton-mill had a succession of mysterious fires breaking out one after the other. It was a long time before they found out the cause. It was eventually found that one of the scutching-machines for cleaning the cotton-seeds was so defective that it bruised the seeds and left an oily streak behind where it touched. The cotton was put away with the oily streak on it, and it took fire, the fire arising in the cotton-fibre. There was another case where the cotton-waste in a mill that had been accidentally smeared with oil was thrown in front of the cold furnace, in which the fire was laid for next day’s work. It was put down there for the engineer to use, and during the night the waste took fire of itself, and ignited the furnace, so that the watchman was wakened up in the middle of the night by hearing a full head of steam blowing off. On the 7th July, 1893, I reported to the Hon. the Minister of Marine, in a memorandum relating to the case of the “*Ruahine*,” as follows: “I have always considered that the use of charcoal for insulation was dangerous, for two reasons—(1) the well-known tendency of some kinds of charcoal to absorb oxygen from the atmosphere, and thus become more liable to spontaneous combustion than in its normal condition; (2) charcoal is a deodoriser but not a disinfectant—that is, it absorbs and retains any germs of putrefaction without destroying them—and thus may become a ‘nidus’ for the propagation of germs that may taint the meat. For this reason, when the meat-freezing trade was started, I strongly urged the use of calcined pumice instead of charcoal as being quite as good a non-conductor and absolutely safe. With reference to the fire on the ‘*Ruahine*,’ there is no clear evidence that the combustion started in the charcoal, and it might be well to make some further inquiry as to where the lower ends of the ventilators open to. The fact that an ascending draught betrayed the existence of the fire equally proves that there must have been a downdraught by some other ventilator. It is surely possible that a spark from the funnel might have followed such a downdraught, and thus ignited the charcoal or other inflammable material in the lower hold. When it is considered that for every foot of charcoal consumed over 3,000 cubic feet of air must have passed down to or up from the fire it will be seen that the draught must have been as fierce as a furnace-flue. Had such a draught not existed the carbonic-acid gas generated by a very small quantity of charcoal would have been sufficient to extinguish the fire. The question as to the prime cause of the fire is thus complicated by the question of how the supply of air required to maintain the combustion obtained access in such large quantities, and indicates that the whole question of the system of ventilation of ships’ holds requires investigation and regulation.” I have always considered that the use of charcoal for insulation is dangerous. This for two reasons: first, because of its absorbing oxygen from the

atmosphere, and its retaining the germs of putrefaction, as I have already stated. The matter was taken up by Mr. Firth, of Auckland, I remember, after the case of the "Mataura." This vessel was loaded alongside the Auckland Wharf. On the opposite side was a vessel having on board blood manure and such matters, which came from Queensland. When the "Mataura" arrived Home her cargo of meat had to be destroyed. At that time it was not thought possible to find a substitute for charcoal, but I recommended calcined pumice. Captain Rose, I think, would recollect where the fire took place.

Captain Rose: I only know from what I was told.

Sir James Hector: There must be an access of air. Charcoal cannot burn without an access of air. For every foot of charcoal consumed there must be 3,000 cubic feet of air. Air is absolutely necessary to combustion. The result of the combination of oxygen and charcoal, in the absence of a ventilating draught, would be the formation of carbonic-acid gas—that would put out the fire.

3. *Hon. Mr. Pharazyn.*] I would like to ask Sir James Hector whether, after all, there is any certainty that wool will ignite by spontaneous combustion under the circumstances stated?—I cannot find any record of its having done so. I distinguish fleece wool from wool in bales. Wool in bales will heat if damp and smeared with oil, or if full of woolly grease. Vegetable fibre in contact with grease moisture and not under pressure will ignite much sooner. Moisture in promoting decomposition supplies sufficient oxygen to produce the point of incandescence. If putrefaction commences heat is generated. This heat may reach the point of incandescence. The persistence of the fire will depend on the access of draught.

4. I think you said that under pressure it was possible for the heat to be localised or concentrated on one point?—I was thinking of the effect it might have supposing the wool-bales were dumped and bound with hoops.

5. The wool-bales are bound with metal hoops?—There is the screw of the hydraulic press. At the time the pressure is at its utmost, if it is iron-bound, the bond is put on and riveted. After that the tension under the hoop is very great.

6. And the heat generated by smouldering might become localised?—Supposing one of the bonds began to get hot it might act like the fly-wheel of a machine and maintain combustion.

7. The bonds would not be likely to get hot, for they are not put on till it is about to be moved?—The hydraulic press squeezes the two bales into one. I do not say that it is during the process of dumping that takes place; but, if the heating does take place, iron being a good conductor might tend to localise the heat until it should reach the point of incandescence; the pressure on the rivets must be something enormous.

8. Is it your contention then that pressure would not produce heat?—I did not contemplate that in my answer, but many other things might localise heat.

9. *Hon. Mr. Swanson.*] I have brought down here two or three books about spontaneous combustion. It appears to me that there is plenty of evidence to show that without any pressure flannel rags, or cotton waste, and other substances used for cleaning machinery, are liable to it?—Yes, all vegetable fibres.

10. Without any pressure at all these authorities leave no doubt that woollen material might take fire?—It is, of course, inflammable, but it does not take fire readily on account of the percentage of nitrogen it contains; that is why it is more difficult to burn wool or horn. Vegetable fibre is much the same, except in respect of nitrogen.

11. Can you suggest anything to stop this shipping of wet wool?—I think that the whole subject of the ventilation of ships is one that ought to be looked to.

12. I understood you to say that if the hold could be made absolutely airtight that would prevent localisation?—The whole question of the ventilation of ships is of the utmost importance; it is one on which I feel very strongly, especially in respect of charcoal insulation.

13. *Hon. Mr. Oliver.*] Are you quite certain that spontaneous combustion might arise from this source?—I mean spontaneous incandescence, which is the beginning of combustion, especially where there are both animal and vegetable products, if they are mixed with oil and moistened. They then undergo a process of fermentation, and then a rise of temperature will be sufficient.

14. *Hon. Mr. Swanson.*] Is there anything that could be thrown in among the wool which would prevent this thing happening?

Sir James Hector: What would be the effect of putting salt into the wool? I do not know.

Hon. Mr. Pharazyn: The effect of that would be to spoil it. It is a question whether the yolk itself in the wool is sufficient to bring about this state of heat.

Sir James Hector: The yolk itself is in the nature of a soap. I have already explained that the yolk, being squeezed into the wool-bale and covered, would then become a source of danger.

CAPTAIN BABOT examined.

15. *Hon. the Chairman.*] We have taken notice of your troubles, Captain Babot, in regard to shipping wet wool: do you think there is any danger likely to arise from putting wool on board ship in a wet state?—Yes, certainly I do.

16. Will you give us the reason why you are afraid of putting wool on board ship in a wet state?—I think there is very great danger to be apprehended from that cause.

17. Will you give the Committee some information which you possess on that subject?—I cannot give you any expert evidence, but we have always understood that wet wool, or heated wool, on board ship is a great source of danger; from my experience that has always been an understood thing.

18. *Hon. Mr. Oliver.*] Will you give us your experience obtained recently, for I have learned that you have had some late experience?—Yes, that is so. After nearly every vessel that arrives in port for loading we find, especially in the winter months, some heated wool in our sheds.

19. Is it generally found that the danger has arisen from the bales being exposed and having been rained upon, or is it that the danger has arisen from baling the wool while in a wet state?—Baling the wool in a wet state; frequently we find that there is no outside appearance of damp, the packing on the outside being perfectly dry. When it lies in the ship or in the shed for a week or so we can detect the moisture. We can perceive the moisture on the floor of the shed, if it lies there any length of time.

20. Can any method be adopted in stowing cargo on board ship by which the danger might be lessened?—We must detect the danger before it goes on board ship; we cannot do anything in regard to stowage; we would not stow it or put it on board ship if we found it to be dangerous, or likely to become so.

21. Have you seen the suggestion that you should proceed very much in the same way as when a haystack is made—viz., with a hollow shaft in the middle?—It is generally fellmongered wool that we find to be in this dangerous state. The small men have not the necessary appliances for shipping, or rather for drying their wool. It is mostly in slipe wool where this occurs. I have been myself at times struck, while passing a shed, seeing the men coming out to load the dray; and as soon as a little shower of rain comes on they leave the wool exposed to the rain. When it is exposed again like that it will be in a dangerous condition.

22. *Hon. Mr. Pharazyn.*] Slipe wool is generally washed?—No; it is generally but half washed. You can wash it; you generally pull the wool off the skin.

23. The scourers wash it. At all events it goes through a washing process, and then it is supposed to be dried by putting it in a drying-machine?—I do not think that the small people do that. I must say that this is the first time, or rather the first instance, in which I have found heated wool come from any of the large companies, who have all modern appliances for drying their wool. I do not understand why it should be so in this case, from the Christchurch Meat Company; it is the first time we have detected anything wrong with their wool.

24. *Hon. Mr. Oliver.*] Have you any suggestion to make to meet the difficulty?—The only suggestion that I can make is to make it a punishable offence for any man to ship wool in such a state.

25. *Hon. Mr. Pharazyn.*] Have you ever known any case where the wool has actually become incandescent?—No; I have never known it.

26. What is the highest temperature obtained in the ship?—Do you mean before shipping or afterwards? I cannot tell you that. Captain Bendall is here, he tests all the wool; he knows when wool should be rejected. There is no doubt about wool heating up to a certain point, and there is no doubt about it being shipped in a dangerous state.

27. *Hon. Mr. Pharazyn.*] There is one case I recollect where the wool was upset into the Wairarapa Lake; is was fished out and left on the shore for several days, exposed to the weather?—We have had numerous cases, but chiefly coming from fellmongers and small men who had no proper appliances for drying their wool. There was the case of the "Jessie Readman" wool, which came from the Chathams, being much heated, and the bales had to be burst open to prevent their taking fire.

28. Have you ever heard of a case of a fire actually taking place through heated wool becoming incandescent, and consequent spontaneous combustion?—No; I have never heard of an actual case, it is only an assumption. A shipment went Home (reported from Sydney), and the moment it was in the barge alongside it blazed immediately.

29. There is one difficulty in the case of wet wool: before it can attain a greater temperature than 212°, or boiling-point, it must dry up the steam; while the steam is going off it cannot rise in temperature?—I do not know that it would on board ship, but when it was afterwards exposed to the air it would. There is a case reported of a ship that went Home, and when the wool was put into the barge alongside it was in a blaze immediately. You will get all the information about this from Mr. Miles; the information respecting it came to him.

Captain Bendall: There is an account of it in the *Banking and Insurance Record*, page 429.

30. *Hon. Mr. Rigg.*] You have told us that the coverings of the bales were perfectly dry in most cases?—Yes.

31. And that the damp came from the inside?—Yes.

32. That would go to show that it was wet when it was packed?—Yes.

33. And that most of this sort comes from the fellmongers?—Yes; that is our experience.

34. Have you known of any cases where wet wool came from a station direct, or of wool that you are aware came from a station, and afterwards showed these signs?—I cannot say that I have; there are many other cases.

35. Do you find these signs of damp often occurring in the shed before the wool is shipped?—Very often. I believe that if it were in the shed for any length of time it would be certain to show signs of damp. The "Tainui" wool was put in the shed, and on its being set on end there was a patch on the floor at the bottom. Several of the Harbour Board officials were present, I believe. They sent for Captain Bendall. Captain Bendall and I went to the shed. We rejected about half of them. That came from a small fellmonger.

36. *Hon. Mr. Pharazyn.*] And what was done with the Christchurch wool?—We reshipped some of it—different brands—in the case of the Christchurch Meat Company's wool. The company wanted to get at the bottom of the matter; and we landed the whole shipment, 171 bales, which was to be returned to Lyttelton.

37. *Hon. Mr. Oliver.*] Have you any further suggestions to make?—I think it would be necessary to have more surveyors to examine this wool. Captain Bendall is overworked. You want at least two extra men as surveyors. The Harbour Board people are very attentive.

38. But if the bale is dry to all appearance, how can Captain Bendall know its actual condition?—He has testers which he can put into it, and take out. By the aid of these testers he can

tell the condition of the bale inside. He naturally looks sharply after the fellmongers' wool; but one man cannot look after them all. As I have suggested, there should be two more surveyors besides Captain Bendall. There is quite enough to keep two men going.

39. Is not this the duty of the insurance companies? The principal persons are the owners of the ship, and, of course, the owners of the wool as well. Do you not think that fact would make them careful in shipping only dry wool?—It is a matter within my own knowledge that a person in charge of a ship is generally very particular not to have wet wool shipped on board his ship. But there is always more or less difficulty in the matter. A man who knows his business will insist on the wool being dry, whether he is the shipper or having charge. As to the wool-owner, there is usually a good-sized shed on every station where there is sufficient accommodation to dry wool.

40. *Hon. Mr. Pharazyn.*] I would like to know whether the stowage can be so managed as to prevent the access of air?—Stowage would not do that; we pack it as close as we can.

41. Then practically there is no access of air to the wool?—No, and in point of fact, where the ventilators would have effect, all draught is shut out.

Captain ROSE examined.

42. *Hon. the Chairman.*] We will now hear you, Captain Rose?—On the subject of wet wool I have had a good many years' experience. Sir James Hector has given the Committee information as to the danger arising from this cause. I remember some years ago taking wool for the late Mr. W. Robertson. The wool had been lying on the beach for some time. A good deal of it had absorbed moisture. In those days we used to dump the wool on board. We squeezed all the water out of it with the press; but when we got to London and all the wet bales were landed, a number of bales were found damaged; the inside was all like tinder; it had perished. It had not blazed because no air could get to it. It is quite possible, if the air could have got to it, it would have blazed out.

43. *Hon. Mr. Oliver.*] Have you any suggestion to make to meet this difficulty?—I do not know. We take every care; the Harbour Board people assist us in every way. The only way to detect the wet wool is to stack the bales when it comes in. If there is any damp it heats in the stack. Some of them become so hot that if you thrust your hand in you can hardly bear it. But you cannot detect it the day it comes down; if, however, it stands a while you can detect it.

44. Is it so very difficult a thing to detect?—It is a thing that gives us a great deal of trouble and anxiety.

45. Do you believe that any ship has ever been lost through having wet wool on board?—I think so; it is not known where a fire has broken out, whether the wool was the cause of it, as there has been no ship known which had no other cargo on board. In most ships there has been other cargo on board.

Captain Babot: There was the case of the "Bluejacket," which had Fiji cotton on board.

46. *Hon. Mr. Pharazyn.*] I understand that vegetable fibre will burn more spontaneously than animal fibre?—Yes, that is so.

47. You ship cocoanut fibre. There is plenty of oil in that?

Captain Rose: With wool coming from the station we have very little trouble. Most of this fellmongers' wool is scoured wool. I fancy the men must be paid to do the work by weight; it would seem like it.

48. *Hon. Mr. Rigg.*] The vessel you have mentioned in your evidence, of what material was she built?—That was in the old days. She was a wooden vessel. It was not that there was a cargo of wool only; the wool in that case was in the centre of the cargo. The wool had absorbed the moisture from the beach.

49. *Hon. the Chairman.*] Did you ship this Christchurch wool back?

Captain Babot: Yes, 171 bales of it. There were 90 other bales in transit; they were sent back. Indeed, the Meat Company was anxious to get to the bottom of the matter. They were put to a good deal of expense, for they had to pay us dead freight. It was their own wish, as they wanted to get at the bottom of the whole affair.

Captain BENDALL examined.

50. *Hon. the Chairman.*] You are the surveyor to the Underwriters' Association?—Yes.

51. Can you give us some information about this damp wool that is shipped?—Yes.

52. The Committee will hear what you have to say?—This fellmongers' wool is always suspected of being damp; I have therefore recommended the underwriters that it should not be shipped until fourteen days after being packed. When it comes into the sheds it appears to be all right, but after the bales are pressed and stacked for a week or a fortnight the wool frequently develops heat: we always expect that, especially during winter months.

53. *Hon. Mr. Pharazyn.*] You have been a captain in command of ships yourself?—Yes.

54. Have you ever of your own knowledge known of a ship catching fire in consequence of wet wool being on board?—No; further than that it was supposed that several missing wool-ships have taken fire from damp wool being on board.

55. You have had some trouble in regard to the wool on the "Tainui" and "Gothic"?—Yes, it was all fellmongers' wool or slipe wool. I have samples of the wool here if the Committee would like to look at them. [Samples produced.]

55. *Hon. the Chairman.*] Where do these come from?—One of them comes from a bale of wool that was so hot as almost to be unbearable to touch when landed from the "Gothic" five days ago. Yesterday I took these samples from heated bales landed out of the hold of the "Gothic." Here is another sample which is charred or discoloured through heating. Now, the heat inside some bales

of this slipe wool cannot be detected with piercing instruments when it first arrives. After it has been pressed it generates heat more rapidly. Here is another sample taken out of wool that was only slightly heated.

56. *Hon. the Chairman.*] Then, you have recommended that this fellmongers' wool should not be accepted at once?—I have recommended to the underwriters that it should be not be shipped until at least fourteen days after it has been packed and pressed.

57. *Hon. Mr. MacGregor.*] Can you then detect the heat in it?—Yes, I think so.

58. *Hon. Mr. Oliver.*] Why "fourteen" days?—It may be detected in ten or twelve days, but fourteen days would allow time to be sure that the heat had been generated in the wool, and was in course of development.

59. You think that fourteen days would develop the heat?—Yes, after being dumped.

60. Then there would be a difference in a bale that was dumped and a bale that had not been dumped?—Yes; the heat generates more rapidly after it has been dumped.

61. Is that the only suggestion you can make?—I am sure heat in wool could not be detected in some instances upon first coming in, or at the start, from the fellmongers. Newly packed wool is received for shipment apparently in good order from the fellmongers very often; but after standing some time I have found the wool unbearable to the touch.

62. You have instruments to detect the heat inside a bale of wool?—Yes, I use an instrument with a thermometer attached; but in tightly pressed bales I could not insert this, and I have to use a pointed steel bar; you cannot insert the thermometer with sufficient force.

63. *Hon. Mr. Pharazyn.*] Then you leave the instrument in the bale a sufficient time to allow the heat to be indicated by the thermometer?—Yes; sometimes you can detect the heat immediately, and sometimes not.

64. In dumped wool you would not be able always to use the force necessary to insert a delicate instrument?

65. *Hon. Mr. Oliver.*] You might drive it in with a hammer, if necessary. In trying to use it for pressed bales you would be likely to break it?—Yes; I have recently, on the "Gothic," broken the thermometer instrument in that way, and have been obliged to get solid instruments of steel made for the purpose.

66. *Hon. Mr. Pharazyn.*] In testing the bales for heat, do you never see any sign of steam?—I could not detect steam until the bands were broken. Steam then issued from between the two bales forming the double dump. On board both the "Tainui" and the "Gothic," steam issued from the bales after being burst asunder.

67. Then, so long as the steam is thrown out, the temperature cannot rise above 212° Fahr., and incandescence could not take place?—Yes; but chemical combinations might take place.

68. *Hon. Mr. Rigg.*] No. 1 sample—did that come from the "Gothic"?—It came from a bale unshipped, that had been on board the "Gothic."

69. It had been carried from Christchurch to Wellington?—Yes.

70. Do you know when the wool coming from a station shows signs of damp?—Yes, very often that is easily detected. You can see externally whether wool has been damaged by wet. From the coast we get a great deal of wool that is damaged by sea-water. This is so easily detected that it is not the greatest source of danger. It is by no means the most dangerous wool that comes to us for shipment.

71. *Hon. Mr. MacGregor.*] What do you do with the wool when you find it damp: do you lay it aside?—Yes.

72. You refuse to ship it?—We write on it, "Unfit for shipment."

73. *Hon. Mr. Oliver.*] May we take it from you, also, what we have learned from Captain Babot and Captain Rose, that you have not sufficient assistance to discharge these duties properly?—It would be impossible for me to insert a piercer into every bale of wool. Besides, I have other duties to perform.

74. How many inspectors do you suppose would be necessary?—To try every bale you would require half a dozen or more.

75. But you generally know suspicious bales?—Yes.

76. You do not know the suspicious bales coming from the fellmongers?—All these are suspicious. The wool of the meat companies we frequently found heated after lying in the store. But lately, since the use of artificial drying process, we have not had any heated wool from these companies.

MONDAY, 30TH JULY, 1894.

MR. ALFRED HENRY MILES, Merchant, Wellington, examined.

77. *Hon. the Chairman.*] The Committee thought it desirable to call upon you to attend to-day to afford them any information you possess with regard to the shipping of damp wool, and if there be any danger arising therefrom?—I think there is no doubt that the main cause of this trouble is owing to the carelessness of those who deal in the fellmongering of skins, and the scouring of wool, because we rarely hear of any trouble arising in the case of greasy wool. Recent experiences point to the fact that the danger has arisen with the fellmongers' wools, particularly the slipe wools, which contain a considerable quantity of grease. The experience of those engaged in the wool trade in London shows that bales of wool are frequently landed in such a condition through heating as to be almost valueless. I have here a letter bearing upon this particular branch of the subject, portions of which I shall read for the information of the Committee. My correspondents write: "We wish to draw your special attention to a case of marine insurance which has lately arisen, in order to bring under your notice the serious danger of shipping damp wool. Certain wools were shipped from Sydney and Melbourne, per s.s. 'Bungaree,' in October, 1893. On the arrival of the ship in

London several of the bales, when being delivered to the barge one afternoon, were seen to be in a bad state, and were signed for by the Lighterage Company as 'wet, stained, and heated.' Early the next morning, while in the barge, the bales fired, doing very considerable damage." The agents for the ship wrote, "When discharged the bales were in an exceedingly heated state from the consequence of their non-inherent vice, and not from any cause for which the ship's owner can possibly be held responsible; in fact, he has grave cause of complaint against the shippers for sending such dangerous cargo." The average-adjusters wrote, "We have very carefully considered all the circumstances of this case, and have likewise had the opportunity of perusing the steamer's log-book, and have had several interviews with the shipbrokers. The facts, as far as we can gather them from these sources, combined with your papers, appear to be that, on arrival of the vessel, a certain amount of wool in the fore-hold, on being discharged into craft, was found to have heated in some instances. The contents of the bales were almost in cinders. This heating appears to have started first in the centre of each bale, and to have gradually spread outwards. Some few of the bales referred to, on being placed in craft, broke out into flames on being exposed to the air. According to the log-book, the vessel does not appear to have met with any bad weather, nor has she made any water, nor is there any mention of any fire on board. The wool in question was not stowed anywhere near the engine-room, nor is there any reason to believe that the hold of the steamer was hotter than should ordinarily be the case. The conclusion we are practically forced to from all these facts is that the bales in question have heated through their own '*vice propre*'; that is, that for some reason or other (dampness or something of that nature) the wool was in such a condition at shipment that it could not stand the press-packing and stowage in the hold of a steamer for so long a period as is naturally required for the voyage from Australia to this country, and that the state of the wool on landing arose solely from this cause. If we are right in this conclusion (and we cannot help thinking we are), then there is no claim for particular average on wool damaged in this manner, nor is the shipowner liable in the least for the unfortunate result." There is no doubt whatever that the danger is greater with these slipe wools than with scoured wools. I have been interested in a good many shipments of scoured wool, some of which have undoubtedly been shipped in an improper condition; but no ill effects have resulted as regards the firing, or serious damage to the wool, because there has not been sufficient damp in the bales; but I have had exceptional losses of weight, which afforded me quite sufficient proof that the wool must have been damp when packed.

78. *Hon. Mr. Pharazyn.*] Those bales did not take fire in the ship?—No. As far as I am competent to speak on that point, I should say there is no danger of firing on board a ship so long as there is entire exclusion of air or draught. I can quite conceive that if some of these heated bales were under a ventilator, or in any part of the ship where air reached them, or if the bales were stowed in the vessel in such a manner that there would be room for the dumping-bands to burst, thus enabling air to reach the heated wool through the pressure being released or relieved, there would be danger of firing.

79. Do you think that under the ordinary conditions of stowage there is danger from the shipping of wet wool?—I should say there is certainly danger in shipping wet wool.

80. Danger to the ship from carrying such a cargo?—The wool might be packed next to cotton and other goods, when there would then be an increased danger.

81. *Hon. Mr. Swanson.*] Next to flax?—Yes; flax, tallow, or oils.

82. *Hon. Mr. Pharazyn.*] I would ask whether, in your opinion, bales of wet wool ever become incandescent in the ship under conditions of ordinary stowage?—I should say not.

83. In any of the cases of fire on board ship there is no proof that the fire originated from the wool?—No; none whatever. In the somewhat recent cases of the "Merope," burnt at sea; the "Winnifred," from Wellington to London, put into Bahia, cargo on fire; and the "Langstone," which caught fire in the Hawke's Bay roadstead, it does not appear that there was any trace of wet on the outside of any of the bales when shipped.

84. You have spoken of slipe wool as being heated: have you looked at greasy wool as being heated in the same way?—I think there is a greater danger with greasy and slipe wool than with scoured wool after wet. This is more a question for an expert in chemistry to determine. I have no doubt Sir James Hector would be able to give you the information.

85. *Hon. the Chairman.*] Where do you find the most trouble—the wool coming direct from the station, or from fellmongers?—Well, speaking generally, I think there is a greater danger with the fellmongers' wool, although there should not be. The large fellmongers have proper appliances for drying their wool, but the small fellmongers, who are depending upon the sunlight and wind to dry their wool, have a greater difficulty in getting their wool dry. The larger companies and the freezing companies should be able to ship their wool in an absolutely dry state.

86. You can give us no idea as to what would prevent any combustion?—The drying of the wool.

87. What would you recommend?—Dry the wool properly before shipment.

88. *Hon. Mr. Swanson.*] Are you sure, if there was no water, that a fire would not take place?—I feel perfectly certain on that point.

89. You will find in works on chemistry that greasy wool has set fire to Her Majesty's ships?—Not the greasy wool, or the wool in its natural state. We are only now discussing the raw material.

90. There is abundance of evidence of fires having taken place through spontaneous combustion in ships where woollen goods, cotton rags, and flax were stored together?—It is difficult to fire wool by itself. If there was a mixture of cotton and wool there might be danger.

Mr. WILLIAM FERGUSON, Secretary and Engineer to the Wellington Harbour Board, examined.

91. *Hon. the Chairman.*] Do you find any trouble from moisture in working dumped wool at Wellington?—We dump, practically speaking, all the wool that arrives by rail. Of course, there is a certain quantity of dumped wool that comes by coastal steamers from Wanganui and Picton. We

dump a very large proportion of the total quantity of wool which passes through the port. There are no other dumping-presses in Wellington. At certain of the coastal stations they dump their own wool, and we do not redump it unless specially required to do so. With reference to the case of the vessel "Langstone," mentioned by the last witness, I may state that seeing she was being loaded at the time, and that her hatches were open, it is very improbable that the fire arose from damp wool. It is more likely to have arisen from some one smoking. So far as I know there is no definite proof that any wool has ever caught fire—either greasy wool or washed wool. I think it is extremely improbable for the wool to become ignited. Woollen goods largely adulterated with cotton might, when mixed with oily matter, undergo spontaneous combustion. I have paid a good deal of attention to this matter from time to time, and, so far as I know, no case has ever been reported where it has been definitely proved that wool will catch fire. It will gradually become charred down to a cinder, but it will never burst into a flame. We have during the various wool seasons had large stacks of dumped wool, from 25 ft. to 30 ft. square at the base, and ten bales in height, and remaining for several weeks, and we have never found heating to any extent in such stacks. We have found marks on the floor where the grease has been squeezed out by the weight, but we have never had serious cases of heating. We have had fires in the sheds where greasy cotton waste has been thrown on one side in close proximity to bales of wool, but in no case did the wool catch fire.

92. *Hon. Mr. Pharazyn.*] In all those cases where the ships had caught fire, so far as you know, there was no proof that the fire had arisen from the wool?—No. I am inclined to think, in any case where wool might have been stacked in the vessel's hold alongside of cotton or flax, if the flax were damp, or the woolpacks were damp, it is possible then that there might be combustion, particularly with greasy wool, for you would have damp vegetable fibre and an oily substance in contact therewith. These would be conditions under which spontaneous combustion might take place, but that would be a very extreme case.

93. Have you seen the case referred to by the last witness?—I saw an extract which contained the gist of the case.

94. It is there stated that the bales burst into flames after being discharged into a lighter. What do you think that fire was caused by?—Very likely the casing might have caught fire, as it is made of jute, a substance liable to spontaneous combustion under certain conditions.

95. *Hon. Mr. Oliver.*] You think there is greater danger where the wool is stacked with flax in ships than where the wool is kept separate?—I think so.

96. Do you think heat is generated in the wool bales?—It is more likely to be generated in the flax bales than in the wool bales. We have had many cases of heated flax.

97. Do you mean that there is a greater danger with wool and flax mixed in the hold of the vessel than there would be if the flax were packed by itself?—I think where there is any oily substance that might come in contact with damp flax there would be a likelihood of danger. The oily matter is the dangerous element. We know that damp flax does become heated, and if you add the oily matter from greasy wool you have all the conditions for spontaneous combustion.

98. There would be increased danger?—Yes.

99. *Hon. Mr. Pharazyn.*] As a matter of precaution, it is better they should be stowed separately?—I think they should be stowed separately. In fact, I think they are stowed separately at present as a matter of convenience.

100. You would suggest that a layer of something should be interposed between the flax and the wool?—Yes, and that the wool should not be stacked on the top of the flax, so that the grease should not descend to it. We find constantly that wool loses weight between Wellington and England. I am informed that many years ago, in the old sailing-ship days, when greasy wool was sent Home 5 per cent. was added to the weight because it was known that it would absorb 5 per cent. moisture on the voyage. The shippers, however, I am informed, have long ceased to add the 5 per cent., and now complaints are continually made to me that the London weights are less than the Wellington weights. I have been for some years past taking great care in testing the weighing-machines, and I am satisfied that, apart from the personal error of the individual, which you cannot possibly eliminate, there is very little risk of mistakes, and that our weights are as accurate as they can possibly be expected to be. The conclusion I draw is that the wool is shipped in a damp condition—that it loses moisture on the voyage Home by evaporation. There is, undoubtedly, evaporation, and consequent loss in weight. Recently, on thirty-two bales of wool there was a loss of $1\frac{1}{2}$ per cent., and I have had complaints made of losses up to 7 per cent., but in such cases of heavy loss there is always a doubt as to accuracy of weights.

101. *Hon. the Chairman.*] Where did the wool come from?—It was greasy wool. I think that the merchants recognise now that washed wool does lose weight. They have not recently made complaints about scoured wool. They accept the fact that there is a little loss. In my opinion it shows that the wool is damp when shipped. I have been trying experiments to find a method of testing the dampness of wool in the bales, but, so far, have met with no success. Any tests which I have been able to apply have not been sufficiently rapid or precise.

102. *Hon. Mr. Oliver.*] A suggestion has been made that wool should not be shipped before fourteen days elapse, so that, if any damp wool had generated heat, it would be discovered?—I am inclined to think the heat would not be developed in fourteen days—not to such an extent as would justify any one in stopping the bales. The only method of testing that would be of any use would be the placing of a thermometer in every bale; but, as some hundred thousand bales of wool are shipped in the year from Wellington, it would be rather a difficult thing to do this. 93,726 bales of wool were shipped from Wellington during the twelve months ending June, 1894, so that it would be difficult to test each bale for heat. I have given instructions to all employees of the Harbour Board that where there is damp apparent, or anything else unusual, to place the bale on one side, and to call the attention of Captain Bendall to it; and I know that is done. Although

there are thus, practically, a large number of inspectors looking after this matter, I think Captain Bendall ought to have more assistance than he has now.

103. He is employed by the underwriters?—Yes.

103A. Do you think the onus ought to be thrown on to the underwriters of strengthening his hands?—I do not care to express an opinion.

104. Have you any suggestion to make to meet the danger?—The only suggestion I have to make is that you should consider the desirability of making it penal to ship wool which is undoubtedly damp, but I cannot make any suggestion as to how you are to find that out. Where wool is wilfully or carelessly shipped wet the shippers should be subjected to a penalty. The existence of a penalty might prevent people wilfully shipping damp wool.

105. Your opinion seems to be that nearly every bale has damp enough in it to increase its weight?—I will not say every bale, but there are lines of bales which may contain 16 per cent. of moisture—that is, as compared with wool absolutely dry. Water is absorbed in the body of the wool or held in contact on the surface. It is clear that if the shearing takes place on a damp day, or if the sheep are kept out in the wet, there must be a larger quantity of moisture in the wool than if the sheep were shorn after a long succession of hot weather. Wool that has been shorn after a long succession of hot weather would tend to absorb moisture; on the other hand, wool which contains more than the natural moisture gives that superfluous moisture off. I do not see how you are going to deal with the case of natural wool, unless a person has wilfully packed damp wool to increase the weight, or sent wool for shipment knowing it was damp.

106. If the natural condition of wool varies so much in the quantity of water it contains, would it not be extremely difficult to determine the extent of culpability?—That is the difficulty I see. Of course, scoured wool ought to be properly dried. If it is shipped damp there is culpability on the part of the scourer. You never could get a conviction under such a penal law, for it would be very difficult to prove the offence; but the mere existence of such a law on the statute-book might have a deterrent effect. I would have the law to be set in motion by private individuals, and not by any system of inspectors. You would not do any good by appointing a number of inspectors.

107. Loss in value may arise from the shipping of damp wool?—Yes. The practice is growing for merchants to buy here on behalf of millers, and it is to the interest of the seller to put as much damp into the wool as possible. As to the suggestion to store the wool for a fortnight before shipment, a very large portion of the wool is stored for a fortnight. Of all the wool that passes through Wellington, from 60 to 66 per cent. is stored in the Harbour Board sheds, and the average duration of storage is a trifle over a fortnight.

108. Then, if a fortnight is not sufficient, what time would be sufficient?—I doubt if any particular time would be sufficient as a test. You could not keep the whole of the wool of the colony packed in store for such a period. Storage accommodation does not exist. It would be impracticable, and would not pay. I think it would be far better to insist that all fellmongers should have proper machines for the drying of the wool.

109. Do not the underwriting companies insist upon the conditions under which they would insure the wool, and has not that had a good effect?—I believe they are not quite unanimous in their action. Some companies have declined to insure flax. The evil of shipping damp wool has not reached such magnitude as to admit of unanimity. The losses are so small. If the losses became greater the rates would be higher. The premium balances itself with the risks. If the risks suddenly become greater, the rates would go up. You cannot interfere in that way. You must leave the insurance companies to manage their own business.

110. *Hon. Mr. Swanson.*] In what state was the wool which you say had lost weight?—It was undoubtedly delivered in good condition.

111. The bales of wool which were wet did no harm?—No; it only decreased in weight. It is to the interests of the merchants to see that the wool turns out the same weight when delivered in London. There have been very few cases of moisture appearing in wool during dumping. I only remember two cases where in dumping there had been any serious signs of moisture produced. In these cases the wool must have been packed wringing wet. Sometimes bales are ordered by Captain Bendall to be put into the sunshine for some days. In cases where the bales have got wet on the surface all our men have instructions to give full information.

112. *Hon. Mr. Rigg.*] How many bales of wool are dumped here during the season?—For the twelve months ending June, 1894, we dumped 69,407 bales of wool, or nearly three-fourths of the total quantity of wool shipped from Wellington.

113. What is the proportion of greasy wool to washed wool?—I could not give you that information. Wool sometimes comes to us in a dumped state from Wanganui, Blenheim, and Picton, and sometimes from the coast stations, and elsewhere. We dump both greasy and washed wool.

114. In dumping, you have seen signs of dampness?—On a couple of occasions.

115. Would that be water, or some grease out of the wool itself?—I often see grease-stains on bales. Where a bale when stacked has a great weight upon it, the grease very often runs out.

116. Would that be caused by the dumping?—No; very seldom. You would not see any grease-stains in the dumping-press.

116A. We have obtained evidence to the effect that grease-stains on the covers of bales are a source of danger. What is your opinion?—If the bales were damp as well as greasy, there would be a risk. The jute of which the pack is made is a vegetable fibre, and very liable to catch fire. If the wool were moist as well as greasy, you would have all the conditions of spontaneous combustion, provided the bales were sufficiently closely packed in the vessel's hold so that the heat could not be taken away by ventilation. In any cases I have heard of the heat was in the interior of the bale, and not on the exterior. We have always had to cut the bales open to discover whether the bales were seriously heated or not.

117. Do you think that in some cases the moisture in the wool is owing to the wool having been shorn wet?—I am inclined to think it is. [Sample of wool produced.]

118. Can you say if that wool has been heated?—It has changed colour, but I cannot express any opinion as to its having been heated. It feels damp now. The hand is, however, a very deceptive test for moisture.

119. Compared with any wool you have seen, can you say to what extent that wool has been damp?—We only cut the bale open; we do not tear it to bits. I cannot express any opinion.

120. *Hon. Mr. Swanson.*] Would it not be worth the trouble of those interested to have some practical experiments made on shore with bales of wool—to have the wool tested in different conditions of damp, dumping, &c., and let the result be made known?—I think it would be very desirable. I could not do it with wool, because it is an expensive article to deal with, but I made an experiment with a bale of rejected flax. It was slightly heated when I got it. I put it into an iron tank, and put it away in a warm place, closing out the air to see whether it would generate sufficient heat to burst into flame. It simply rotted. The conditions were somewhat the same as on shipboard. There is no risk of sudden fire from damp flax. There is, in my opinion, much more risk from flax than from wool. In my opinion there is a great deal too much fuss being made about the shipping of damp wool. I think that both the risk and its occurrence are being greatly exaggerated. As I have stated, the material of the woolpacks is a vegetable fibre, and when there is moisture and oily substances present, we may reasonably expect it might be possible to cause spontaneous combustion.

121. *Hon. Mr. Oliver.*] Was the bale of flax you experimented upon dumped?—No; it was damp and heated before it came into my possession.

121A. Would the dumping have made any difference?—My own impression is that it would rather tend to prevent heating. You would bring the fibres into closer contact, and expel the entangled air. I doubt if the fibre of flax is itself compressed. It is much more likely that there might be some compressibility in the fibre of wool.

122. *Hon. Mr. Swanson.*] Have you noticed any difference between wool dumped with a screw and that dumped by the hydraulic press?—All wool is packed by the screw-press, or some similar contrivance, and then, if dumped, is further squeezed by hydraulic pressure. The wool gets as much pressure as we can give it.

123. What is the effect?—I cannot say whether it is more liable to heat or not; I have no means of ascertaining that.

WEDNESDAY, 1ST AUGUST, 1894.

Mr. BURRIDGE examined.

124. *Hon. the Chairman.*] We have sent for you to give us some information with respect to shipping wet wool, how far it may be dangerous on the voyage Home. We have been informed that you, as manager of the Gear Company's establishment, can give us the information we require—so far, that is, as the wool department is concerned?—Yes, that is so.

125. Have you had many years' experience of wool?—Yes, some sixteen years.

126. Have you been accustomed to ship much wool?—Yes, about 3,500 bales each season.

127. Have you found any difference in wet wool taking place, from the time of shipping to the time of arrival at Home?—It sometimes varies a little, but not very much. Last year we experienced very little between the wool from the time it left the shed until it reached Home.

128. Was it less than usual, and, if so, can you assign a reason for its being less?—It was very little. The reason why it might be less, or more, is that in the south there is not the same accommodation that we have here. The consequence is that wool is more likely to be in a damp state when coming from the South Island. The difference in weight is considerably greater in wet wool. As to the Gear Company, we have every appliance for preparing wool for shipment. Last year it was found that we had experienced very little loss of weight through the wool being damp at the port of shipment.

129. We may assume that a large company like the Gear Company would take every possible care that the wool was dry before being put on board ship?—Yes; the whole thing is under my control, and has been during the five years that I have been with them. I have heard of no complaint of any deficiency or difference of weight occurring at either end.

130. From your experience in the wool business, have you ever known wool to take fire on board ship during its passage Home?—I have heard of its having done so. But that was a very considerable time ago. I was so young at the time that I took very little notice of it. But since I have had experience of business I have found wool to take fire upon one occasion—that is, greasy wool. It was stacked outside, as we had not sufficient accommodation for it inside. We covered it over with a tarpaulin, but it must have got damp. We found the fire in the centre of the bales. The woolpacks were burnt. When two or three of them were stripped it was found that all the outside of them were charred black like charcoal. That was the only time I saw wool afire with the exception of some woollen waste from the Petone Wool Factory. I was there for four years. During that time we had the waste on fire on one occasion. That was attributable to oil and dirt in the wool. I should say that this was all fellmongers' wool, no other passed through my hands there; by "fellmongers' wool" I mean wool off the skins.

131. *Hon. Mr. Oliver.*] Where was your first experience obtained?—In Canterbury. At a fellmonger's (J. W. Ellen); that was the place where I first served my time when I left school; that was at Kaiapoi.

132. You say that the appliances you have at the Gear Company's establishment are the most perfect of their kind within your experience?—Yes; the most perfect in the Australian Colonies; that is admitted by every one.

133. Have you known any instance of bales being rejected after they had left your establishment?—On one occasion there was one bale rejected. It got wet on the way from Petone to the wharf.

134. Was it at your place?—No; it was during transit. It was rejected because the wool-pack got wet. The wool, when unpacked, was dry.

135. Where was it that you had experience of the wool firing spontaneously?—That was in Canterbury.

136. Will you describe the circumstances under which that took place—that is, tell us how many bales there were together, whether they were pressed, and how exposed?—That was the only instance that I am aware of. There were twenty-seven bales stacked and covered with a tarpaulin; some with sheets made of woolpacks.

137. It was rained on?—The moisture got through the sheets. It was fleece wool.

138. How many bales did you find on fire?—Three.

139. Were they outside or inside?—The inside bales. They were completely surrounded by other bales. To the best of my knowledge we had to pull the stack down to enable us to get at the fire.

140. The bales outside were not on fire?—The wettest bales caught fire first. Greasy wool is more apt to heat through damp.

141. Was the outside very dry?—Not very dry; they were big, large pieces, but greasy.

142. How long had they been there?—They had been there for some time. They might have been there two or three months.

143. Could you tell us, within a week or two, the time they were there?—They had been there some time previously, probably two months.

144. Are you aware of any other cases?—There have been several cases in the south, during my experience, where wool has been rejected and sent back owing to it being hot or heated. It would be easily detected if clean wool is packed from the drying-ground before the moisture has evaporated. It should be dried one day and packed the next; but in ninety-nine cases out of a hundred it is dried and packed the same day.

145. When you found the bales on fire in that way you cleared it away at once?—We took the wool out of the pack. In this case I have mentioned the outside was charred black, and the centre was charred brown.

146. Has it been found that the jute woolpack, in which the wool is packed, takes fire more readily than the wool itself?—Yes. I would point out the probability that it was the woolpack that took the fire first. It was the sheet from the wet wool that caused the fire. The pack would ignite quicker than the wool. The wool is sometimes that hot that if you rub it between your hands it will fall to pieces.

147. You have already mentioned that you had known several instances in which wool waste had ignited?—What I call "waste" is the wool going through the carding-machines in the first process before setting the web—the waste is taken off the machine and put back as waste.

148. That is very oily?—Yes; it is thoroughly saturated with oil. I have had experience of fire from this cause at the wool-factory at Petone. We therefore put the waste-room as far off from the main building as we can, because we are in doubt that it might catch fire.

149. How many instances have occurred, to your knowledge, from this cause?—Three; two at Kaiapoi and one at Petone.

150. From your knowledge of the circumstances in which wool is shipped and placed in the ship's hold, can you suggest any method of lessening the danger of fire from heated wool on board ship?—I would recommend that all wool should be dumped three days before putting it on board the ship. If it is dumped three days before being shipped, and there is any heat in it, you can easily detect it by putting your hand on it on the outside; where it is very wet you will sometimes find the beads of water resting on the woolpack. Three days before shipping would be sufficient to find out any dampness or heat in the wool.

151. From your knowledge, would you say that the yolk or grease in wool that has not been washed is itself likely to become a source of danger on board ship?—The yolk in greasy wool is not a thing that easily catches fire itself. It is in the nature of soap; in fact, it is the finest soap you can scour wool with. It is difficult to fire greasy wool, but washed wool, if you dry it, will burn, but not well. Greasy wool, while damp, will heat much quicker than scoured wool that is merely damp.

152. Where you say the three bales were found to be on fire, were the circumstances such as exclude the notion that the fire could come from the outside?—Oh, yes; it was inside the heap. I do not think that the fire could possibly have come from the outside. It was not packed wet. If you pack fleece wool while wet you cannot open it; if it is rolled wet you cannot open the fleeces. In scouring you have to class the fleece wool into four or five different qualities; this it is impossible to do if it is wet.

153. If you had to class wool which had been packed in the shearing-shed in a wet condition you would know it at once?—Decidedly, yes; it would on the second or third day show that it was wet wool.

154. Would you say that there is a large proportion of the wool sent away from the stations in a damp condition?—I do not think so.

155. What proportion, in all the experience you have had, has been sent away in such condition?—From all the experience that I have had, it seems to me that proprietors and shearers are particular not to shear on a damp day if they can help it. The general experience I have had is that most of the damp wool comes from small farmers, men of twelve to fifteen bales. They have not the necessary accommodation for shearing, and consequently shearing is carried on under the greatest difficulty. Shearers are sometimes glad to finish off their work in haste so as to enable them to get on to the next station.

156. Have you had such experience of the sheds as would enable you to say whether the difficulty is with the men shearing when it is not quite dry?—Sometimes if they are finishing up, whether it is wet or dry, they will try to get over the work so as to enable them to get on to their next engagement. On large stations it would be the desire of the owners to shear only dry sheep, but there would often be a desire on the part of the shearers to finish up their work whether it was wet or dry. It depends, therefore, very much on what part of the time the shearers are engaged, whether they have nearly finished, or are only at the starting. If they are only at the start, the object does not influence them to the same extent. If they are near the finish they desire to get off to their next station. Shearers themselves do not like to shear wet sheep; but if they get the sheep the next day before they have to be at some other place they will shear the sheep in any condition.

157. That would not be for the owner's interest; because the subsequent working the wool might be more costly?—It would not make any difference as regards the wool, for it leaves his hands free for any working-up of the wool afterwards.

158. But a buyer would not buy the wool without examining it; and if he found it has been shorn wet he would not buy?—Certainly not; if I were buying wool, if I found it damp, I would take from 10 per cent. to 15 per cent. off; if it was very damp, I would take off 15 per cent. instead of 10 per cent.

159. *Hon. Mr. Pharazyn.*] In the case you have mentioned, where those wool-bales caught fire, did you notice anything like incandescence—like hot coal?—It was all hot and charred all round the bales and red on the top.

160. Was it red?—Well, no, it was not exactly red, it was brown; but after the heap was pulled down it was simply black; it was charred.

161. Was there any actual fire?—No, there was no actual fire, no flame, no incandescence; but there was left a hard substance which if you rubbed it between your hands you would reduce it to powder.

162. Now, suppose that had taken fire on board ship, would it have endangered the ship?—I should say Yes, for in the course of time it would become a large body of fire.

163. But you yourself never saw any fire?—I should think the heat would increase as the time went on, and ultimately take fire. In the case I refer to, if we had not taken it out of the packing, and had left it there another week, it would have become a body of fire.

164. In the case of its being placed in the ship's hold very little air would get to it?—In the case you put, it would be more difficult to burn; but I should still say that, if there was heat in it, the heat would go increasing until the whole thing became ignited, woolpack and bales alike.

165. That is just the whole thing: the whole question, of which we have no proof?—I did not observe anything else except that the woolpack was burnt all round.

166. Wool might undergo charring for any length of time without communicating any of its dangerous qualities to something else?—That was the only case in my experience. When the wool-packs were on fire they were burnt several feet in advance of where the wool was actually charred. If it had been in the ship's hold, with very little or no access of air to it, it might only have smouldered without bursting into flame. I have never seen any greasy wool burn, only on this occasion; but waste wool burns furiously, no matter what water you throw on it. I have a doubt whether it would take fire spontaneously in a ship's hold. I have no experience of what might happen under such circumstances. I can only give the Committee my experience of what happens in the yards. Further than that I cannot say anything. If wool is damp to any extent it will heat. If no air can get to it in the ship's hold it would not be likely to take fire; but I have no experience on that subject. If the suggestion which I submitted, that wool should be dumped three days before shipping, was adopted, I think it will be found to give very little trouble afterwards. I think three days would be sufficient to obviate any danger.

167. In the case of any damp, would it not be necessary for the whole of the water to be evaporated before combustion could take place, and, if it were producing steam, is it not well known that, so long as steam is being produced, the temperature cannot be raised above 212°, or boiling-point?—It could not fire under such circumstances.

168. *Hon. Mr. Swanson.*] We have evidence before us to the effect that fourteen days should be allowed; you say three days?—After three days, if you will put your hand on the pack, you will know whether there is any heat there or not.

169. Then, would three days be the minimum, and if it were longer it would do no harm?—No, it would do no harm; but, as to the extent of moisture indicated by weight, there may be a considerable difference, according as the wool is baled up in a thoroughly dry state. It may weigh 3 dwt. 1 qr. perfectly dry, and afterwards it may weigh 3 dwt. 1 qr. 10 lb.

170. *Hon. Mr. Pharazyn.*] The difference would be caused by the moisture absorbed from the atmosphere?—Yes; the moisture taken from the atmosphere would make it weight from 2 lb. to 6 lb. weight heavier.

171. What was the position of the bales packed under the tarpaulin? Were they on planks?—They were lying simply on posts.

172. *Hon. Mr. Rigg.*] You have said that the wool would show moisture three days after being dumped?—Yes.

173. Supposing it to be wet, would it show immediately after dumping; would the moisture be squeezed out?—No; I do not think it would be squeezed out; it would not show until from twelve to twenty-four hours after; it would have to be very wet to be squeezed out.

174. You have said that the heat was in the covering outside?—It was the heat from the wool that ignited the covers.

175. When you were at Kaiapoi did you receive much damp wool from the stations?—No; we received very little damp wool from any large station. It was in the small lots that we found trouble. In the Petone Woollen-factory, buying from three hundred to five hundred bales in one

lot, we would find very little damp wool. You might go from station to station for a long time and not find any damp wool.

176. Are there any stations that scour their own wool?—Yes; there is one at Blenheim; there are several in the South.

177. In such a case it would not matter to the proprietor whether the sheep were wet?—No; it would not matter.

178. *Hon. Mr. Oliver.*] You see there some samples of wool which have been produced before the Committee: has that wool been heated?—Yes, it has. As soon as wool gets damp, if it has been heated at all, and you happen to rub it with your hand, it will go to dust. In the North Island fellmongeries they work their wool more successfully. But the trouble is, in Canterbury, the owners of wool are mostly small men who want their advances quickly. That is "slipe" wool. They use a chemical process to get the wool off the skin. They often get their wool in damp. I have always recommended that it should be left twenty-four hours before you start to pack it.

179. Is the fleece much depreciated by this chemical process?—Oh, yes; it weighs less, and its value at the best would not be worth as much as by the sweated process.

180. *Hon. Mr. Oliver.*] Do you think this chemical process would make the wool more easy to fire?—I do not think so. It would be more difficult to burn, because it holds the moisture longer.

181. Will you tell the Committee what is that chemical process?—It is sulphide of soda painted inside the skin when it is wet. When it is put on pretty strong the wool will strip off. I do not myself believe in that process.

182. *Hon. Mr. Pharazyn.*] Does that not injure the skin?—Yes, it takes all the nature out of the pelt. I prefer sweating, myself.

183. *Hon. Mr. Oliver.*] And by sweating, without the use of chemicals, what is the process, and how long does it take?—I know that I have a good many against me in this opinion. For sweating you must use an airtight room. When the skins are wet you hang them up by the two shanks; they remain there from twenty-four to thirty-six hours. You may have to apply steam. The use of sodium goes through the wool, and leaves some lime in the wool. The people in the North Island all paint with sodium.

184. Do you get more for the pelts when no chemicals are used?—Yes; we not only get more for the pelts, but we get more for the wool. If the skin is subjected to the chemical process we would get less weight compared to the sweating process. In the case of sweated wool, we also get a greater weight of yolk.

EXHIBIT No. 2.

HEPBURN *v.* LORDAN.

(L.R., 34 L.J., Ch., 293; 1865.)

WOODS V.C.—As to the question whether this material (jute) will spontaneously ignite, it seems far from certain that it will not, although there is no evidence that it will. I find this: that it will ignite if stacked green like hay in the country where it is collected. It is admitted that spontaneous ignition will then take place. It is not yet proved that it will spontaneously ignite when wetted after being so collected, dried, and brought to this country. Of course, the principal cause of ignition is the communication of damp; but there may be, and very probably is, a different chemical action and a greater tendency to ignite when it is recently cut and when there are more of the vital juices in it. That can only be proved by actual experience. But it appears that cotton, a material not altogether dissimilar, will spontaneously ignite after it has arrived in this country. That seems upon the evidence indisputable. Dr. Taylor, who gives evidence upon this subject, very clearly and distinctly says that he does not think there is any well-authenticated instance of the spontaneous ignition of jute. That remains to a certain degree in doubt. But, as regards the facility of ignition and the enormous damage which ensues from the difficulty of extinguishing it when once ignited, we have the fact that a million and a half of property has been destroyed in seven years, and we have recently two fires occasioned by this very material.

EXHIBIT No. 3.

EXTRACT FROM WATTS'S DICTIONARY OF CHEMISTRY.

(Vol. i, p. 1093.)

THE spontaneous combustion of other porous substances, such as charcoal-powder or small coal, and especially of masses of tow, cotton, or rags saturated with oil, takes place in a similar manner. The substance absorbs and condenses the air within its pores; oxidation then commences immediately and raises the temperature, which again accelerates the oxidation; and thus the process goes on with continually increasing rapidity, till at length the mass bursts into flame. The low conducting-power of such a porous mass greatly facilitates the combustion by preventing the dissipation of the heat generated. Instances are known of olive-oil igniting upon sawdust; of greasy rags from butter, heaped together, taking fire within a period of twenty-four hours; of the spontaneous combustion of tape measures, which are covered with an oil varnish, when heaped together; and even of an oilskin umbrella put away in a damp state. The presence of moisture greatly

promotes spontaneous ignition of porous materials, such as hay or coaldust, the water probably supplying oxygen to the combustible matter. (See Graham's Report on the Cause of the Fire in the "Amazon": Chem. Soc. Qu. J., v. 34.)

EXHIBIT No. 4.

A LECTURE TO WORKING-MEN, DELIVERED BY PROFESSOR VIVIAN B. LEWES, AT NOTTINGHAM, IN CONNECTION WITH THE BRITISH ASSOCIATION.

[*Nature* (1893), Vol. 48, p. 626.]

THERE are few amongst us who have not heard of and even come across cases in which large masses of coal, small quantities of oily rags or waste, and hayricks which have been made from grass stacked before it was thoroughly dried, have ignited without any apparent cause, and have kept alive in our minds and on our tongues "spontaneous combustion."

It was found that when any substance underwent combustion, the products weighed more than the body before it had been burnt.

In all cases slow combustion is accelerated by increase of temperature, and the higher the temperature the more rapid becomes the chemical action, and all combustible bodies, at a certain temperature, undergo what is termed "ignition"—that is to say, a temperature is reached at which slow combustion passes into ordinary combustion with manifestation of flame or incandescence, the chemical combination being then so rapid that the heat evolved is manifest to our eyesight, whilst a still greater increase in the rapidity of combustion will in some cases bring about the most rapid form of combustion, which we term "explosion."

Many substances are capable of undergoing all three rates of combustion. For instance, it can readily be proved that when organic substances containing hydrogen undergo decay, some of the hydrogen present unites with the oxygen of the air to form water, and the heat generated by the combination is spread over so long a period that at no moment of time is it perceptible to the sense.

During the decay or slow oxidation of combustible bodies, heat is generated, and it is only necessary for this heat to reach a certain point—*i.e.*, the point of ignition—for the little-noticeable slow combustion to become ordinary combustion, with its manifestation of flame and incandescence, and it is this action to which the term "spontaneous combustion" has been given.

When the combustible substance has a great affinity for oxygen, and at the same time a low point of ignition, spontaneous combustion will take place with great ease. Indeed, in some cases, such as that of phosphorus, we are obliged to prevent the access of air to the body if we wish to prevent ignition taking place.

In practically all the cases of spontaneous ignition which come under our notice, we have the heat evolved during the slow combustion kept in by the presence of a mass of non-conducting material, and this heat, being unable to escape, gradually grows higher and higher, the chemical combination becoming more and more rapid as the temperature increases, until we reach the point at which ignition of the mass takes place.

Perhaps the commonest case of spontaneous combustion is the ignition of oily waste or greasy cotton rags. Nearly all vegetable and animal oils have the power of slowly absorbing oxygen, and in some of them this goes on with considerable rapidity, with conversion of the oil into a resin, a property which gives them the power of drying, and causes a considerable rise of temperature. A mass of oil, however, only exposes a very small surface to the oxidizing influence of the air, but when such oil comes to be spread upon any non-conducting fabric the oxidization is very rapid, and the non-conducting power of the fibre of the fabric prevents the rapid dispersion of the heat, with the result that even a small quantity of such oily substance will readily inflame.

There are plenty of well-authenticated cases in which even a handful of oily cotton waste which has been used for polishing furniture has ignited when thrown on one side, and caused most disastrous fires. Just twenty years ago Mr. Galletly read a most valuable paper before the Chemical Section of the British Association, in which he showed that the liability of oils to produce spontaneous combustion was in proportion to their tendency to dry. If a substance like cotton waste be rendered oily with anything except the mineral oils, it acquires the power of taking up oxygen from the air, and this gives rise to heat. The oxidation is slow at ordinary temperatures, and accordingly it may be some time before the increase of temperature becomes manifest; but when this point is reached the action proceeds with great rapidity, and the point of ignition is reached in a very short time, and then the mass bursts into flame. If the oily matter be placed in a warm position at first spontaneous ignition may take place within a few hours, or even minutes. Cases of spontaneous combustion due to this cause have been more abundant than from any other, and cases are even on record where serious fires have resulted from sparrows using oily waste in the construction of their nests.

Another common cause of spontaneous ignition is that of haystacks which have been made up before the grass has been thoroughly dried, this being due to the sap left in the vegetable fibre undergoing fermentation, which, being a process of oxidation, gives rise to heat. This heat is kept in by the surrounding hay, which is an admirable non-conductor of heat, and gradually increases until the ignition-point of the mass is reached, when the stack bursts into flame. In some cases the action does not go so far as this, and we often see the inside of a haystack charred to an almost black colour, showing that the action has stopped but little short of the point required to give active combustion, this being probably due to the stack having been very closely built, and the access of

air to the centre being very small, and in some cases, when such a rick is cut, the air coming in contact with the central portion causes active ignition. If hay has once been properly dried, and then becomes wetted with rain, spontaneous ignition hardly ever takes place, even although the hay becomes mouldy, and it is evident that the action which leads to ignition of the hay is fermentation of the sap.

In this lecture I have tried to bring before you the important fact that spontaneous combustion merely means that the heat due to chemical actions taking place in any substance—heat that has been unable to escape—has raised the temperature to the point of ignition, a point at which slow combustion passes into rapid combustion with manifestation of incandescence; and in speaking of spontaneous combustion, we must clearly remember that it represents merely the acceleration of an action which has been going on slowly and surely, although our senses may have been too deadened to detect it, and that if we wished to be hypercritical, “unaided ignition” or “natural ignition” would be a far more correct term to apply to it than “spontaneous combustion.”

EXHIBIT No. 5.

NOTES ON STOWAGE.

[By CHARLES H. HILLCOAT.]

COAL.—The important question of ventilating coal-cargoes has given rise at different times to much anxious inquiry. A step in the right direction seems to have been taken in 1875, when the subject was brought before the Royal Commission in London. After much consideration that body decided to recommend the Board of Trade to stop through-and-through ventilation, and to continue surface ventilation only. It was pointed out that air, to do any good, would have to sweep continuously and freely through every part of the cargo, a condition not obtainable aboard ship. Steam coal is said to absorb about twice its own volume of oxygen in ten days. The admission of small quantities through an air-shaft has been found sufficient to aid spontaneous ignition, but not to ventilate the cargo. The Commission recommended that the temperature in different parts of the hold should be tested daily, and a note of the same made in the ship's log-book. A system of surface ventilation should be carried out which would be effective in all weathers, and afford continuous egress to the open air (independently of the hatchway) of gas, which is especially dangerous during the first part of the voyage. (P. 30.)

FELT (INODOROUS).—A substance which is prepared from the refuse of flax, treated with a mixture of resin and oil—a very dangerous article to ship on account of its liability to spontaneous combustion. It is lighter in colour than the ordinary variety of felt, from which it must be carefully distinguished, as the latter, so far as is known, has no tendency to spontaneous combustion. This substance can only be shipped by special arrangement, and whenever it is stowed under deck it should be placed where it can easily be got at. It should never be treated as general cargo, or covered with other goods. All bales of this kind of felt should have the words “Inodorous Felt” printed in large letters on the outside, so as to avoid all possibility of confounding it with the other article. The following are the particulars relating to a fire on board the s.s. “Gulf of Venice,” caused by the spontaneous combustion of this substance: “On the 15th October, 1883, the vessel being in the Indian Ocean, the chief officer reported that smoke was coming out of the forward ventilator on starboard side, No. 1 'tween-decks. At once directed the hatches to be taken off, and had the fire-hose played in the part of the hold where the smoke was most dense; after a few minutes, finding it had the desired effect, stopped playing water in the hold, and began taking the cargo on deck. After a short time came on the burning portion of the cargo, which was a bale of felt, and it was on fire right in the middle of one of the bolts of felt in a case. Had it removed on deck and thrown overboard.” “On the 17th October, while examining the forehold where the first had been on the 15th, found another bale of same mark as that on fire before, very much heated and commencing to let out smoke. Brought it on deck with six more of the same quality, and, having cut them open, found them greatly heated, over 210°. Deeming them not safe to stow again with any other cargo, had them all thrown overboard.” “On the 24th October, 1883, found that fire had again broken out in the forehold of No. 1; got the cargo on deck from the lower hold, and got at the cause of the fire—a bale of felt. Got it on deck and hove it overboard. Stowed cargo on deck, and covered it over with sails.” (Pp. 49, 50.)

Applying water to a fire in a vessel's hold, especially if she be fully loaded, is not only very difficult but often impossible. Attention is therefore particularly invited to the success of the San Francisco underwriters in saving the barque “Whistler” and her cargo in October, 1871. This vessel, laden with general cargo for Portland, Oregon, returned from sea on fire. The hatches had been battened down to smother the flames, but in vain. Two useless efforts, several weeks apart, were made to put out the fire by water by the City Fire Department, and the owner was on the point of scuttling her when the insurers obtained his permission to try the effect of carbonic-acid gas. Half a dozen barrels of marble-dust (a cheap material: chalk or whitening would have done equally well) and three demijohns of muriatic acid were used by mixing them in water-casks on deck, and conducting the resulting gas down the pump-well by means of rubber hose fitted to the bungs of the casks. In three days the hatches were opened, and every particle of the fire was found to be extinguished. Moreover, no further damage was done to the cargo. The whole cost of the material was but a few pounds. (P. 51.)

FLAX.—In Eastern countries flax is chiefly grown for the oil from its seed; in colder climates the fibre principally is used. Flax if damp is said to be liable to spontaneous combustion. Stow as jute or hemp, away from articles of a greasy nature. (P. 53.)

HEMP.—Russian hemp is considered perhaps the finest in the market. If stowed direct from the press it will in all probability heat in the holds. Merchants prefer allowing it an interval of a few weeks between pressing and shipment to allow the moisture to work off. Rape-seed, oil, tar, or grease will cause spontaneous combustion if stowed too near. (P. 111.)

JUTE.—There seems to be a decided opinion amongst many that bales of jute will ignite by spontaneous combustion. The truth of this theory, however, is not borne out by general experience. There are, no doubt, instances of fire having occurred on board vessels loaded with jute, but it is an open question whether such should not be ascribed to other causes. Until more is known on this subject, however, damp bales of jute should not knowingly be received on board as cargo, unless for stowage in a safe place and by special arrangement. Bales stowed in the hold should not be allowed to touch the ship's side, or they will get black and rot with sweat, especially if shipped during the south-west monsoon. Be particular in allowing dunnage of at least 1 in. space in the sides right up to the deck for moisture to drain off between the bales and the skin of the ship. Rape-seed, oilcake, or other heating articles should not be stowed with jute. (P. 118.)

WOOL.—It is supposed that damp or oily wool will cause spontaneous combustion, hence it becomes necessary to ship dry wool only, unless under special circumstances, where it can be kept separate and easily got at. (P. 177.)

EXHIBIT No. 6.

“THE SHIPPING AND SEAMEN'S ACT, 1877.” (WRECKS AND CASUALTIES.)

DEPOSITIONS OF WITNESSES BEFORE A COLLECTOR OF CUSTOMS.

THE examination of Daniel McRitchie, of Stanley Rice, and of George Farrell, taken on oath this 15th day of April, in the year of our Lord 1901, at Port Chalmers, in the colony aforesaid, before the undersigned, Collectors of Customs at Dunedin, in the presence and hearing of Daniel McRitchie, master of the ship hereinafter mentioned, touching the damage to a certain ship called the “Strathgryfe,” of the Port of Greenock, McRitchie, master, and belonging to D. McGillivray, M.O., of Greenock, which sailed from Sydney, N.S.W., on the 8th day of March, 1901, bound to London, and which inquiry is made in pursuance of the provisions of “The Shipping and Seamen's Act, 1877” :—

This deponent, *Daniel McRitchie*, being duly sworn, on his oath saith as follows: I am a master mariner and master of the ship “Strathgryfe.” My master's certificate, No. 31414, Board of Trade. I have been master of her eleven years, and have been forty-two years at sea. The “Strathgryfe” left Sydney on the 8th March last, with a full cargo—wheat, about 300 tons in bags; about 645 tons of concentrates, also in bags; 749 casks tallow; and about 10,000 bales wool, both scoured and greasy, some dumped and some not. The tallow was stowed in the bottom of the ship with concentrates between the casks, and the wheat at both ends of the ship, also in the lower hold. On top of the tallow was stowed the wool, and the whole of the 'tween-decks were full of wool. She was a full ship. I cannot say where or how the different classes of wool were stowed; they were all mixed throughout the ship, just where the bales fitted. Six thousand two hundred bales were shipped at Newcastle, New South Wales, in Gibbs, Bright, and Co.'s stores; the balance from Flood's stores, Circular Quay, Sydney. Nothing whatever was noticed wrong with the wool when it was shipped. On Thursday, the 21st March, lat. 48° 48' S., and long. 170° 40' E., at 4.45 p.m., smoke was seen issuing from one of the after ventilators by the second mate, who immediately called my attention to it. On taking off the after hatch, dense volumes of thick black smoke issued from it, and I saw the ship was on fire. We got out five bales of wool from the square of the hatch, but the men were driven away by the smoke; there was not much heat then. We then replaced the hatch, closed all ventilation, cut four square holes in the deck, about 5 in. square; we also bored a large number of auger-holes big enough to let the nozzle of the hose down. This we did where we supposed the fire to be. We then pumped water down with the force-pump, and drew water in buckets which we poured down the ventilators. As soon as we found we could not get at the seat of the fire, I put the ship about and headed for New Zealand, being the nearest land. We kept constantly pouring a stream of water down through these holes, to endeavour to confine the fire to one place. After a while the smoke from the holes appeared to get thinner and lighter in colour, and it also came out of the main and mizzen mast-heads, having apparently forced its way down into the limbers. We had to wrap canvas round all the mast-heads to stop the draught. We arrived off the land to the south of the Nuggets at 4.30 p.m. on Saturday, the 23rd, and the wind being north-east we had to tack out again, but got off Otago Heads and anchored off the lighthouse at 0.30 a.m. on the 24th, having communicated with the Nuggets Lighthouse on passing. The pilot boarded us about seven miles south of Taiaroa Head from the tug, which stood by us in case of need. We lay at anchor until 1 p.m. on Sunday, the 24th, when the tug brought us into Otago Harbour and anchored us in the Quarantine Station. Lloyd's surveyor and Lloyd's agent came on board after she was cleared in by the Customs and Health Officers. While lying there the tug assisted to pump water into the ship, and so far got the fire under that about 4 p.m. we were able to get to work at the cargo. We put between four and five hundred bales into a hulk alongside out of the after hatch, but even then we could not be positive where the fire was. On Monday we came up to the Port Chalmers wharf, and there started discharging cargo from the fore hatch also. We thought we had the fire out on Monday, but on Tuesday it broke out afresh. The main seat of the fire was found to be in the after hold, mainly on the port side but extending over to the starboard abaft the hatch. On examination we found the 'tween-decks burnt away on the

port side abaft the hatch, five of the 'tween-deck beams burnt and twisted, and some of the wood lower-hold stringers were burned away. The fire was finally put out on Tuesday, and we went on discharging. We have put out some two thousand six hundred bales of wool more or less damaged; several more were completely destroyed in the hold—I cannot say how many. About half the total quantity of wheat had to be landed, damaged both by fire and water. We also had to land two thousand or more bags of concentrates and rebag them. The tallow was not damaged. We have been in port three weeks loading, and expect it will take us at least one month to restow cargo, dock, &c. As to the origin of the fire, we traced the seat of it to scoured wool in the second tier from the bottom. I cannot tell the brand, for the bales were quite burned away. I think from the way in which the fire gained head after it was first noticed, that it must have been smouldering when we left Sydney, though there was no sign of it even in the ventilators, for I constantly looked down them from day to day to see if the ventilation was all right; but it is very difficult to speak with any certainty. In answer to your question as to what means can be taken to guard against these fires, I can only suggest that careful examination should be made of every bale of wool shipped—if possible, by a wool expert. My opinion—and it is, as you know, very generally held—is that the principal risk is with scoured wool, especially fellmongers', which may be shipped in an imperfectly dried state. I may say that we stowed the scoured wool next to the wheat so as not to taint the latter; that is how I know that the wool destroyed, and which was apparently the first to catch fire, was scoured and not greasy.

DANIEL McRITCHIE.

Stanley Rice, being sworn, saith on his oath as follows: I am a seaman, and hold a second mate's certificate, Board of Trade. I have been six years at sea, and am second mate of the ship "Strathgryfe," of Greenock. I was on board her at Sydney and Newcastle while she was loading, and was about the holds a good deal. I saw the wool as it was stowed, but did not notice any damp or out of condition. I noticed nothing amiss until Thursday, the 2nd, about a quarter to 6 in the evening, when I noticed smoke coming from one of the after ventilators. I at once reported the matter to the master. I was by when the after hatch was taken off, and assisted to get out a few bales of wool; but it was impossible to go on working on account of the smoke, which was dense black and thick, but not very hot. The coamings of the after hatch were getting hot, and shortly after the water-ways were so hot on both sides, but especially the starboard, that close to the scuppers the pitch was coming out of the seams, and the heat dried up the water in the ways. I cannot say what kind of wool was stowed in the place where the fire broke out—it was all destroyed; but I am aware that the scoured wool was stowed next the wheat, and, to the best of my belief, it would be about that place that the fire first broke out.

STANLEY RICE.

George Farrell, being sworn, saith on his oath as follows: I am an A.B. I am on board the ship "Strathgryfe." I was on board her when she was loading. I was on deck, and not much down in the hold. I was engaged about the ordinary work of the ship, and noticed nothing unusual about the cargo as it came on board. It was stowed by stevedores as usual. I remember the alarm of fire being given. Some of the hands came forward, and all hands were ordered aft. I saw smoke coming out of the ventilators on the poop. The captain ordered No. 4 hatch off—that is, the after hatch. A great deal of thick black smoke came out. With great difficulty we got out four bales of wool, but could do no more for the smoke. I noticed that the hatches were hot, and the scuppers—we could just bear our hands in them. I heard nothing whatever from any person about any fire or any suspicion of it up to the time of the alarm being given. There was no talk in the forecabin about anything of the kind, or about any dangerous cargo being on board. We were all quite taken by surprise when the fire broke out. I have been at sea in a ship on fire before—the "St. Main," in the Bay of Biscay—and after seeing what was done then and on this occasion, I believe that the right course was taken by the master, and the best that could be done was done for the safety of the ship, cargo, and crew.

GEORGE FARRELL.

EXHIBIT No. 7.

STATEMENT OF SHIPMENTS OF HEMP AND TOW SHIPPED BY G. H. SCALES FROM WELLINGTON.

SHIPMENTS BEFORE FIRES (from 1st July, 1905, to 19th April, 1906).

Hemp, 86,939 bales; tow, 21,148 bales (exclusive of "Pitcairn Island," 756 bales).

SHIPPED ON VESSELS WHICH TOOK FIRE.

Vessel.	Bales Hemp.	Bales Tow.
Perthshire	5,283	195
Waimate	1,922	204
Gothic	1,897	...
Rimutaka	881	...
Pitcairn Island ... ..	...	756
	9,983	1,155

SHIPMENTS ON VESSELS AFTER FIRES (from 19th April, 1906, to 28th June, 1906).

Hemp, 18,874 bales; tow, 5,101 bales. (Exclusive of vessels which took fire.)

EXHIBIT No. 8.

ACCOUNT OF WET WOOL RECEIVED AND DELIVERED TO SHIPS FROM HARBOUR SHEDS AFTER BEING DRIED IN SHED.

Dates.	Marks.	No. of Bales.	Ex Steamers and Rail.	Dates.	Marks.	No. of Bales.	Ex Steamers and Rail.
U SHED.							
1905.				1905.			
Nov. 7	Te Kamru ..	6	Queen.	Dec. 14	A B ..	1	Rail.
" 7	Spur ..	1	" del. to town.	" 15	FEH ..	1	"
" 7	A. Bell ..	2	Rail.	" 16	JCY ..	1	"
" 10	P over KD in triangle ..	2	Wakatu.	" 18	Makino ..	9	"
" 10	Blair Athol ..	3	Rail.	" 18	Ribble ..	4	"
" 10	Te Hoe ..	3	"	" 18	Mahi ..	2	"
" 10	HC over S ..	1	"	" 18	Waitatapu ..	2	"
" 10	Part over Brancepeth ..	5	"	" 18	EJR ..	3	Kahu.
" 10	1.1.1. ..	1	"	" 18	R & S over T ..	2	"
" 10	Ederdale ..	3	"	" 17	Claverley ..	2	Wakatu.
" 20	Weka ..	4	Baden Powell.	" 21	WCH ..	5	Toroa.
" 11	McLean Bros. ..	3	Rail.	" 21	Pipi ..	2	"
" 11	RS ..	1	"	" 21	RS over Pareoranga ..	1	Rail.
" 11	Highden ..	2	"	" 22	Kereru ..	1	"
" 13	MD conjoined over Ditton ..	1	"	" 27	Fraser ..	1	Himitangi.
" 13	Anchor ..	4	"	" 27	HMG in oblong ..	5	Rail.
" 16	R & S over T ..	13	Kahu.	" 27	Ribble ..	1	"
" 16	EJR over G ..	2	"	" 28	JS over Q ..	3	"
" 16	CF over Dalefield ..	2	Rail.	" 28	MM over R ..	2	"
" 21	Reversed B conjoined with H ..	1	Himitangi.	" 28	AMO ..	1	"
" 21	RFM ..	1	"	" 28	Nikau Bay ..	1	Manaroa.
" 21	Matai ..	3	"	" 28	Crossed JJ ..	1	Huia.
" 22	Kona over R & S over T ..	4	Kahu.	1906.			
" 22	EJR ..	2	"	Jan. 4	J in circle over Maungarupi ..	3	Rail.
" 22	Aohanga ..	2	"	" 4	Kowbeg ..	1	Kahu.
" 22	Woodlands ..	3	"	" 4	Moa ..	1	"
" 22	Longburn ..	3	Rail.	" 5	KOB ..	9	Rail.
" 22	Tyne Hall ..	1	"	" 5	HSH ..	4	"
" 22	EC over P ..	4	"	" 5	RR conjoined ..	3	"
" 22	Woodlands ..	3	Kahu.	" 5	Kakinu ..	1	"
" 22	AFF ..	1	Rail.	" 6	Maungatira ..	12	"
" 22	LJM over Puketoi ..	1	"	" 6	FBMcB in parallels ..	3	"
" 23	AB over Helton ..	1	"	" 6	G MK ..	1	"
" 23	Tupurupuru ..	2	"	" 6	M over AB ..	1	"
" 23	AFF ..	1	"	" 6	Galpin over Woodlands ..	1	"
" 23	MD conjoined over Ditton ..	2	"	" 6	WV over LL ..	1	"
" 24	Tupurupuru ..	2	"	" 8	FJ over A ..	1	"
" 27	JDF ..	1	Manaroa.	" 8	Matipo ..	4	"
" 27	SG over Wai-iti ..	1	"	" 8	SS over P ..	4	"
" 27	X ..	3	Rail.	" 8	WB over H in triangle ..	1	"
" 28	Burton over Sheild ..	1	"	" 8	DHG over K ..	2	"
" 29	Abbotsford ..	1	"	" 8	G 2 ..	1	"
" 29	D in crescent over Kawea ..	3	"	" 8	GW over H ..	1	"
" 29	Hill Side ..	2	"	" 8	LWT ..	1	"
" 29	Waiwaepa ..	1	"	" 11	HHH ..	1	Queen
" 29	SYB ..	2	"	Feb. 3	KN over Raumanga ..	2	Rail.
" 29	Nirvana ..	1	"	" 5	LVK ..	3	"
" 29	Erewhon ..	4	"	" 7	Mara ..	2	"
" 29	FMH ..	1	"	" 5	RWB over Glenwarlock ..	2	"
" 29	CBP over Hutongi ..	1	"	" 7	SS over A ..	1	"
Dec. 9	G in circle ..	24	Kahu.	" 6	Linton over W ..	10	"
" 9	EJR over G ..	19	"	" 6	MD ..	8	"
" 11	B over White Rock ..	4	"	" 6	WB over K ..	2	"
" 11	Kaiwaka ..	1	"	" 6	R in circle ..	1	"
" 9	Broadlands ..	2	Rail.	" 6	Manawa ..	2	Himitangi.
" 14	Galpin over Woodlands ..	2	"	" 6	Annedale ..	2	"
" 14	AS ..	1	"	" 6	JC over Pahuau ..	8	"
" 9	DW over V ..	4	"	" 6	Flat Point ..	9	"
				May 5	HS over H in diamond ..	3	Arahura.

K SHED.

1905.				1905.			
Dec. 7	Nivana ..	2	Rail.	Dec. 7	Chelsfield ..	3	Rail
" 7	Te Hoe ..	1	"	" 11	JJ over DR ..	2	"
" 7	SJA ..	1	"	" 11	RRR ..	4	"
" 7	Ngamoto ..	3	"	" 12	G. E. Little ..	1	"
" 7	JMS ..	2	"	" 11	Anchor ..	1	"
" 7	C3 over Rongamai ..	1	"	" 12	FA over Overton ..	5	"
" 7	ER over Waratah ..	1	"	" 12	CCT ..	1	"
" 7	AA over F ..	2	"	" 13	Stratheden ..	1	"
" 7	GHO ..	1	"	" 14	Manston ..	2	"
" 7	OBX ..	1	"	" 14	FBC ..	1	"
" 7	Crossed Keys ..	1	"	" 14	GP over Maungawai ..	1	"
" 7	MH over O ..	1	"	" 16	BT over Eastweare ..	3	"
" 7	WCH in oblong ..	1	"	" 16	LJM over Puketoe ..	4	"
" 7	H Bros ..	1	"	" 16	Anchor ..	1	"
" 7	RS over Pararangi ..	1	"	" 16	HTE over Te Ata ..	2	"

ACCOUNT OF WET WOOL RECEIVED AND DELIVERED, ETC.—*continued.*

Dates.	Marks.	No. of Bales.	Ex Steamers and Rail.	Dates.	Marks.	No. of Bales.	Ex Steamers and Rail.
1905.				1906.			
Dec. 16	S over J H ..	1	Rail.	Jan. 24	Ruanui ..	3	Rail.
" 18	E over Sandford ..	3	"	" 24	Glengrieff ..	4	"
" 18	Bowlands ..	1	"	" 24	Potaka ..	3	"
" 18	Anchor ..	1	"	" 26	R G over C ..	1	"
" 18	Sulphur Wells ..	1	"	" 26	Brooklands over Tiramea ..	2	"
" 18	J B over N ..	2	"	" 26	S B A ..	1	"
" 20	G K over Reeth ..	5	"	" 29	J J ..	3	"
" 20	MD conjoined over Ditton ..	1	"	" 29	Blairstown over T P ..	8	"
" 20	H Bros. over Tane ..	1	"	" 29	Ben Lomond ..	2	"
" 20	J B over Homewood ..	3	"	" 29	E S over K ..	4	"
" 22	L F P ..	3	"	" 29	Anchor ..	2	"
" 22	A H over Siberia ..	1	"	" 29	Weston ..	3	"
" 22	Rataiti ..	3	"	" 29	L J M over Puketoi ..	1	"
" 22	C C T ..	3	"	" 29	E S over K ..	2	"
" 28	H D R ..	1	"	" 30	Ruanui ..	1	"
" 28	Maungatua ..	1	"	" 30	Hawabata ..	1	"
" 28	Highden ..	1	"	" 30	A T conjoined ..	1	"
" 28	Crossed Keys ..	2	"	" 30	D on side over C A B ..	1	"
" 28	C T over Pukehau ..	1	"	Feb. 1	Ruanui ..	1	"
" 28	Bowlands ..	1	"	" 1	O over W C ..	3	"
" 28	Granham ..	2	"	" 1	F M H ..	1	"
" 29	K I N ..	3	"	" 1	Glennore ..	2	"
" 29	J Y C ..	3	"	" 1	J M over P N over Cluny Hills ..	20	"
" 29	J P L ..	1	"	" 1	R in square over Cave Lands ..	2	"
" 29	Awhea ..	6	"	" 1	W L ..	1	"
" 29	C M over Wharepapa ..	1	"	" 1	Glennore ..	1	"
" 29	C V S over Ferndene ..	1	"	" 1	Stag's head ..	1	"
1906.				" 1	M A over R ..	1	"
Jan. 3	— over Q ..	1	"	" 1	S C over C ..	1	"
" 3	A A over D ..	1	"	" 1	J S A ..	2	"
" 3	J W over Brook under crescent ..	4	"	" 1	Makiekie ..	1	"
" 3	K in circle over Elmwood ..	2	"	" 1	Ruanui ..	11	"
" 3	G V S over W in diamond, Totara ..	1	"	" 1	Te Hoe ..	1	"
" 4	Tiramea ..	1	"	" 1	Crossed keys ..	2	"
" 4	Burmola ..	1	"	" 1	S in diamond, Torere ..	1	"
" 4	W L D ..	1	"	" 1	Ruanui ..	5	"
" 4	STR over W in diamond, Totara ..	1	"	" 1	Makariri ..	1	"
" 6	ETS ..	1	"	" 1	Ngaurikehu ..	6	"
" 6	NGA over U P E ..	2	"	" 1	Pukekake ..	2	"
" 6	W M c L ..	1	"	" 1	Moiki ..	2	"
" 6	J P L ..	1	"	" 1	" ..	1	"
" 6	WH over Elea ..	1	"	" 19	Springhill ..	2	"
" 6	S D E ..	1	"	" 19	T W W ..	2	"
" 6	Navana ..	1	"	" 19	L C over R F ..	1	"
" 6	E P conjoined over Waime ..	1	"	" 19	J O N ..	2	"
" 6	W M c L ..	1	"	" 21	Rewa Rewa ..	8	"
" 6	P G A over O C P ..	4	"	Mar. 7	Kurupatu ..	2	"
" 15	U A ..	1	"	" 7	Crescent over diamond ..	1	"
" 23	H K conjoined over Ota-whao ..	2	"	" 7	Waiouru ..	5	"
" 23	CHA over arrow ..	7	"	" 8	Karioi ..	2	"
" 24	Ruanui ..	3	"	" 9	F W over R ..	1	"
" 24	GGT ..	1	"	" 14	Ngaurukehu ..	1	"
" 24	P P conjoined over Kia Ora ..	1	"	" 23	Waiouru ..	1	"
" 24	Glengrieff ..	1	"	" 23	Potaka ..	1	"
" 24	Ngaio ..	3	"	" 23	F M M ..	1	"
" 24	J in circle over Maungaraupi ..	1	"	" 23	Lawton ..	1	"
				" 29	W L ..	2	"
				April 1	Stockwood ..	1	"
				" 1	S B over P ..	1	"
				" 1	N A T ..	1	"

K SHED—*continued.*

EXHIBIT No. 9.

THE PRODUCE COMMISSIONER TO THE HIGH COMMISSIONER FOR NEW ZEALAND.

SIR,—

Westminster Chambers, 13 Victoria Street, London, S.W., 26th June, 1906.

The occurrence within a short space of time of a series of fires on board vessels carrying cargo from New Zealand has caused widespread concern in shipping and commercial circles. It is felt that the matter calls for the most searching investigation and strong common action on the part of those concerned. Bad as they were, it is recognised that the occurrences might well have been far more serious, and that steps must be taken not only to protect property, but to avoid the risk of a possible great disaster to human life where passenger-steamers are concerned. The opinion on this side seems to be that the matter is one in which the New Zealand Government can and should take action.

The vessels affected are the steamers "Gothic," "Waimate," "Perthshire," and "Rimutaka." To these may be added the sailing-ship "Pitcairn Island," destroyed off Cape Horn, but this vessel does not come within the scope of the present report.

In each case the trouble occurred in connection with wool cargo, and it is safe to say that the cause of all the fires was spontaneous combustion in the wool.

Although it is known that the past season in New Zealand was an exceptionally wet one, thus possibly tending to the baling and shipping of damp wool, the present extraordinary series of fires has led the opinion to gain ground that other causes than dampness are responsible for the trouble. In the search for the originating centres of the various fires, slipped wool has been very much in evidence; that from one company in the colony in particular. A theory has been broached that possibly a new method of treating the skins—*i.e.*, the use of a new depilatory agent—may have caused some chemical residue to be left in the wool which has led to combustion. The action of some new sheep-dip is another theory of somewhat similar nature. Samples of wool taken from ignited bales at the seat of the fire on the "Gothic" have been secured by the Shaw, Savill, and Albion Company, and submitted for analysis to a specialist. The latter has been instructed to pay special attention to any evidence of chemical action as above stated. The result has not yet been received by the company, but will be communicated when available.

As full particulars will doubtless be published in the Press of the colony, it will not be here necessary to go into the details of each fire and the damage done. A few facts may be briefly stated, however.

Two separate outbreaks occurred on the s.s. "Gothic." The first, in No. 4 hold, was of comparatively small dimensions, and was effectively disposed of by jettisoning, &c. The second fire broke out after the vessel's arrival at Plymouth, and resulted in the complete flooding of No. 3 hold, containing wool, hemp, tallow, preserved meats, Teneriffe potatoes, &c.; the partial flooding of No. 2 lower hold, containing frozen meat; the destruction of some of the passenger accommodation; and a certain amount of damage to the refrigerating installation. The situation was serious enough to cause the vessel to be beached. Considering the nature of the cargo in No. 3 hold, especially the combination of tallow and hemp, the ship was fortunate in escaping as well as she did, and great credit is due to those concerned in the handling of such a formidable fire.

The fire on the "Waimate" was discovered a few days before the vessel made the English coast. It occurred in one of the after holds among wool. The Clayton extinguishing apparatus, with which the New Zealand Shipping Company have been equipping their vessels, was set to work, and although, owing to certain circumstances it could not be fully used, it appears to have held the fire in complete check until arrival in London, where, after the removal of the hatches and locating the actual fire-centre, a few buckets of water sufficed to complete the work. There was, in fact, no water damage at all. Nothing was jettisoned, the Clayton system calling for tight closing of hatches, &c.

The fire on the s.s. "Perthshire" also occurred towards the end of the voyage. It was confined to one hold, and was effectively dealt with by jettisoning a number of burning or smouldering bales of wool. The seat of the fire seems to have been in the square of the hatch, which facilitated operations.

The "Rimutaka" outbreak took place late on Saturday night, the 23rd instant, two days after the vessel had berthed in the Victoria Dock, the location of the fire being the aftermost hold. The Clayton apparatus was at once put into full operation, and, according to the statement of the ship's people, had practically smothered the fire. At this juncture the shore fire brigade arrived on the scene, and, in spite of remonstrances from the officer of the watch, removed the hatches and poured water into the hold through hoses. The result was a far greater damage by water than by fire. The survey of the damaged cargoes is not yet completed. Particulars of such, therefore, cannot be given in the present report.

It is satisfactory to report that the hemp cargo, which has generally borne a bad character for damage with the shipping people, has come out of the above-recorded events with a clean sheet. In no case has any sign of spontaneous combustion been discovered in a bale of hemp. In this connection it may be noted that the shipping companies own that the institution of the grading of hemp by the Government in the colony has relieved them of a great deal of anxiety. They feel that all consignments are now subjected to careful independent inspection, whereby damp parcels would be stopped.

I have, &c.,

H. C. CAMERON,
Produce Commissioner.

The High Commissioner for New Zealand, London, S.W.

EXHIBIT No. 10.

Royal Courts of Justice, 19th June, 1899.

In the High Court of Justice,
Queen's Bench Division,
Commercial Court.

OWNERS WOOL CARGO *EX* "WAIKATO" *v.* THE NEW ZEALAND SHIPPING COMPANY
(LIMITED).

Before Mr. Justice Bigham.

JUDGMENT.

(From the shorthand notes of Messrs. Cherer, Bennett, and Davis, 8 New Court, Carey Street, W.C.)

MR. JUSTICE BIGHAM,—

The plaintiffs in this action were the owners of several parcels of wool shipped at Rockhampton and Brisbane, in the Colony of Queensland, in the defendants' steamer "Waikato" for London.

The plaintiffs alleged that the steamer before starting on the voyage was in an unfit state to carry the wool by reason of insufficient ventilation of the holds, whereby the wool was heated and damaged. This the defendants denied, and they further pleaded that if the wool was damaged as alleged, it was by reason of its own "inherent vice." Bills of lading had been signed in Queensland by the defendants' agent in which the wool was acknowledged to have been in good order and condition when shipped; but these bills of lading contained many exceptions protecting the defendants. The plaintiffs therefore rely not upon the bill of lading contract to deliver the wool "in good order and condition," but upon an implied promise of the defendants to provide a ship fit to carry the wool safely. That the wool was very seriously damaged when it arrived in this country was not in fact denied; the dispute therefore resolved itself into one issue: was the damage to the wool due to the defective condition of the vessel at the beginning of the voyage? The onus of proving the affirmative of this issue rested with the plaintiffs, and I have to see whether they have made it out.

The "Waikato" was an insulated steamer intended for the carriage, amongst other things, of frozen meat. The insulation consisted of the usual lining of charcoal on the sides and the top and the bottom of those holds which were destined for the frozen meat, the objects of the insulation being to exclude external heat. On the voyage in question no frozen meat was carried, and the insulated holds were used for general cargo, including the plaintiffs' wool. The vessel had in all five holds, Nos. 1, 2, and 3 being forward of the engine-spaces, and Nos. 4 and 5 aft. Nos. 1, 2, 3, and 4 were wholly insulated, but only the 'tween-decks of No. 5 was insulated. No wool was carried in No. 3, and nothing turned on the condition of that hold.

The vessel carried wool from three ports of shipment—Brisbane, Rockhampton, and Townsville. The Brisbane wool was taken on board between the 2nd and 17th October, 1896, the Rockhampton wool between the 20th and 28th October, and the Townsville wool between the 2nd and 5th November. So that practically all three descriptions were shipped in the course of a month. The Brisbane wool consisted of 4,456 bales, 1,599 being stowed in No. 1 hold, 2,803 in No. 4 hold, and 154 in the fore peak; the Rockhampton consisted of 3,156 bales, 1,233 of which were in No. 1, 403 in No. 4, and 1,516 in No. 5, two bales not being traced; the Townsville consisted of 3,584 bales, of which 640 were in No. 1 and in the fore-castle, 2,175 were in No. 2, 668 in No. 5, and 101 were untraced.

Nearly all (about 90 per cent.) of the Brisbane wool when delivered in London was damaged by heating. This wool consisted of about thirty-five different parcels, which had been brought to the seaboard from sheep-farms, some of which were as much as five hundred miles apart. The extent, but not the character of the damage, varied in the different lots, and affected the value from 5 per cent. to 20 per cent. Out of the thirty-five parcels all were more or less damaged except three parcels; the three undamaged parcels consisted of a lot of seventy-three, a lot of twelve, and a lot of 144, and some of each of these three parcels was in No. 1 and No. 4 holds, and none elsewhere. The plaintiffs have made a claim as to the lot of 144. This part of their claim must in any case be dismissed, because the evidence shows that this lot was delivered in sound condition.

The Rockhampton wool was damaged to the extent of about 40 per cent. of the whole, the damage being of the same character as that suffered by the Brisbane wool; but the damage was practically confined to four parcels, there being in all seventeen parcels of this wool shipped. Those thirteen parcels were delivered in sound condition; the four parcels damaged were the four largest parcels, and they made up a total of 1,845 bales, of which 1,259 were damaged to an extent of 66 per cent.

The Townsville wool consisted of ten parcels; two of these were damaged, but only slightly, and the damage represented only about 5 per cent. of the whole bulk, and as to the greater part of this small damage (the damage to the lot marked "Kyuna") the owners had made no claim against the ship. I find that practically the Townsville wool was delivered sound.

A considerable amount of evidence of scientific men and of practical men was put before me upon the question as to the necessity of ventilating the whole cargo during carriage. It was said on behalf of the plaintiffs that ventilation was essential in order to keep the wool in good condition, and that this was particularly so in the case of insulated holds, the insulation having the effect of retaining in the holds any generated heat. The defendants, on the other hand, said that ventilation was of no importance if the wool was sound to begin with, and positively harmful if the wool was damaged when shipped. The effect of this evidence is to leave my mind in doubt upon the point; but there can be no question about the fact that at the beginning of the voyage the defendants did provide some ventilation for the holds in which the wool was carried, and that the officers of the ship, acting under advice and in accordance with their own opinion, devised further means

of ventilation during the course of the voyage, and as the heat of the holds increased. This seems to me to point clearly to the conclusion that the defendants and their servants thought that ventilation ought to be provided and attended to. The statements in the log bear this out. The statements in the log are, however, not so clear when they are examined for the purpose of ascertaining what was the effect of the additional ventilation on the heating mass of wool.

The vessel left Townsville on the 6th November, and in a very few days the weather became hot, the temperature of the air reaching 89 degrees, and in a few days later (by the 15th) 97 degrees. The officers appear to have had some anxiety about this time as to the condition of the coals which were stowed near the No. 3 hold, but on examination showed that there was no heating and that the temperature of No. 3 hold itself, in which there was no wool, was normal. After the vessel had been out a fortnight bad weather came on, and it was necessary to batten down the hatches and to cover the ventilators. When this bad weather has passed over and the hatches were once more removed it was discovered that the temperatures of No. 1 and No. 4, which contained the greater part of the Brisbane and Rockhampton wool, were very high, reaching as much as 110 degrees (the 27th November). The vessel arrived at Colombo on the 28th November, and there a vapour was seen issuing from No. 4 hold through the ventilator. This appears to have caused some alarm for the safety of the ship, and the temperature of all the holds was taken, with the result that the heat in the Nos. 1 and 4 was found to be much greater than in any of the others, reaching as high as 127 degrees. The log describes Nos. 5, 3, and 2 as not overheated. From this time special attention was paid to the ventilation of the two holds Nos. 1. and 4, but from the morning of the 28th to the 30th no perceptible improvement was produced (see log, 11 p.m., 30th November, temperature of Nos. 1 and 4, 100 degrees to 127 degrees), and by the night of the 1st December the temperature in No. 4 had risen to 138 degrees. After this the temperature gradually but very slowly fell.

There can, of course, be no doubt that the wool itself was the source of this great heat. Some of the wool was scoured, but a large part of it was greasy, and the evidence satisfies me that the grease had a tendency to oxidize, and that in the process of oxidation great heat is generated. In many of the bales this generated heat must have exceeded 212 degrees, for on examination of the contents of the bales on arrival it was found that the fibre of the wool was destroyed, and the evidence satisfies me that no heat less than 212 degrees could have produced this result. The vapour which was seen issuing from No. 4 hold would (according to the evidence) seem to indicate a temperature in the wool itself of about 250 degrees.

Now, the additional ventilation provided at and after leaving Colombo succeeded in reducing the heat of the atmosphere in the holds I have no doubt; but whether it had any real effect upon the internal heat of the wool is not so easy to determine. It may well be that the internal heat continues as the heat of a burning fire will continue however cold the surrounding air may be made. It must be noted in this connection that the bales of wool are machine-pressed and form a hard mass, and that these hard bales are themselves stowed together in a hold as closely as possible. It is difficult therefore to understand that ventilation will operate to any great extent except on the surface of such bales as the air can reach. It will no doubt carry off so much of the internal heat as may reach the outside covering of the bales. But wool is a non-conductor, and therefore the heat generated inside the bales would have little tendency to reach the surface. I am inclined to think that, though the additional ventilation reduced the air-temperature of the holds it had very little, if any, effect on the heated mass of the wool, and that the wool burned itself out, the oxidation being, in fact, a process of combustion.

The real question, however, is whether ventilation—better ventilation than was provided at the beginning of the voyage—would have prevented the rapid and excessive oxidation of the wool from arising. I doubt it. It is, in my opinion, the fact that the insulated holds in this steamer were provided with less than the usual amount of ventilation. But the evidence shows that No. 2 was the worst-ventilated of all holds. Yet the wool in No. 2 hold suffered the least damage. It is true that only Townsville wool was stowed in this hold, and that the Townsville wool was the last wool shipped; so that the plaintiffs are right when they say that this wool was subjected to the effects of limited ventilation for a shorter time than the Brisbane and Rockhampton wool. But when I am considering the contention of the plaintiffs that deficient ventilation is the real cause of the damage to the wool, I cannot help being very much impressed with the fact that the wool which was least ventilated practically escapes harm. Moreover, there was of the Townsville wool nine parcels in No. 2 hold, and only two of these nine were affected.

As all the parcels were carried under precisely the same conditions as regards ventilation, it seems to me to be probable that the damage to the two parcels is to be attributed to some cause other than defective ventilation. The evidence of the plaintiffs' own witnesses satisfies me that there may be another cause—damp packing—and although there are sworn certificates from the wool-brokers in Queensland to the effect that the wool was in good condition when packed, I am disposed to think that this may be the true cause. Nos. 1 and 4 holds were better ventilated than No. 2, yet in these holds the damage was more extensive and more serious. I do not forget that the great bulk of the wool in these holds has been in the vessel for a longer time than the Townsville wool. But there are three parcels of Brisbane wool which were (as to each of them) stowed partly in No. 1 and partly in No. 4, and which nevertheless turned out perfectly sound. Why? They were carried in precisely the same conditions as all the other parcels. I draw the inference that they were shipped in a better condition than the other parcels, and that the damage to the other parcels may therefore be due to the damp packing, or to what is called "inherent vice." I say "may" be due because, of course, it does not follow that because the three parcels were perfectly sound throughout the others were not sufficiently sound to be fit for carriage in a well-ventilated hold. I find the same thing with reference to the Rockhampton wool; some of the parcels in No. 1 hold were delivered undamaged. I find, too, with reference to this wool that the first parcel in the particulars produced before me—a parcel of 359 bales—was stowed in three different holds, No. 1, No. 4, and No. 5, and it was all damaged to the same extent—namely, to the extent of a half-penny in 6½d. The ventila-

tion in No. 5 was better than the ventilation in Nos. 1 and 4, yet the damage to the wool is the same. This, again, seems to me to point to a cause existing in the wool itself rather than to external conditions.

Turning again to the Brisbane wool, I find that in many of the damaged parcels there are numbers of bales which turned out sound. For instance, the parcels marked "Glengallon," "Talgai," and "Pinkilli," and others. How is this to be accounted for except on the hypothesis that the wool itself was when shipped in such a condition as to render some portion of it more liable to heat than others? Then, further, it was demonstrated and admitted that at least forty-eight bales of the damage to the Brisbane wool were in the fore peak, but no serious complaint was made as to the ventilation of this part of the ship, and it was not insulated. To what is the damage to these bales to be attributed unless to some inherent cause?

After a very careful consideration of the case, I am unable to find as a fact that the condition of the wool when delivered was due to the want of sufficient ventilation. But I wish to say a few words about the ventilation, which was, in fact, provided. I think what may be called the fixed appliances for ventilation were less than usual and were in that sense insufficient. But it is the duty of the officers of the ship to attend to the ventilation of the holds during the voyage, and they had the means on board when they started of supplementing the fixed ventilation. Immediately after leaving Queensland they had it in their power to give the cargo all the additional ventilation which was given to it on and after the arrival of the vessel at Colombo. I refer to the more complete removal of the hatches, to the use of a windsail, and to the removing of the caps of the thermometer-tubes. If they fail either from neglect or through an error of judgment to avail themselves sufficiently of these additional means of ventilation the plaintiffs must in this form of action (when the complaint is that the ship was in the first instance unfit for the voyage) bear the consequences.

I am of opinion that though the fixed appliances for ventilation were less than usual, yet the means available for ventilation were sufficient, and that therefore the ship was not unfit at the beginning of the voyage for the purpose of carrying the wool. It appears to me that the vessel had on a previous voyage carried wool without damage, the ventilation being the same as on the voyage in question.

I arrive at the following conclusions: First, that it is doubtful whether ventilation is necessary for the safe carriage of some wool; secondly, that if it is necessary the means of ventilation put at the disposal of the ship's officers were sufficient; thirdly, that want of ventilation was not the real cause of the damage to the wool; fourthly, that the real cause of damage was probably damp packing or some other condition of the wool itself. I think, therefore, the loss must be allowed to rest where it has fallen—namely, on the respective owners of the different parcels of wool.

Mr. F. Laing.—It will be judgment for the defendants, with costs?

MR. JUSTICE BIGHAM.—Yes. I do not know, Mr. Walton, whether there has been any attempt made to settle it. I have delivered my judgment, but I thought I might ask you whether it was not essentially a case for settlement.

Mr. Joseph Walton.—There was a substantial offer, but it went off on the question of amount. I have nothing to say but that they could not agree upon the figure. I remember the circumstances now.

EXHIBIT No. 11.

138 Leadenhall Street, London, E.C., 22nd September, 1897.

PARTICULARS DERIVED FROM LOG S.S. "WAIKATO."

S.s. "Waikato" at Brisbane from Oct. 2nd till 17th Oct., loading wool at Nos. 1 and 4 holds. Ther. ranging from 74° to 94°.

Weather throughout fine, except on Oct. 17th, 6 p.m., when it rained till 7 p.m. Hatches and tarpaulins put on whilst raining.

On Oct. 18th proceeded to Rockhampton. Arrived there 19th Oct. Loaded wool and meats at Nos. 1, 2, 3, 4, and 5 holds. Temp. 72° to 94°.

On Oct. 25th finished Nos. 3 and 4 holds, put on tarpaulins and battened down. One half of 'tween-deck hatches left off and stowed under trunk-ways, with one bale of wool on top.

Weather throughout the stay at Rockhampton fine.

On Oct. 29th proceeded to Townsville, arriving there on Oct. 31st. Loaded at Nos. 1, 2, and 5 holds. Thermometer 78° to 92°.

Weather at Townsville fine throughout.

Left Townsville Nov. 6th for Thursday Id., arriving there on Nov. 9th. Took in a quantity of pearl-shell at No. 2, and left the same day.

From Thursday Id. to Colombo experienced light following winds, with damp muggy heat. Temp. 81° to 93°.

On Nov. 23rd found temperatures of holds rising: temp. 102°. Took off Nos. 1, 2, 4, and 5 hatches. At 3 p.m. weather set in squally; battened down all hatches.

From Nov. 23rd to 26th hatches were taken off and put on according to the weather. Temperature down ventilators, 90° to 110°.

Nov. 28th, arrived at Colombo at 6.30 a.m. Obs. vapour rising from Nos. 4 and 5 ventilators (Nos. 4 and 5 holds connected by ventilators). Found temperature to be 127° in No. 4 hold and 120° in No. 1; temperatures of Nos. 2, 3, and 5 holds normal.

Nov. 30th, left Colombo for Suez.

Dec. 1st, temperature of No. 4 hold, 119°. Broke out cargo to L.H. No. 4, and put down windsail. At 2 p.m. temperature had risen to 140°. The temperature in the freezing-engine-room trunk, which was 98° before the hatch was broken out, came up to 134°. Temp. at 10 p.m., 130°.

Dec. 2nd, temp. No. 1 hold, 120°; No. 4, 128°.

From this date until arrival in U.K. the temperatures gradually went down, weather being cooler.

EXHIBIT No. 12.

The New Zealand Shipping Company (Limited),

138 Leadenhall Street, London, E.C., March, 1899.

SIR,—

I beg to hand you the following facts with reference to voyage 6, s.s. "Waikato," home-wards:—

At Brisbane Oct. 2nd to 17th the s.s. "Waikato" loaded wool in Nos. 1 and 4 holds, thermometer ranging from 74° to 94°.

On Oct. 18th we proceeded to Rockhampton, and arrived there Oct. 19th. On Oct. 20th to 29th we loaded wool and case-meats in Nos. 1, 2, 3, 4, and 5 holds, temperature ranging 72° to 94°; on Oct. 25th we finished Nos. 3 and 4 holds, put on tarpaulins, and battened down hatches.

On 29th we proceeded to Townsville, arriving there Oct. 31st, and loaded Nos. 1, 2, and 5 hatches; thermometer 78° to 92°.

We left Townsville Nov. 6th for Thursday Island, arriving there Nov. 9th. Took in a quantity of pearl-shell and left the same day.

From Thursday Island to Colombo we experienced light following winds, with damp heat: temperature 81° to 93°. On Nov. 23rd we found temperature of holds rising, and took off Nos. 1, 2, 4, and 5 hatches; at 3 p.m. weather set in squally, so we battened down all hatches.

Nov. 26th, the weather being finer, took off Nos. 1, 2, 4, and 5 hatches, temperature down the ventilators being 90° to 110°.

Nov. 28th, we arrived at Colombo. At 6.30 a.m. chief officer observed vapour rising from Nos. 4 and 5 ventilators. Took temperatures of Nos. 1 and 4 holds, and found them to be 120° and 127° respectively.

I consulted with chief officer and chief engineer, and determined to run the aft refrigerating-engine to exhaust the hot air out of No. 4 hold. This was done for two hours, with the result that it seemed to increase the temperature and produce a strong smell, resembling ammonia or sheep-dip, which drove the men out of the engine-room.

Before doing this I might mention that the chief engineer crawled round the trunks to ascertain if he could discover any smoke, or any signs of fire.

About 9 a.m. I went on shore to consult the ship's agent about the high temperature, and he suggested seeing the Master Attendant of the port and another shipmaster, to come off to the ship.

The Master Attendant and Captain MacLellan, s.s. "Katoria," found temperature in No. 4 hold to be 127°, and 120° in No. 1, other holds normal, and advised that the wool be taken out to the L. holds.

This we did after leaving Colombo, with the following results: that the temperature came up to 140° (port side L.H.), which before taking out the temperature was 119°, and the temperature in the freezing-engine-room trunkway, which was 98° before wool was taken out, came up to 134°.

At 2.30 p.m. we started to take out cargo in No. 1 hold, with much the same results (I have no record of temperature taken here).

From this date till we arrived in the United Kingdom the temperature gradually decreased, the weather being cooler.

I might mention that I have carried wool both in sailing- and steam-ships for twenty-five years, and that the practice in sailing-ships is to screw the wool into the ship with box screws, the broken stowage in wings, and outlines of the two ground tiers being filled in with ballast, the wool in the rest of the hold being so tightly screwed as not to admit of any air-space, except round the cargo-battens at ship's side.

In the s.s. "Waikato" it is impossible to screw wool, the insulation being covered by only inch boards, and also the trunk running right round the ship, stanchion, &c., causing a great deal of broken stowage, and that there are permanent battens running right round the ship and on the floors, causing more than usual air-space.

I might point out to you that the damage to the wool was in the centre of the bales, that from the outside to about 6 in. or 8 in. towards the centre the wool was in good condition, the damage being greater towards the centre. This, I should think, would point to mischief in the bales themselves, possibly being caused by the sheep being shorn with the dew on them, or the sheep-dip not being properly washed off the sheep, or some other cause. Only last voyage, in Wellington a bale was being trucked from the shed to the ship and was seen to be smoking, the bale being quite hot.

Again, I might show that before giving the ship extra ventilation, by taking off the hatches, &c., the temperatures of the holds did not exceed 102°. I take it this was not excessive.

Wool in the same holds turned out in good order.

Unusually good receipts were got for the wool in London—out of 11,295 bales there were only 245 stained with grease.

The Manager, N.Z.S. Co.

Yours, &c.,

J. W. CROUCHER.

EXHIBIT No. 13.

VIVIAN B. LEWES says—

I am Professor of Chemistry at the Royal Naval College, Greenwich, Associate Member of the Council of the Institution of Naval Architects, Fellow of the Institute of Chemistry, the Chemical, Physical, and other learned societies.

I have devoted much attention to the subject of heating and spontaneous ignition in cargoes, and have written and lectured on the subject.

I have examined the s.s. "Waikato," and the holds in which the damage to bales of Queensland wool took place, and find that the hold was arranged for cold-storage—that is, it was insulated by means of partitions containing charcoal, in order that when cooled down by the refrigerating process employed, there shall be as little heat in the hold as possible or conduction from without.

In my opinion such holds are admirably fitted for the carriage of greasy or unwashed wool, as, although there would always be a tendency in such a hold to keep in any of the heat generated by the substance itself, there would be a great retarding factor in keeping back the action of heat from without, and it is this in the first instance which during passage through the tropics is a very important factor in starting actions such as this which have led in the present case to the damage of portions of the cargo.

All processes of heating of this character are due to oxidation, and would be entirely stopped in the absence of air or moisture. Ventilation to be of any use must be of the most perfect character, so that the air may be free to sweep through and around the whole mass of the cargo and to carry away from any heat that may be engendered by chemical action; if this be not obtainable, then the less ventilation the better, as imperfect ventilation merely tends to supply the amount of oxygen necessary to carry on the chemical action in the mass without removing sufficient heat to in any way check it.

In a wool cargo perfect ventilation is impossible, as the most that can be done is to supply a current of air around the bales without the chance of any quantity penetrating to the interior of the mass, the quantity which does so penetrate by diffusion being just about sufficient to lead to dangerous action. The best condition for a cargo liable to heating from chemical actions of this character is to have it tightly battened down and all free connection with the external air as far as possible done away with.

Wool consists of two parts, a rind or tube and a pith, the rind consisting of a horny matter which surrounds the softer pith. Besides these, in its natural condition the wool contains a large quantity of fatty material generally termed "swint" or "yolk," this swint being chiefly matter exuded by the animal, and containing certain salts of potash, together with fatty matter and dirt, and constituting as much as 44 per cent. of the unwashed wool. The fatty matter is a substance akin to tallow, and contains amongst its constituents oleic acid, which will absorb oxygen, and in doing so become rancid in the same way that tallow does, and in a properly packed and stored bale of wool this action nearly always takes place, and is accompanied by a slight increase in weight and also by the generation of a small amount of heat. This heat is always concentrated near the centre of the bale, as it is here that the air has practically no access and the non-conducting outer surface nurses up the heat. If, however, the wool be slightly moist, this action in the centre of the mass becomes excessive, and it is by no means an uncommon circumstance to find a bale of wool which has been stored in an open shed giving off vapours and fumes from actions going on in the centre of the mass, the heat of which is scarcely perceptible on the surface; and where large masses of bales are stored in the hold of a vessel it is well recognised that this moisture will lead to serious damage to the wool.

When the action is carried to the point when fumes begin to be given off, the escape of gaseous matter causes a loss in weight in the bale itself, whilst the preliminary action of the oxidation of the oleic acid causes a slight increase. When the wool is packed dry and in good condition, it is the first action only which generally occurs, a slight increase in weight being noticeable in most wool cargoes; but where the excessive action has gone on, the portion affected will often have lost so much weight as to make a noticeable difference in the total tare.

The temperature at which the excessive action that leads to loss of weight commences is 130° C., —266° Fahr., and at this temperature it emits a very strong odour and turns yellowish in colour, whilst, as the temperature increases, the colour deepens to a golden brown, and fumes containing ammonia and a strong cheesy smell show that the temperature has risen to a sufficient height to decompose some of the nitrogenous organic matter of the rind, causing it to become brittle, and seriously deteriorating its value.

I have made experiments with Queensland wool of the character of that carried by the "Waikato," and find that the presence of a small trace of moisture causes this wool to heat even when in small bulk to a temperature considerably higher than was the case with the dry wool. An exactly similar phenomenon is common in the case of hayricks: if the hay is properly dried before the rick is built, no action takes place, whilst if the hay be made in a moist condition heating always follows, and in the case of a rick of sufficient size gives rise to spontaneous ignition.

I have been through the log kept on the "Waikato" during this voyage, and in it the temperatures existing in the hold of the vessel are carefully taken and noted, and as the highest of these is only 60·6° C. — 141° Fahr. it is totally insufficient to account for the loss of weight taking place in the cargo and the damage which is alleged to have accrued to the wool.

It is quite evident, therefore, that the excessive heating has taken place in the centre of a certain number of the bales, and the temperature has arisen there to a point more than twice as high as that registered at the outer surface of the wool, as it is only at this high temperature that the fumes and odour of ammonia noticed by one of the officers in charge would be evolved, and the vapours distilling out from the decomposing matter would colour other bales which might not in themselves be seriously affected.

It seems to me almost certain from the evidence that I have seen that in this cargo there were two or three parcels of wool which had been made up in bale before being properly dried, the amount of moisture being such as might be obtained by shearing the sheep whilst the wool was slightly damp with dew or before it had been thoroughly dried from a preliminary washing of the animal; and as it is manifest from the temperature recorded that this action was taking place in the centre of the bales, no amount of ventilation would have avoided it, but would have accentuated the mischief, as by supplying more oxygen the action would have been increased.

Strong confirmatory evidence of the fact that moisture was present in these bales is to be found in the chief officer's evidence, that on taking off the hatches he found that a number of meat-tins loaded above the wool were covered with moisture. This would manifestly be brought about by the heat in the cargo driving some moisture out from the wool, which would condense as it reached the cooler tins in the mouth of the hatchway.

In my opinion there is not the least doubt but that the damage caused to the wool cargo on board the s.s. "Waikato" was brought about by the presence of a certain quantity of wool which had been packed in bale before being properly dried, and not to any fault in the construction of the vessel.

EXHIBIT No. 14.

REPORT OF THE "BELTANA" FIRE.

ON Sunday, the 15th December, 1889, at about 1 p.m., the "Beltana" barque, Captain Bright, bound from Port Augusta to London with a cargo of wool, put into Lyttelton with her cargo on fire. The vessel had sailed from Port Augusta on the 22nd November, 1889, and the fire was first noticed on the 9th December; she reached Lyttelton six days after the presence of the fire was first detected.

Very shortly after her arrival, the Christchurch Railway Brigade, under Superintendent Ashley, and the Christchurch Volunteer Fire Brigade, under Superintendent Turton, were in attendance, the former with their large steam fire-engine, the latter with their double-cylinder Babcock chemical engine. The tug "Lyttelton" with her powerful fire-engine was also in attendance.

As the fire was confined to the hold of the ship, it was decided to attempt to extinguish it by means of the chemical engine instead of by the fire-engines. Holes were bored in the vessel's deck, and injections of chemicals were made into the hold until the supply brought down was exhausted. The chemical engine then returned to Christchurch without apparently having made much impression on the fire. After this a consultation was held between Captain Bright; Captain Ticehurst, Marine Surveyor; Mr. F. H. Barns, Lloyd's agent; and Mr. W. Devenish Meares, of the Union Insurance Company, at which it was decided still to attempt to deal with the fire with chemicals. Mr. Gardner, analytical chemist, of Christchurch, and Mr. Harris, ex-Superintendent of the Christchurch Brigade, were telephoned for, and the former asked to bring with him a quantity of chalk and sulphuric acid for the purpose of generating gas in the vessel's hold. Mr. Gardner brought with him a large quantity of the materials mentioned. After the arrival of Mr. Gardner and Mr. Harris the whole circumstances of the case were again discussed, and it was decided not to risk taking off the hatches to generate gas in the vessel's hold, but to make another attempt with the chemical engine, and Superintendent Turton, of the Christchurch Brigade, was requested by telephone to send the "chemical" back again, together with a plentiful supply of materials. The "chemical" with four men returned to the ship again about 10 p.m.

Shortly before the return of the "chemical," Captains Bright and Ticehurst and Mr. Barns made an examination of the outside of the ship, and found that the heat had increased to such an extent that they could hardly bear their hands on the sides of the vessel. It therefore became a matter for most earnest consideration whether the ship should not be at once scuttled in case the flames burst through the sides. A second consultation was held, and it was decided to make every preparation for scuttling, but to proceed as long as possible with the attempt to extinguish the fire by chemicals. The necessary arrangements for scuttling were made.

At 10.30 p.m. fresh holes were bored in the decks, and the gas from the chemical engine forced into the hold. This was continued until about 3.30 a.m. on Monday. By this time there was a material decrease in the heat on the vessel's deck, and it was considered that the fire, if not actually extinguished, was at all events under control. Operations were then stopped to give the carbonic-acid gas that had been forced into the vessel further time to do its work. Further injections were made on the 16th, 17th, 19th, and 20th December, and in all fifty-two charges were forced in by the "chemical" as follows: 15th December, 23 charges; 16th December, 11 charges; 17th December, 7 charges; 19th December, 6 charges; 20th December, 5 charges. The materials used were in round numbers as follows: 1,000 lb. bicarbonate soda, 660 lb. sulphuric acid, 4,100 gallons water. Each charge is estimated to produce about 105 ft. of carbonic-acid gas. It will thus be seen that the quantity of water used was a mere trifle compared to what would have been required had the fire been extinguished by water alone, either by pumping it into the vessel or by scuttling her.

In case the fire might possibly break out again after removal of the hatches, it was determined to wait plenty of time, and on this account the vessel's hatches were not opened until Saturday, the 21st December, or six days after she had arrived in port. On the hatches being removed, it was found that the upper tiers of wool were not injured except by smoke and the water forced in with the gas. When the wool came to be discharged, it was found that as it was taken from the fore part of the main hatch, it was cool and only stained with smoke; but as the 'tween-decks were

approached the seats of the two fires were discovered, one right in the square of the main hatch and the other about three beams abaft the hatch and slightly on the starboard side. The fires were quite separate and had no connection one with the other. The one in the square of the main hatch had partially consumed two or three bales of wool; but the one abaft the hatch had been of considerably greater magnitude, and had reduced to ashes at least twelve or fifteen bales, and had charred and partially burned fifty to sixty more. As the work continued—going down to the lower hold and working aft—the bales still came to hand in a damaged state, some being so hot that on landing they ignited, and others were so much damaged that they could not be handled. The wool in these damaged bales, or, rather, what had been wool, had to be put into baskets to be landed. That particular part of the ship's hold had evidently been one mass of smouldering fire ready to burst into flame the moment any air was allowed to get at it. Those who saw the condition of that wool could not refrain from remarking upon the marvellous escape the ship had had from total destruction.

Some idea of the danger may be formed when it is stated that about fifty bales were totally destroyed, sixty-eight bales so much damaged that the wool was landed loose and sold in heaps, and 203 bales charred and burnt to such an extent that it was deemed advisable to sell them for what they would fetch in preference to handling and reshipping them.

The cargo in either end of the ship was not touched by fire, and was only injured by smoke and the application of the chemicals. Some bales were scoured, others repacked, and the rest just turned over and restowed. There is no doubt that some of the wool was improperly packed. After the bales were landed, several were found to be quite damp—these were bales of locks and pieces, and the wool itself was saturated with urine and dung. This wool should never have been shipped in that state, but should have been scoured. The safety of the ship and cargo, and the lives of the crew, were jeopardized by shipping it as it was.

The facts above mentioned are recited, as it is believed the case in question is the only one on record where a fire on board a wool-ship has been extinguished by the means used on this occasion. It is considered that many thousands of pounds were saved by the action taken. Christchurch is the only place in the colonies where chemical engines such as the one used on this occasion are available.

Captain Bright is entitled to much credit for having taken every step to close up the hold of his vessel and make for a port of refuge, instead of attempting to extinguish the fire at sea. Had he attempted to do so by taking off the hatches it is quite certain the vessel would have been totally burned.

EXHIBIT No. 15.

EXTRACTS FROM THE "AUSTRALASIAN INSURANCE AND BANKING RECORD."

[16th July, 1889; pp. 527, 530.]

INSURANCE INSTITUTE OF VICTORIA.

MR. W. FARQUHAR read his paper on "Spontaneous Combustion," from which the following are extracts:—

The ordinary condition of combustion, however, in which we are more immediately interested is the chemical union of combustible substances with oxygen gas. The act of union commences with the usual evolution of heat as the result of breaking up the molecular structure. If the combination be protracted, and the combustible body a bad conductor, the heat is cumulative, and the temperature rises until incandescence ensues. Continued oxidation at this stage decomposes the combustible body into its component parts as gas, and ignition of the gas occurring at the high temperature constitutes flame.

Wool being an animal fibre, oxidation from moisture would, in the first instance, generate ammoniacal fumes, which would hinder combustion, and the danger of ignition would proceed from the combustion of the woolpacks in which bales are enveloped. . . . The whole subject requires the careful study and attention of all classes of the community dealing with manufactured and raw produce of an organic nature. A better knowledge of the subject should lead to measures of prevention, as well as to a proper discrimination between fires of spontaneous origin and those from ordinary ignition.

[16th July, 1890; p. 502.]

WOOL CARGOES: SPONTANEOUS COMBUSTION.

In our number for March, 1889, we took occasion to comment on the successive fires which so unaccountably arose on the s.s. "Essex," and we concluded our remarks as follows: "It will now be interesting to see whether measures will be taken by the Board of Trade to ascertain the cause of these fires, or whether the shipping community will allow itself, or be allowed, to go on courting similar disasters in the future blindfold." So far as we are aware, the Board of Trade made no inquiries on the subject, neither the underwriters nor any body else having, it is to be inferred, though it worth while to invoke an inquiry. Surely, however, the Australian and New Zealand Underwriters' Association, at any rate, might have taken steps to secure an official investigation of circumstances so interesting and important to its members. Since the case of the "Essex" we have read of fires on board other Homeward-bound vessels—the "Winefred," "Beltana," "Largo Law," and the s.s. "Riverina"—and the experience of our readers may supply other instances.

There seems, indeed, to be a sort of epidemic of such disasters. We have before us, as we write, the average statements of the "Largo Law" and the s.s. "Riverina," and the underwriters concerned, whose interest in their contents will be something more than academic, may gather useful knowledge by their perusal. Whatever may have hitherto been held upon the subject of spontaneous combustion in wool cargoes, the preambles to the adjustments of the averages of the two vessels last named seem to leave little room for further doubt that wool may on occasion be a very dangerous stuff to stow in a vessel's hold. "The fire having been apparently extinguished," says the historian of the "Largo Law" disaster, "part of the bulkhead was torn down, and bales of burnt and scorched wool were broken out, and one was passed on deck in pieces to be dried, and the others were left in the lazarette." The ship had indeed a very narrow escape of total destruction, and but for the vigorous measures taken by those on board, who were no doubt quite alive to the fact that their own safety, as well as that of the ship and cargo, was at stake, she would probably in due course have figured in the Loss Book at Lloyd's. The s.s. "Riverina" had also a very narrow escape. After the fire was got under the officers worked their way to its seat, and there found "the bales which had been on fire, and were still smouldering and burnt to a hard black mass. The vessel having put into Aden to discharge the goods damaged by the water which had been copiously poured down the hold, a Mr. Burnell, a passenger on board, drew up, at the captain's request, a report of the fire, with its cause and history. Mr. Burnell being an expert on the subject of wool, his report is both valuable and instructive, and we cannot do better than here set it forth:—

"Riverina," s.: *Extract from Survey Report on the Cargo, by Mr. G. Burnell, dated Aden, 9th May, 1889.*

I have to report being on board when the fire broke out in the cargo. As soon as they were able to break out cargo to get at the locality of the fire I went down below and witnessed them breaking out the burnt bale, which was the last bale on the port side in No. 2 hatch, and abaft of the hatch against the bulkhead, in the lowest tier of wool. The bale was charred inside, and communicated the fire to the end of another bale of wool with which it was in contact, and also to another bale immediately above it. These were the only bales which were burnt. Water was poured down to extinguish the fire, and as soon as practicable the hatches were opened and the cargo broken out to remove the damaged bales. After the burnt bale was taken out, I went down into the space it had occupied and examined the surroundings to ascertain, if possible, if the cause had been communicated from outside, but could find no trace of oil either on the bulkhead or on the adjoining bales, nor any other appearance to lead to the origin of the fire outside the bale itself.

From my knowledge of wool, both in the greasy and scoured state, which is the result of forty years' experience in the colonies, I am of opinion that the cause of the fire was spontaneous combustion, caused through the wool not being quite dry when packed. I have further to state that the wool damaged by the water has been sent ashore to dry at my recommendation. The damage through water is slight.

Great praise is due to the officers for their prompt manner and continued efforts in dealing with the matter.

The facts as exposed in the average statements support by themselves a strong presumption that in each of the cases specially referred to the cause of the fire was the spontaneous combustion amongst the wool; but the above report of an expert, whose presence was as opportune as his opinion is valuable, seems to place the matter beyond doubt. Knowing, indeed, as we do, how great is the heat generated in the hold of all vessels, but particularly of iron vessels passing through hot latitudes, or wherever exposed to the rays of a hot sun, it requires no great effort of the imagination to believe that wool, stored damp in such a situation, would be likely to soon smoulder and char. Whatever view underwriters may take of this state of affairs, it seems obvious that the shippers of wool should make it their duty to guard against the packing of it in a damp condition, whilst shipowners on their part should lay strict injunctions upon their officers to reject any bales of appearance indicating a damp interior

[17th August, 1890; p. 290.]

SPONTANEOUS COMBUSTION.

SIR,—In my paper to the Insurance Institute of Victoria in June, 1889, occurs the following remark: "New Zealand flax has had an evil reputation for spontaneous combustibility on the access of moisture. Probably some resinous property in the fibre may assist the oxidation." Exception was taken to this remark by Mr. Pond, of Auckland, New Zealand, in a lecture, the notice of which appeared in the November number of the *Insurance and Banking Record*.

W. FARQUHAR.

Mr. Pond said (*Australian Insurance and Banking Record*, 1889, p. 858), "There was no instance of incandescence that he knew of from spontaneous combustion of flax."

THE "BELTANA" FIRE.

[*Lyttelton Times*, 24th January, 1890.]

Henry Bright, master of the "Beltana": Probably fourteen hundred bales of the whole cargo were unstained and undamaged. About fifty bales had disappeared, and some two hundred and fifty were more or less burnt. It was clearly proved that the spontaneous combustion was set up in the greasy wool, none of the scoured wool being burnt.

John Harcourt Gardiner, Associate of King's College, London, holding a permanent certificate as Lecturer on Science from the South Kensington Educational Department, and ten years Lecturer on Science at the late Royal Polytechnic Institute, London: I concluded after my examination of the vessel, that there must have been a large quantity of wool undergoing combustion in the hold, and the probability is that if the hatches had been removed previous to my arrival—there being a large quantity of tarry matter and various hydrocarbons set free from the wool, and being in a highly heated condition—it would have at once burst into flame, and probably endangered the whole cargo and the vessel itself. On examining the bales of wool as they were discharged, I found there were some bales which, although comparatively uninjured upon their exterior surface, were in a state of active combustion inside, showing that these bales could not have been set afire from the exterior, but that it must have been the result of spontaneous combustion. Merino wool is especially rich in fatty matter and earthy salts. These salts have the power of absorbing moisture to a certain extent from the atmosphere—are, in fact, more or less deliquescent. If this wool had been exposed for some time to a damp atmosphere before packing, the absorbed moisture might cause slow combustion, which would afterwards cause actual fire and flame; this condition might also be set up by the wool having been sheared in wet weather, or by it being exposed to a heavy dew or other means supplying the moisture to cause combustion to set up. Scoured wool, provided it had been properly dried after scouring, would not be so likely to set up combustion as wool in the grease.

FURTHER EXTRACTS FROM "THE AUSTRALASIAN INSURANCE AND BANKING RECORD."

[18th May, 1891; p. 367.]

The following is of much interest to marine underwriters, being an extract from copy of survey report on cargo per brigantine "Nellie," Lowry, master, from Lyttelton, N.Z., to Boston, U.S.A., surveyed in dock at Lyttelton, N.Z. :—

"I wish to draw your attention to a circumstance which came under my notice during the early morning of the 13th instant. At 2 a.m., or one hour before we knocked off pumping water into the vessel, I had one of the main hatches lifted to enable the gas in the hold to escape, and in looking down into the hold I saw several of the iron bands round the flax bursting (caused by swelling of the bales), and as these bands burst they, every one, emitted sparks. Now, in my rounds of the various dumping-sheds, and also on board of vessels, I have oftentimes seen bands of both flax and wool bursting when being rolled over and over. In the daytime, sparks from bursting bands would not be noticed, but I have no doubt they are emitted, and may be the cause of some fires on board of vessels. On discharging cargo from the main hatch, found the fire was confined to lower main hold, from centre of hatch all round three tiers deep, three longers fore and aft, and in sides; tops, sides, and corners of bales burnt; inside of bales whole; no signs of spontaneous combustion. I am unable at present to state definitely the exact number of bales that will have to be condemned, but I do not think it will be more than fifteen. My opinion of the origin of the fire is some person smoking whilst putting on the hatches at 5.15 p.m. on the 10th instant, or a spark perhaps from the galley, which is only two or three feet away from the hatch, or may be a band bursting in the hold. In concluding this report, I wish once again to bring under the notice of the underwriters the danger that exists in shipping flax and tow unprotected by covering of any sort."

[17th February, 1891; p. 129.]

COMBUSTIBILITY OF NEW ZEALAND HEMP.

A ship on fire in port has been among the incidents of the past month. The disaster occurred to the American ship "Leading Wind," which was loading gum and flax for New York, alongside the wharf at Auckland. About 500 tons of flax had been stored in the lower hold when a fire among this inflammable material made its existence known by volumes of smoke. Strenuous efforts were put forth to extinguish the flames by pouring water in streams down the hold, but after this course had been pursued ineffectually for several hours a survey was made, and, upon the advice of the representatives of the underwriters and the captain, the vessel was towed away from the wharf and scuttled. She has since been raised and is now discharging. This incident has, of course, revived the old controversy over the liability of New Zealand flax to spontaneous combustion, and, at the request of the Auckland Underwriters' Association, there is to be a searching inquiry by means of a coroner's inquest. Every one who has had experience in the storage of New Zealand hemp scents the theory of spontaneous combustion. Badly prepared flax has been stored for many years without exhibiting any signs of heating. There is no instance of the kind on record, and a much more simple explanation of the fire on the "Leading Wind" may be found in any one of the many ways in which fire is carelessly used by persons engaged in handling flax between the store and its final resting-place in the ship's hold. The theory of spontaneous combustion was set up in the case of the fire which broke out aboard the "Mariposa" within twenty-four hours after her departure from port with a shipment of flax, but an examination of the bales after they were discharged showed that not one of them had been burnt through to the centre, and the fire had unquestionably originated externally. Subsequent disclosures so clearly proved this to the satisfaction of the Underwriters' Association that they placed the fact on record. The gross acts of carelessness—especially smoking—which one sees in connection with the storage and cartage of inflammable goods and the loading of vessels, give rise to wonder that fires in the holds of ships are not more frequent. Not long ago an Auckland merchant had occasion to go down into the hold of a ship on berth for England to examine some bales of wool. He was accompanied by the stevedore, and while there observed a man walking about among the cargo smoking a pipe.

“That’s a rather dangerous proceeding—isn’t it?” he remarked to the stevedore, who thereupon addressed a word of caution to the smoker. To the merchant’s astonishment the offender proved to be the captain of the ship. When officers of ships set such an example—and they may sometimes be seen superintending loading operations while smoking cigars, which drop from time to time fiery masses of ash upon the deck—what can be expected of the seamen? Coming back to the fire on board the “Leading Wind,” however, it is important that the inquiry should be approached without prejudice in any direction. If New Zealand flax is liable to ignite spontaneously, it is important that shipmasters and underwriters should be made acquainted with the fact. That it is a cargo in the storage, cartage, and stowage of which—the rule “Smoking strictly prohibited” should be rigidly enforced—there are disastrous examples to prove. Attention should also be given to the danger of employing high-pressure donkey engines, which sometimes emit showers of sparks in the work of loading vessels. Nothing has been disclosed to suggest that the fire aboard the “Leading Wind” was due to any of these causes, but if conjecture is allowable upon such a matter which is at present shrouded in mystery, and is to be made the subject of a judicial inquiry, it seems more rational to suspect some of the more common causes of fire than to set up a theory of spontaneous combustion with respect to a material which has been stored and shipped for the past fifty years without producing a single authenticated case.

[19th June, 1894; p. 429–30.]

SPONTANEOUS COMBUSTION OF WOOL.

The important question of the spontaneous combustion of wool has recently been raised by the *Economist*, the issue of the 21st April containing a leading article which we reproduce as follows:—

[19th February, 1894; p. 139.]

News was received on the 24th ultimo that the R.M.S. “Jumna,” with a large cargo of wool for London, took fire in the lower part of her fore hold before reaching Batavia. The damage extended to only a few bales of wool, but the whole of the cargo in the fore hold had to be discharged to enable the fire to be extinguished. Another fire broke out on the 31st January in the same quarter of the R.M.S. “Dorunda,” also bound to London, and was of so serious a character that the captain at one time had little hopes of saving the vessel. A number of bales of wool and hides had to be jettisoned. The steamer “India” had an experience somewhat similar to the above two months ago in Brisbane. The circumstances surrounding the fires, each in the fore hold of three ships of the British India Company, point to some connection between their origin, and it is understood that the company have asked the Government to hold an inquiry.

OILSKINS OR OILED CLOTH.

[19th March, 1896; p. 225.]

Several fires having occurred on board vessels which were clearly traced to the ignition of these goods, renewed efforts were made to prevent their being shipped in future “under deck,” and it is to be reported with much satisfaction that all the shipping companies and firms engaged in the Australasian trade have agreed to refuse to carry them in that way, and some have decided not to take them under any circumstances.

[19th January, 1897; p. 65.]

A fire broke out among the flax stored ’tween decks aboard the barque “Alice,” loading alongside Wellington wharf. About fifty bales were destroyed, and a quantity more damaged by water. There is a difference of opinion between the officers of the vessel and the agents as to the cause of the outbreak. The officers are confident it was the result of spontaneous combustion, but the agents are equally confident it was caused by a spark from the galley fire. Experts declare that the flax shipped on the “Alice” was of the best quality that has ever been exported from the colony.

[19th April, 1898; p. 268.]

In the first week in March a fire broke out on the ship “Canterbury” while she was lying at the Victoria Wharf, Dunedin. Out of 997 bales of wool on board at the time 400 were damaged, as well as a number of bales of flax. An investigation to ascertain the cause of the fire shows that in all probability it originated among some flax shipped at Wellington. A survey of the vessel was made since the outbreak by Captain Thomson (Lloyd’s surveyor), Mr. G. L. Denniston (Lloyd’s agent), and Mr. Law (shipbuilder), and it was found that a considerable number of bales of wool and flax were burnt outside, and the main deck over the seat of the fire considerably charred. The damaged bales have been discharged from the vessel, and they will be dried and rebaled, probably before the vessel leaves the port. An inquiry into the cause of the fire is being held.

[19th August, 1899; p. 582.]

Dr. Dupre: With a mixture of wool and glue-pieces, after being subjected to a temperature of 250° Fahr. for five hours, there was a tendency to spontaneous combustion. He deduced from these experiments that it was possible the fire on board the “Holinwood” may have resulted from hair being mixed with the glue-pieces, such as might be adhering to the ears and portions of hides of animals of which the bales of glue-pieces were composed. In July the surveyor of the Underwriters’ Association of New South Wales came across two bales of fleshings sent for shipment, both of which were found to be heated and steaming. In continuation of previous inquiries upon this subject, Professor W. A. Dixen, of Sydney, was called in to make an investigation. The result proved that the bales were heated, and in a dangerous condition for shipment, the cause being that they had not been sufficiently dried, and being packed whilst damp, a powerful fermentation was set up and heat generated.

[19th December, 1901; p. 1015.]

A fire occurred on the s.s. "Waimate," lying in Napier Bay, on the 3rd instant. Assistance was obtained from the shore, and the brigade got a hose to work in No. 4 hold, but it was extremely difficult to operate on the exact spot. . . . The fire broke out in a consignment of flax stowed in the middle deck of No. 4 hold. . . . The Court of Inquiry found that the fire originated in the flax.

The four-masted ship "Strathgryfe," which left Sydney on the 8th instant for London, put into Port Chalmers on the 23rd March, owing to a fire in the hold. The vessel carried the following cargo from Sydney: Wool. . . . The fire was extinguished in Port Chalmers. It originated among the wool portion of the cargo, and many bales were not destroyed. The ship was not much damaged.

[1903; pp. 938, 518, 323.]

A demonstration to illustrate the working of the Clayton fire-extinguisher was recently given in the presence of representatives of the Harbour Trust and the Underwriters' Association. . . .

The agents for the apparatus claim that it is invaluable in connection with fires on board ships; but so far as Australia is concerned, we have had no practical example of its utility in this respect.

The cause of scientific fire-extinction on board ship has just received a good lift. It appears that the North German Lloyd Company have some machine-works of their own at Bremen, and that they have entered into an arrangement with the Clayton Fire-extinguishing Company for the manufacture and sale in Germany of the latter company's sulphur-gas apparatus. As a start, the N.D.L. has decided, "in case the expectations as to the results of the Clayton invention are confirmed," to equip all its steamers with the apparatus. In the probable event of this programme being carried out, no doubt the N.D.L. will make the most of such an additional security to passengers by its vessels, with the result that the Hamburg-American Company will be forced to follow suit. If this will happen, it will not be long before our free and independent English lines will see the advisability of doing something in the same direction, greatly to the increased security of ocean property and passengers as regards risks of fire. No doubt the present condition of affairs is something very like a scandal, and if the N.D.L. should as a pioneer bring about a reduction of the present risks, it will be well entitled to the world's compliments.

The *Times* of the 13th February contained the following letter from Mr. Douglas Owen on "Fires on Shipboard." [The following is an extract.]:—

"The modern necessity for prompt despatch often results in the wool and other products being shipped either insufficiently dried or improperly packed, with the result of heating and combustion."

[1905; p. 897.]

Wellington, October, 1905.—On the 27th September fire was seen to be issuing from a hold of the steamer "Turakina," which had nearly finished loading for London. The hatch was battened down, and a Clayton fire-extinguisher started in the 'tween-decks, where the fire was supposed to be. This was kept going till the morning of the 29th, when the heat seemed to have subsided. On opening the hatch, however, smoke and fire speedily reappeared. The seat of the fire was located, and the chemical engines belonging to the Harbour Board were got to work, and the fire was soon extinguished. About fifty bales of hemp and wool, chiefly the former, were found to be damaged, and were landed.

EXTRACT FROM THE "PASTORALISTS' REVIEW."

[15th August, 1906; p. 479.]

MOISTURE IN WOOL.

By S. B. HOLLINGS.

My own view is that no sheep-dip could possibly cause spontaneous combustion in wool, and I should say that the opposite would be the case.

My own opinion is that the fires were due primarily to moisture in the wool, the sheep being shorn when their fleeces were too damp. If it was possible to trace the bale or bales in which the fire originated, and we could get to know the kind of weather prevailing in New Zealand when the sheep were shorn, then it is certain we should have some reliable data on which to build our claim.

EXHIBIT No. 16.

FIRE AND EXPLOSION RISKS.

Dr. VON SCHWARTZ (1904).

SPONTANEOUS IGNITION.

UNDER this heading are generally classed all cases of quick or slow oxidation, or combustion brought about by chemical, electrical, biological (bacterial), or physical process (vibration, pressure, shock, or friction) only, without the conjoint assistance of extraneous sources of heat (flame, hot or glowing bodies).

Many instances of spontaneous ignition are preceded by spontaneous heating as a kind of prelude. . . . and might on that account be classed as chronic. . . . With substances liable to chronic spontaneous ignition, one can never be sure; they may be stored in large quantities for years, and may be worked up, packed, and shipped without manifesting any sign of their dangerous character, until one day it is suddenly found that the mass has become internally carbonised, calcined, or entirely consumed. It is in this behaviour that the greatest danger from such cases of spontaneous ignition lies.

The process of spontaneous heating, to which the most earnest attention should be devoted, since it may at any time develop into spontaneous ignition, may best be represented by the following experiment: Some cotton-wool is wrapped round the bulb of a thermometer, and the instrument is then introduced into a bottle containing a small quantity of some liquid that emits vapours at the ordinary temperature. The thermometer is not immersed in the liquid, but is merely suspended above the latter for some little time, whereupon it will be found that the mercury begins to rise; thus, in the case of liquid ammonia, the temperature will generally rise from, say, 10° C. at the outset to 14° C., 16° C., or over.

The cause of this accession of temperature, independent of any external excitement, is the condensation of the ammonia-vapour on the fibres of the wadding; condensation of gases, vapours, or mist on porous, fibrous substances being always accompanied by a liberation of heat. When the thermometer is drawn out of the bottle and exposed to the air, so that the vapour can escape from the cotton-wool, the mercury falls again, because vaporisation is attended with loss of heat.

Under specially favourable conditions, such accessions of temperature often proceed to great lengths, and may lead to spontaneous heating, followed in turn by spontaneous ignition.

Spontaneous heating or spontaneous ignition has been already observed in practice to occur with the following substances (*inter alia*): Oils, oilcloth, fats, sulphur-compounds, hay, wool, cotton, flax, hemp, jute, tow, oil-rags, greasy cloth.

The processes and conditions which may incite to spontaneous heating or spontaneous ignition are—

			Predominantly in the Case of
Moisture, bacterial activity, germination	...	...	Agricultural products, fodder, manure.
Storage in large heaps	...	...	Agricultural products.
Contained fat or oil	...	...	Organic substances, fibres.

The period of development in cases of chronic spontaneous ignition may extend over two or three months; in many cases a good deal depends on the bulk of the stored mass.

No sharply defined classification of the kinds of spontaneous ignition is possible, the phenomenon being attended with special features in the case of almost every different substance, and also subject to considerable modification according to circumstances. The capriciousness of the phenomenon can be most clearly ascertained by experiments in the production of artificial spontaneous ignition, the results proving negative in the majority of instances, whilst in others characteristic spontaneous ignition will unexpectedly occur. For this reason the results of such experiments are never quite decisive, or at least one should never conclude from a negative experimental result in these cases that spontaneous ignition is impossible under similar conditions in practice.

From many of these instances it is apparent that attempts to render the progress of spontaneous ignition dependent on the fulfilment of this or that condition are nugatory. The prevailing conditions are uncontrollable, and cannot be made to conform to definite rules; above all, fire insurance and other officials must be cautioned to avoid the idea that spontaneous ignition can be rendered possible or impossible by the non-fulfilment, or the reverse, of one or more conditions. For the occurrence of spontaneous ignition in organic bodies at a low temperature, the following are a few of the essential points: Presence of some carbonaceous combustible substance, moisture, oxygen, and a certain minimum temperature.

It must be admitted that these requirements are applicable to many conditions, just as it is undeniable that, in order to warm and illuminate a cold, dark room, the employment of a stove, lamp, fuel, and also fire is necessary; but to endeavour to correlate these requirements to *all* conditions is inadmissible, since, in the case of fibrous materials impregnated with oil, for example, moisture, so far from being essential, actually retards the progress of spontaneous ignition, oily rags being capable of spontaneously igniting only when in a dry state.

The sole idea that these few examples are intended to convey is that the general prevention of spontaneous ignition by adherence to cut and dried regulations is unattainable; furthermore, that no insurance company should allow itself to be persuaded that any substance which has already proved in practice to be attended with the risk of spontaneous ignition can be considered as freed from that risk by the adoption of special conditions.

The dried fibres of hemp, jute, flax, tow, as also hay, straw, and similar substances, very readily take fire spontaneously when they are stored in lofts, directly under the roof, so tightly that ventilation of the surface is precluded; under these conditions two or three weeks' constant dry weather will suffice to convert the substances in question into a mass that carbonises and ignites spontaneously.

* * * * *

The behaviour of the various fibres in flame and fire is very different, the vegetable fibres burning readily and briskly, with the formation of only a small quantity of dullish charcoal; once lighted they are liable to continue burning. On the other hand, the animal fibres burn slug-

gishly, are not so easily kindled, and can only be induced to continue burning when the combustion is supported by an extraneous flame or source of heat. They furnish a large proportion of spongy charcoal, which will not continue to glow or burn unless in a strong draught.

The cause of this difference is to be sought in the presence or absence of internal cavities in the fibres; these cavities also play a considerable part in the spontaneous ignition of fibres, and render the vegetable fibres more dangerous in this respect than those of animal origin.

Though agricultural products and other organic matters can be brought to a state of spontaneous ignition by the presence of wet and moisture, the fibres remain indifferent and cannot be so induced, even with an abundance of moisture. Only in cases where other factors co-operate, such as pressure, presence of fats, &c., which of themselves are sufficient to incite spontaneous ignition, is this tendency enhanced, pressure effecting this result in the presence of a high proportion of moisture, and fat aiding when the moisture is too low.

Hence a large percentage of moisture is only dangerous when the fibres are simultaneously subjected to heavy pressure, the two factors in conjunction increasing the power of retaining heat. When fatty matter is present, the tendency to spontaneous ignition is augmented by a low percentage of moisture, especially when pressure is also applied. Even fibres that have been dried and oiled and become very fiery when pressed, and wool containing less than 12 per cent. of moisture should not be oiled at all. In fact, moisture plays a very important part in this matter, the desirable and minimum percentages being as under:—

Wool	...	...	...	18.2	per cent.	desirable,	12	per cent.	minimum.
Silk	...	...	...	11.0	"	"	10	"	"
Cotton	...	...	...	8.5	"	"	7	"	"

Otherwise the liability to take fire spontaneously is increased.

Bacterial agency is devoid of importance in connection with the inception and continuance of spontaneous heating, the latter resting solely on purely chemical reactions. This view, which is now general, was experimentally demonstrated to be correct by R. Kissling.

Wool.

Animal fibre is less dangerous than vegetable fibre, but when the two are worked together they possess the character of the latter.

The danger resulting from the presence of natural or artificial fat in wool is only heightened when the material is put under heavy pressure or is very dry, in which event the accumulation of heat chars the internal portions of the mass.

* * * * *

Apart from its combustibility, wool *per se*, as an article of commerce or raw material, presents few dangers.

* * * * *

The aptitude of wool for taking fire, spontaneously or otherwise, may be considerably facilitated by the presence of dye-stuffs, some of which are capable of igniting spontaneously. Special risk attaches to wool that has been badly dyed, redyed, or met with any accident in the dyeing process.

Flax (Linen), Hemp, Jute.

The preliminary treatment of flax and hemp is mostly carried on in water, and, when piled in heaps or compressed, the wet masses exhibit an objectionable tendency to heat spontaneously, and in some cases to ignite.

An important point with these three fibres is to keep all fatty substances at a distance, since even small quantities may lead to spontaneous ignition; and, moreover, the storage temperature should not be over warm. When in a pure and thoroughly dry condition, these three fibres may attain such a degree of desiccation, under the influence of moderate warmth, the radiant heat from a stove or piping, and in summer from the rays of the sun or being stored close under a roof, that pyrophoric carbon is formed and the mass takes fire. In this respect they are more susceptible than wood.

The residues left when these fibres are put through the cleaning process are known under the general name of "tow." Tow is dangerous, inasmuch as it will glimmer at even 257° Fahr., and is therefore one of the most easily kindled of fibres. When oiled it has a greater tendency to take fire spontaneously than the purified fibres, and is specially dangerous as regards retaining heat if piled up in somewhat larger heaps than usual. For instance, in one case it was only discovered about half an hour before an outbreak of fire that a large pile of tow had become completely carbonised inside without exhibiting the slightest indication externally.

On the whole it may be said of all fibres that the waste products are far more dangerous than either the crude or purified fibres themselves, and therefore they need more careful looking after. The chief reason for this dangerous character is the presence of dusty constituents, which greatly facilitate the reactions resulting in combustion. It is these dust-constituents that also form the source of danger in other fibrous materials, like old rope, fishing-nets, string, &c., and this risk is imminent in junk-stores and other places where such goods are sorted, packed, and got ready for shipment. These materials also give off certain gases during storage, which gases, when mixed with dust and ignited by contact with a flame, produce violent explosions (tow-explosions) similar in character to those furnished by dust.

EXHIBIT No. 17.

SIR,—

Christchurch, N.Z., 20th July, 1906.

With regard to loading in wagons "L" and "LA," you have a regulation that we should load twenty-four bales in the former and twenty-seven bales in the latter trucks, and I wish to draw your attention that this quantity is excessive for this time of the year, as the bales cannot be so arranged in the trucks with these quantities so as to make a proper ridge in the middle to enable the tarpaulins to throw off the wet. Fifteen bales in "L" wagons and eighteen or twenty bales in "LA" is all that should be carried when liable to wet weather. We loaded wool out for the "Oswestry Grange" from Fairfield, and nine bales got damp in transit from this cause. I would be pleased if you would give this matter your attention, with a view to giving us some discretion as to loading in wet or doubtful weather.

Yours, &c.,

F. WAYMOUTH,
Managing Director.

The Traffic Manager, Christchurch.

District Traffic Manager's Office (New Zealand Railways),
Christchurch, 31st July, 1906.

SIR,—

In reply to your letter of the 20th instant with reference to the method of loading wool in "L" and "LA" wagons, I am advised that five "LA" wagons were loaded at Fairfield for the "Oswestry Grange," of which four contained twenty-seven bales each and the fifth nineteen bales. In one of the wagons eight bales turned out wet or damp. Seeing, however, that in the case of the other wagons, which contained the same number of bales, the wool turned out in good order, it would appear that the cause of the bales being wet was not the number of bales in the truck. Two sheets only were used on the trucks in the case under review; in wet weather, with a load of twenty-seven bales, it is advisable to use three sheets, and this, I believe, is the invariable practice at your Belfast works.

I have, &c.,

S. F. WHITCOMBE,
District Traffic Manager.

The Managing Director, Canterbury Frozen Meat Company, Christchurch.

SIR,—

Ashburton, N.Z., 3rd August, 1906.

I am in receipt of yours of the 2nd instant, also enclosed copy of letter from District Traffic Manager, Railways, *re* sheeting wool.

I remember loading 127 bales of wool in five "LA" wagons for the "Oswestry Grange" on the 16th July. The Traffic Manager is in error when he states that the trucks were only covered with two tarpaulins. I supervised the loading and sheeting of this consignment, and covered four trucks containing twenty-seven bales each with three tarpaulins, the truck containing nineteen bales was covered with two.

In my opinion twenty-seven bales are too many for an "LA" truck, which the railway authorities compel us to load; twenty-three bales are far easier and better covered, and do not present so much surface on the top, or, better still, nineteen bales per "LA" truck, which can be most securely covered, and fifteen bales per "L" truck. Given good tarpaulins, it is impossible for water to lodge on the tops, as the top bale forms a roof, and the covers being well over the sides, throws the water clear of the trucks.

I remain, &c.,

LEWIS SMITH.

The Managing Director, Canterbury Frozen Meat Company, Christchurch.

SIR,—

The Canterbury Frozen Meat and Dairy Produce Export Company (Limited),
Christchurch, 4th August, 1906.

With reference to your letter of the 31st ultimo with regard to loading wool, I referred the matter to our foreman fellmonger at Fairfield, and I enclose you herewith copy of his report on same, which again bears out my statement with regard to the loading.

Yours, &c.,

F. WAYMOUTH,
Managing Director.

The Traffic Manager, Christchurch.

District Traffic Manager's Office (New Zealand Railways),
Christchurch, 10th August, 1906.

SIR,—

With reference to your letter of the 4th instant with regard to loading wool, I have the honour to inform you that to meet you in the matter, I have arranged that your Fairfield people can load "LA" with twenty-three and "L" wagons with twenty bales in bad weather.

I have, &c.,

S. F. WHITCOMBE,
District Traffic Manager.

The Managing Director, Canterbury Frozen Meat Company, Christchurch.

EXHIBIT No. 18.

SIR,—

Christchurch, N.Z., 5th September, 1906.

During the wool season 1905-6 I specially noted the following lots of wool, while valuing catalogues, as being "wet," and consequently avoided them for shipping purposes, considering they were not in a fit condition.

Wellington sale, 17th November, 1905: Messrs. Levin and Co.'s catalogue, Lots 22 and 34. Lot 22 was not sold in the sale, but passed in to Messrs. Fay and Co., who would probably buy it afterwards. Lot 34 was bought by Messrs. Swift and Co., of Dunedin.

Christchurch sale, 21st November, 1905: Lots 44 and 107 in New Zealand Farmers' Co-op. catalogue. Neither of those lots were sold in that sale. Lot 44 was offered in a sale held on the 14th December, and sold to Messrs. Hirst and Co., of Huddersfield; probably Farmers' Co-op. could give name of ship the wool went to England in. I did not notice anything wrong with this lot on valuing it the second time. Lot 107, DM, seventeen bales, was bought by Mr. Swanton for shipment.

Napier sale, 5th November: In Hawke's Bay Farmers' Co-op. catalogue—Lots 119, eight bales, and 186, twelve bales. Both bought by Messrs. Swift and Co., Dunedin.

Dunedin sale, 21st December: New Zealand Loan and Mercantile Agency Company's catalogue, Lot 60, twenty-six bales, bought by me; reclassified and dried at Port Chalmers before shipping. National Mortgage Agency Company's catalogue, Lot, 90, three bales, bought by me, and reclassified as Port Chalmers before shipping. Dalgety and Co.'s catalogue, Lot 247, bought by Messrs. White and Co., of Dunedin; probably reclassified in Dunedin.

The Chairman, Wool Commission.

Yours, &c.,
WALTER HILL.

SIR,—

Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lots 22 and 34, offered in your wool-sale catalogue on the 17th November, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, Messrs. Levin and Co. (Limited), Wellington.

DEAR SIR,—

Wellington, 4th December, 1906.

We have the honour to acknowledge receipt of your letter of the 3rd December, requesting us to furnish you with the brands, &c., of Lots 22 and 34, offered at our wool-sale on the 17th November, 1905.

The following are the particulars so far as we can supply them to you:—

Lot 22, marked SB over P, ten bales; owner, S. Barrow, Pahautanui; purchaser, Fay and Co.

Lot 34, marked J in a circle, eight bales; owners, J. and D. McMasters, Martinborough; purchaser, J. W. Swift and Co., Dunedin.

As we merely deliver the wool to the buyers, we are unable to give you the name of the ship and date of shipment, but you can doubtless obtain this information by applying to Messrs. Fay and Co., Wellington, and Messrs. J. W. Swift and Co., Dunedin.

Yours, &c.,

LEVIN AND CO. (LIMITED)

The Secretary, Wool-fires Royal Commission, Wellington.

(A. E. Mabin).

SIRS,—

Wool-fires Royal Commission, Wellington, 6th December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the destination, name of ship, and date of shipment of Lot 22, SB over P, ten bales wool, purchased by you at Messrs. Levin and Co.'s wool-sale in Wellington on the 17th November, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

Messrs. Fay and Co., Wool-brokers, &c., Wellington.

SIR,—

Wellington, 6th December, 1906.

We are in receipt of yours of even date asking for particulars of Lot 22 *ex* Messrs. Levin and Co.'s sale of the 17th November, 1905.

The ten bales referred to were shipped on the 23rd November, 1905, per s.s. "Ruapehu" for London, where the lot was sold by public auction by Messrs. Charles Balme and Co., under Lot 557, on the 27th January last, and realised 11½d. per pound, a very good price indeed for wool of its quality at the time of sale.

Yours, &c.,

The Secretary, Wool-fires Royal Commission, Wellington.

JAMES FAY AND CO.

SIRS,—

Wool-fires Royal Commission, Wellington, 6th December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the destination, name of ship, and date of shipment of Lot 34, marked J in a circle, eight bales, purchased by you at Messrs. Levin and Co.'s wool-sale in Wellington on the 17th November, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

Messrs. J. W. Swift and Co., Wool-brokers, &c., Dunedin.

DEAR SIR,—

Dunedin, 8th December, 1906.

We have the honour to acknowledge receipt of your favour of 6th instant.

In reply to your request, we have much pleasure in advising you that Lot 134, eight bales out Messrs. Levin and Co.'s sale of 17th November, 1905, was shipped to London per s.s. "Mimiro" on the 19th November, 1905. If it will be any assistance to the members of your Commission, we might mention that up to the present time we have received no complaint from the consignees as to the out-turn of the wool.

We are, &c.,

Per pro J. W. SWIFT AND Co.,
Thos. Smith Paterson.

O. F. D. Cooper, Esq., Secretary, Wool-fires Royal Commission, Wellington.

SIRS,—

Wool-fires Royal Commission, Wellington, 11th December, 1906.

I have the honour to acknowledge the receipt of your letter of the 8th instant, and to thank you for the information therein contained.

On reference to my letter of the 6th instant it will be observed that I was directed to inquire as to the destination of Lot 34, J in circle, eight bales, *ex* Levin and Co.'s sale of the 17th November, 1905, but in your letter you advise me of the destination of Lot 134. Perhaps this is an error, but I would be obliged if you would correct or confirm the supposition for the purpose of record.

I have, &c.,

Messrs. J. W. Swift and Co., Dunedin.

O. F. DUNREATH-COOPER, Secretary.

DEAR SIR,—

Dunedin, 14th December, 1906.

We have to acknowledge receipt of your favour of the 11th instant.

We regret very much that through a typographical error in our letter of the 8th instant we should have mentioned the number of the lot as 134. The information supplied referred to Lot 34 as per your previous inquiry.

We are, &c.,

Per pro J. W. SWIFT AND Co.,
Thos. Smith Paterson.

O. F. D. Cooper, Esq., Secretary, Wool-fires Royal Commission, Wellington.

SIR,—

Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lots 44 and 107, offered in your wool-sale catalogue on the 21st November, 1905; and of original Lot 44, which was again offered by you on the 14th December, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, N.Z. Farmers' Co-operative Association, Christchurch.

New Zealand Farmers' Co-operative Association of Canterbury (Limited),

Christchurch, 4th December, 1906.

SIR,—

In answer to your favour of the 3rd instant, we beg to supply the following desired information:—

Lot 44; brand, CH over 2 in a triangle; number, $\frac{1}{3}$; owner, J. O. Amyes; purchaser, J. Hirst and Co.; shipper, Dalgety and Co., 28th December, 1905, per s.s. "Ionic."

Lot 107; brand, WG in a diamond with 89 outside of the diamond*; owner, D. McDonald; purchaser, R. Jowitt and Sons; shipper, Dalgety and Co., 24th November, 1905, per s.s. "Gothic."

We are, &c.,

ROBT. HARDIE, Manager.

The Secretary, Wool-fires Royal Commission, Wellington.

SIR,—

Wool-fires Royal Commission, Wellington, 6th December, 1906.

I have the honour, by direction, to acknowledge the receipt of your letter of the 4th instant, and to thank you for the information therein contained.

The Lot 107 which the Commission is desirous of tracing was originally offered in your sale on the 21st November, 1905, but was not sold at that time; it was branded DM, consisted of seventeen bales, and was bought by Mr. Swanton for shipment at a subsequent sale—perhaps the same sale at which original Lot 44 was eventually sold.

I would be obliged if you would be so good as to inform me if the Lot 107, WG in a diamond with 89 outside of the diamond, is the same line; if not, will you supply me with the particulars of this lot as asked for in my letter of the 3rd instant.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, New Zealand Farmers' Co-operative Association (Limited), Christchurch.

New Zealand Farmers' Co-operative Association of Canterbury (Limited),

Christchurch, 7th December, 1906.

DEAR SIR,—

We are this morning in receipt of your favour of the 6th instant, the contents of which have had our attention.

* Not reported damaged *ex* "Gothic."

In reply we beg to state that Lot 107, DM, seventeen bales, crossbred, was passed in at the November sale to Swanton (R. Jowett and Sons), and was sold privately afterwards to Swanton. This lot is identical with Lot 107, W G in a diamond with 89 outside of the diamond.

Yours, &c.,

ROBT. HARDIE, Manager.

The Secretary, Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lot 247, offered in your wool-sale catalogue on the 21st December, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, Dalgety and Co. (Limited), Dunedin.

DEAR SIR,— Dalgety and Co. (Limited), Dunedin, 5th December, 1906.

We are in receipt of your letter of the 3rd instant, and in reply we give you herewith particulars of Lot 247 offered in our wool-sale on the 21st December.

Brand, B H over bar; numbers, 6, 7, 8, and 9; description, four bales crossbred ewe; owner, Bentley and Horsfall; buyer, Messrs. White and Co., Dunedin.

The wool was taken delivery of after the sale, and we are therefore unable to supply you with any information as to shipment, nor can we say whether the wool was shipped under the original brand and numbers given above. Messrs. White and Co. could probably give you any further information you may desire.

Yours, &c.,

DALGETY AND CO. (LIMITED).

O. F. D. Cooper, Esq., Secretary, Wool-fires Commission, Wellington. (Per G. S.)

SIRS,— Wool-fires Royal Commission, Wellington, 8th December, 1906.

I have the honour, by direction, to request that you will be so good as to furnish me with the destination, name of ship, and date of shipment of four bales of wool branded B H over bar, numbers 6, 7, 8, 9, crossbred ewe, being Lot 247 in the wool-sale catalogue of Messrs. Dalgety and Co. (Limited), Dunedin, of the 21st December, 1905, and purchased by you.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

Messrs. White and Co., Dunedin.

DEAR SIR,— 193 Princes Street, Dunedin, 12th December, 1906.

We are in receipt of your favour of 8th December in reference to wool sold in Dunedin on 21st December, 1905. We will make inquiries, and if the information asked for can be obtained we will advise you immediately.

Yours, &c.,

WHITE AND CO. (LIMITED)

(J. K. Mooney).

Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lots 119 (eight bales) and 186 (twelve bales), offered in your wool-sale catalogue of the 5th November, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, Hawke's Bay Farmers' Co-operative Association, Napier.

Hawke's Bay Farmers' Co-operative Association (Limited),

DEAR SIR,— Port Ahuriri, Napier, 5th December, 1906.

As requested in your letter of 3rd instant, we have pleasure in giving you particulars of two lots of wool sold in our sale of 5th December, 1905.

Lot 119, eight bales, numbered 1 to 8, original brand D A, owned by Mr. D. A. McLean, of Waipukurau, bought by Messrs J. W. Swift and Co., and shipped to Dunedin per s.s. "Mokoia" on the 28th December, 1905.

Lot 186, twelve bales, original brand T in a circle, numbers 5, 9, 12, 13, 14, 16, 20, 21, 26, 32, 35, and 38, owned by Mr. R. H. Todd, of Kaikora North, and rebranded D D over 1 in a circle, and shipped to London per "Indralema" on the 15th December, 1905.

Yours, &c.,

R. W. KELLY, Manager.

The Secretary, Wool-fires Royal Commission, Wellington.

P.S.—Both lots were shipped by us on behalf of the purchasers—Messrs. J. W. Swift and Co., of Dunedin.

SIRS,— Wool-fires Royal Commission, Wellington, 8th December, 1906.

I have the honour, by direction, to request that you will be so good as to inform me of the destination, name of ship, and date of shipment, with marks and numbers of eight bales of wool branded D A, being Lot 119 in the wool-sale catalogue of the Hawke's Bay Farmers' Co-operative Association (Limited), Port Ahuriri, of the 5th December, 1905, purchased by you and shipped to Dunedin per s.s. "Mokoia" on the 28th December, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

Messrs. J. W. Swift and Co., Wool-brokers, &c., Dunedin.

DEAR SIR,— Dunedin, 10th December, 1906.

We have to acknowledge receipt of your favour of 8th December.

In reply to your inquiry *re* the eight bales wool branded D A, Lot 119, in the Hawke's Bay Farmers' Co-operative Association sale of 5th December, 1905, these wools were brought on to Dunedin by the s.s. "Mokoia" for manipulation by ourselves. The bales, on being opened, we found to be in good condition and nothing wrong with the contents.

We are, &c.,

Per pro J. W. SWIFT AND Co.,
Thos. Smith Paterson.

O. F. D. Cooper, Esq., Secretary, Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lot 90 (three bales), offered in your wool-sale catalogue on the 21st December, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, National Mortgage and Agency Company (Limited), Dunedin.

National Mortgage and Agency Company of New Zealand (Limited),

SIR,— Dunedin, 5th December, 1906.

In reply to your favour of 3rd instant, copy of which is here given—"I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship, and date of shipment of Lot 90 (three bales), offered in your wool-sale catalogue on the 21st December, 1905"—the three bales of wool in question were sent to us for sale by Charles Robert James, settler, Greenfield Settlement, near Lawrence, branded 77 over bar, and numbered 1 to 3. They were purchased by Walter Hill, of Christchurch, and by his instruction rebranded A C over B in circle, and sent to Port Chalmers on the 8th January, 1906, to the care of the New Zealand Shipping Company. The wool was reclassified and repacked along with a lot of other wools and shipped by various vessels. We have applied to the New Zealand Shipping Company, and they say it is impossible to trace by what vessel the particular wool in question was shipped.

Mr. Hill might possibly be able to give some further information, but we do not think it probable.

We have, &c.,

NATIONAL MORTGAGE AND AGENCY COMPANY OF NEW ZEALAND (LIMITED).
(J. Loudon.)

The Secretary, Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 3rd December, 1906.

I have the honour, by direction of the Commission, to request that you will be so good as to furnish me with the brands, numbers, name of owner, name of purchaser, name of shipper, name of ship and date of shipment of Lot 60 (twenty-six bales), offered in your wool-sale catalogue on the 21st December, 1905.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Manager, New Zealand Loan and Mercantile Agency Company (Limited), Dunedin.

New Zealand Loan and Mercantile Agency Company (Limited),

DEAR SIR,— Dunedin, 11th December, 1906.

Replying to your letter of the 3rd instant, the enclosed duplicate of letter received by us from the local manager of the New Zealand Shipping Company will explain the position in regard to shipment of the wool you allude to. A C over B in a circle was the buyer's rebrand.

Yours, &c.,

ANDREW TODD, Manager.

The Secretary, Wool-fires Royal Commission, Wellington.

The New Zealand Shipping Company (Limited),

DEAR SIR,— Dunedin, 7th December, 1906.

We are in receipt of your letter of the 5th instant, for which we thank you.

With reference to the consignment of wool marked A C over B in a circle, forwarded from your store to Port Chalmers on the 8th January last, this wool was taken into our store at Port Chalmers and there reclassified prior to shipment. As it was mixed with other wools, we cannot say what ship carried this lot.

Yours, &c.,

G. B. BULLOCK, Local Manager.

The Manager, New Zealand Loan and Mercantile Agency Company (Limited), Dunedin.

EXHIBIT No. 19.

SURVEY REPORT.

Lyttelton, 18th November, 1905.

THIS is to certify that I, Stewart Willis, the undersigned surveyor to Lloyd's Register, did, at the request of Messrs. the Farmers' Insurance Company, hold survey on the 18th November on sundry bales wool and skins, mark and number as per margin [Brookdale, Nos. 53, 56, 59, 79, 80, 82, and 49], said to be *ex s.s.* "Wakatu," and at present stored in the Shaw, Savill, and Albion Company's shed.

On examining the bales I found six bales damaged by fresh water—namely, Nos. 56, 79, 59, 53, 82, 80, all wool; also one bale, No. 49, containing skins. These bales are badly saturated with water, and it is impossible to dry them sufficiently in the shed.

I recommend that the six bales of wool and one bale of skins be sent to wool-scourers to be spread out and dried prior to shipment, as in present condition it would be dangerous to ship them.

STEWART WILLIS,

Surveyor to Lloyd's Register.

SURVEY REPORT.

3rd April, 1906.

THIS is to certify that I, Stewart Willis, the undersigned, surveyor to Lloyd's Register, did this day, at the request of Mr. R. Brown, manager of the New Zealand Farmers' Insurance Company, hold survey at the Shaw, Savill, and Albion Company's shed, Lyttelton, on two bales of wool, marks and numbers as per margin [Mendip Hills, 29, wethers, super. pieces; Mendip Hills, 31, super. 1 combings].

I now certify that after careful examination I found as follows: Both the bales have evidently been stowed for some considerable period on a damp place, with the result that in each instance the woolpack on one side of the bale is completely rotten and torn. The wool is badly stained, caked, and mildewed for two or three inches into the bale. The woolpacks are also badly stained on the other sides of the bales, but, although there can be no doubt the packs have been wet at some period, I cannot find any trace of moisture in the wool in that locality.

I recommend that the two bales be sent to wool-scourer, opened up, and thoroughly examined as to damp, and all mildewed or damaged wool removed.

STEWART WILLIS,

Surveyor to Lloyd's Register.

SIR,—

Lyttelton, 29th June, 1906.

As requested, I have this day surveyed eleven bales of wool marked "Mesopotamia," said to be in a more or less damp condition.

On examining the wool I found bales Nos. 316, 313, 304, 315, 306, and 309 in a slightly damp condition. This dampness is entirely external, and is in patches on different parts of the bales. I recommend that these bales be opened out in the shed and given a few days to dry, which will meet the requirements of the case.

On examining bales Nos. 302, 311, 313, and 305, I found these bales seriously wet, and recommend that they be sent to a wool-scouring works to be thoroughly dried. Bale No. 300 is not damaged.

For your information I may state that I am of opinion that the bales have been carted or allowed to stand in the rain, as the moisture appears to have been entirely external. There must have been considerable carelessness in connection with this matter, as in the bales which I have recommended to be sent to the scouring-works the moisture has penetrated a considerable distance into them.

Yours, &c.,

STEWART WILLIS.

J. Grierson, Esq., Manager,

Victoria Insurance Company, Christchurch.

EXHIBIT No. 20.

EXTRACT FROM SHAW, SAVILL, AND ALBION COMPANY'S (LIMITED) LETTER OF THE 30TH JUNE.

"GOTHIC" FIRE.

Shortly after this vessel had left Teneriffe a fire was discovered in No. 4 hold. The crew broke out the cargo, and found some burning bales of wool. These were thrown overboard, and everything was believed to be right. When passing the Lizard on the way to Plymouth fire was found to be existing in No. 3 hold, and after the Plymouth passengers had been landed this assumed such alarming proportions that the other passengers had to be sent ashore at once, the hold flooded with water, and the vessel put on the ground. These operations had the result of putting out the fire. The hold was then pumped out, and the vessel came on to London under her own steam. The discharge of the cargo was immediately proceeded with, and while this was going on some more hot bales were found in No. 4 hold: two of them which showed no outward signs of fire were found to be burning at the heart; and in No. 3 hold, which had been flooded with water, bales in a similar condition were found.

EXHIBIT No. 21.

SIR,—

Lyttelton, 28th November, 1893.

The foreman of Messrs. Shaw, Savill, and Albion Co.'s shed informs me that he has received instructions from Messrs. Dalgety and Co. to ship on board the "Halcione" to-day the forty-three bales of wool which you saw this morning. His instructions are to keep back those he knows to be wet; and he has retained three bales. None of the undumped bales that I sampled were thoroughly dry, and I have no hesitation in saying that it is a most dangerous proceeding to send these forty-three bales on board the "Halcione" without having them most thoroughly examined. Five bales from Cheviot marked "CPT" are damp with salt water. Two of these should be sent to the scourer. The numbers on bales are as follows: Nos. 6, 43, 75, 107, 81.

In the New Zealand Shipping Company's store there are eighteen bales marked "Olford": the packs are stained by damp and the wool slightly damp. I recommend that the whole be opened out. The shipping company are, I believe, in communication with the shippers of the wool.

C. H. Croxton, Esq.

STEWART WILLIS.

SIR,—

15th December, 1893.

I now send you marks and numbers of sixteen bales of wool that have been more or less damaged with sheep-dip on board the ship "Hermione." The wool was stowed in main hatch, and during discharge of above cargo two tins of this sheep-dip fell out of the sling. One burst, and spread its contents in every direction. I recommended the captain to have the bales which were damaged broken out from amongst the cargo, and they are now in the vessel's 'tween-decks. I strongly recommend that all these bales be sent out of the ship.

C. H. Croxton, Esq.

STEWART WILLIS.

SIR,—

16th July, 1894.

While shifting some cargo on board the s.s. "Gothic" taken on board at Dunedin, a bale of wool has been discovered in a very much heated condition. It is scoured wool, and is now opened and spread out in Messrs. Shaw-Savill's shed to dry, and was taken on board the "Gothic" at Dunedin. The bale had developed a very large amount of heat even in this short period.

A. Scott, Esq.

STEWART WILLIS.

SIR,—

25th January, 1895.

I have to inform you that eight bales of wool have been landed *ex s.s.* "Kahu" in a wet condition. They are now stored in the Shaw-Savill shed, and as it is salt water damage I recommend that these bales be scoured prior to shipment.

F. Waymouth, Esq.

STEWART WILLIS.

SIR,—

4th March, 1895.

I have just perused the enclosed. The bales marked DC over HC were found by me to be in a heated condition on the 28th February. On the 1st March I had the hoops burst, and found the bales quite warm. This can be proved by Mr. Farrar, who is storeman at the Shaw-Savill shed, and, if required, by another witness. The bales since that have cooled down very much, having been exposed to a cool current of air since the 1st instant. I do not say that the bales are damp—I simply state that they were warm; and this morning they still showed a certain amount of heat. The former case mentioned by the Canterbury Meat Company happened some time ago, and I think it is only fair to myself that you should know the facts. A number of bales from the Canterbury Meat Company were found by me in the New Zealand Shipping Company's store: three of these were absolutely warm, and the balance, as I stated at the time, I was suspicious of. No doubt can exist as to the three bales, as Mr. Bennett and Mr. Dale, of the New Zealand Shipping Company, felt them and agreed with me. All these bales were left by the meat company for days in the shed exposed to a cool current of air, and were felt daily by the storeman and self. They gradually cooled down; then the meat company sent for them and examined these bales at their own works, the result being as shown by them in the enclosed letter. I deny most emphatically that they have proved me to be wrong, and, as heated wool on board ship may lead to very serious loss and damage, I would like to see this matter thoroughly threshed out.

F. Graham, Esq.

STEWART WILLIS.

SIR,—

23rd April, 1895.

Two bales wool, mark and number as per margin, are now in the New Zealand Shipping Company's shed in a very heated condition. The temperature of these bales is 110°, and had they been dumped and shipped straight out of the shed, as is often the case, without doubt a fire would have resulted on board the vessel. There are twenty-eight bales in all of this line, and I strongly recommend that the whole of these be carefully examined prior to shipment. The bales mentioned are all from Mr. Clark's works, and only through gross laxity could wool be sent out in such a wet condition as this must have been in.

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

28th November, 1895.

Two bales wool, mark and number as per margin, have come to hand in a wet condition. These bales are now in the Shaw-Savill shed, and have now been opened out to dry. I may point out that all the wool which has up to date come to hand in a damp condition has been from the railway, and has been caused by imperfect or defective sheeting of same.

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

29th November, 1895.

I would wish to draw your attention to the large amount of wool that is coming to hand in a more or less damp condition. I believe the most of it is caused by improper and insufficient sheeting when loaded on the trucks. Two shipments of wool now in the New Zealand Shipping Company's shed, of which several bales are wet, is a case in point. Those marked "JN," with numbers running from 1 to 36, all show (or nearly all) unmistakable signs of having been wet. Nos. 31, 5, and 2 are still wet. Those marked Nos. 1 to 22 are just the same, and Nos. 2 and 18 are still slightly wet. I am of opinion that they have got wet in transit, either by rail or wagon, during the last rains, and have simply been dried, or partially so, before sending on by being left standing in a shed. I do not consider the above shipment a good line for insurance.

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

13th January, 1896.

Confirming my verbal message of this morning, I beg to inform you that two bales of wool marked "C.M.C.Ltd" were found by me this morning on board the "Pitcairn Island" in a burning condition. I send you a sample of wool out of these bales. I find there are 103 bales of this mark on board the ship, and I strongly recommend that all of these be broken out from amongst the cargo, and that the bands be broken and bales thoroughly examined previous to the ship being allowed to sail.

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

"Pitcairn Island."

18th January, 1896.

I beg to report that six bales of the 103 shipped by the Canterbury Meat Company (Limited), of which two were in a heated and burnt condition, still remain on board this vessel. The captain informs me that every endeavour has been made to find the six bales, but, unfortunately, without success. The two burnt bales have been sent back to the Canterbury Meat Company's works, and the balance that have been found are now in the New Zealand Shipping Company's shed. None of these have yet been opened for examination. In face of this I can only confirm my report of the 13th instant. I may point out that the bales in which the combustion originated were marked "CMCXX," and there were only two bales of this particular brand, both of which are now out of the ship.

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

21st January, 1896.

I have to inform you that at Mr. Barns's request I met him this morning in the New Zealand Shipping Company's wool-shed in order to examine the condition of the wool-bales *ex* "Pitcairn Island." I now enclose for your information memorandum giving marks and numbers of bales examined, and also the marks, &c., of the six bales still on board the ship. As the result of my examination, I am of opinion that as there were only two bales of the XX quality, and these are both out of the ship, and further, as I fail to find any signs of heat in the bales opened, further steps are unnecessary. I may add that it is not the intention of the New Zealand Shipping Company to reship any of this wool on board the "Pitcairn Island."

F. Graham, Esq., Chairman.

STEWART WILLIS.

SIR,—

11th January, 1897.

The s.s. "Kahu," on arrival from the Chatham Islands, had eight bales of wool on deck. One of these, marked "DR," was in a wet state, but had been received by the ship in that condition. I am strongly of opinion that no wool should be carried on deck, and I may point out that the steamers "Wakatu" and "Southern Cross" are constantly arriving at this port with large quantities of wool stowed on deck.

A. Scott, Chairman.

STEWART WILLIS.

SIR,—

12th February, 1897.

I now enclose for your information marks and numbers of wet wool *ex* s.s. "Kahu." This vessel arrived with thirty-two bales wool on deck. Nine bales went to Christchurch, and twenty-two are down here. I am waiting for the truck containing the twenty-two bales to be discharged, so that I can thoroughly examine same before reporting. The nine bales were in truck No. 1644L, and, I believe, went to Messrs. Tabart.

A. Scott, Chairman.

STEWART WILLIS.

SIR,—

August, 1897.

As reported in my log-book on the 11th and 13th August, twelve bales of wool marked "JR" and shipped on board the s.s. "Otarama" at Timaru, were found to be, on that vessel's arrival at this port, in a badly heated condition. Two bales were found in the No. 1 hold and the balance in No. 3. They were taken out of ship and placed in the New Zealand Shipping Company's shed, all bands having been burst. Twelve hours after they had been opened (consequently they must have cooled to a certain extent) I tested their condition with a thermometer, and found the following temperatures in centres of bales: No. 29, temperature 120°; 33, 100°; 30, 130°; 31, 130°; 27, 82°; 24, 120°; 32, 120°; 26, 64°; 28, 130°; 21, 54°; 23, 110°; 25, 58°.

During my visit to Timaru on the 18th and 20th August, I found that twenty-five bales of same mark, part of which had been intended for shipment on the "Otarama," had been detained by

Messrs. Guinness and Le Cren in consequence of their condition. I examined these bales, and found them in a scandalous state. Four bales, Nos. 16, 17, 15, and 22, had been spread out to dry, but were still damp, and the whole shipment in a more or less damp and *wet* condition. Those bales which had been squeezed up against others in the stacking were heated, and gave the following temperatures: No. 29, temperature 110°; 23, 94°; 26, 132°; 19, 88°; 14, 80°. None of these twenty-five bales had been dumped, or the heat would have been much more intense. I would point out that here is a clear case by which a steamer with valuable lives and cargo would have been seriously imperilled, if, in the first instance, the heated wool had not been found after shipment, as without doubt she would in a short time have been on fire in two separate holds. In the second case, through the care of Mr. Young, who has charge of Mr. Mill's store, the danger was avoided, and shipment stopped; but I cannot too strongly condemn the utter callousness shown by shippers sending their wool forward in such a disgraceful condition, and especially as regards the lot of twenty-five bales found at Timaru, some of which gave unmistakable signs of being wet even on outside of packs. The bales of wool *ex* "Otarama" were in some instances smoking when the bands were burst.

STEWART WILLIS.

A. L. Parsons, Esq., Chairman.

SIR,—

9th January, 1900.

Thirty bales of wool marked "Piraki" were received in the Shaw-Savill shed *ex* s.s. "Jane Douglas" yesterday afternoon. Sixteen of these bales are more or less wet with salt water, and should not be shipped in their present condition. I strongly recommend that the lot be sent at once to be scoured. The numbers of the bales are as follows: 6, 2, 12, 69, 3, 5, 41, 30, 71, 75, 45, 46, 7, 17, 36, and 39. I am informed by the agents of the steamer that this wool was shipped in the face of the captain protesting against it. I happen to know this bay, and some grave carelessness must have existed in the handling of the wool in order to have damaged it to this extent.

J. Grierson, Esq., Victoria Insurance Company.

STEWART WILLIS.

SIR,—

9th February, 1902.

On examining the bales of wool damaged by salt water marked "Hekerangi" *ex* s.s. "Himitangi," I found it necessary to send Nos. 210, 284, 397, 7, 447, 275, 142, 40, 31, 177, 33, 221, and 167 bales to Mr. York to be scoured, the salt water having penetrated very deeply into the bales.

J. Grierson, Esq., Victoria Insurance Company.

STEWART WILLIS.

SIR,—

4th March, 1902.

The four bales of wool mentioned by you in your letter of the 3rd instant have been inspected by me this morning. The damage has undoubtedly been caused by salt water, and the bales are very wet. Under these circumstances I have sent them to York's to be scoured. The wool referred to came down in the steamer "Wakatu." I was present when this vessel arrived and started discharging. She had no wool on deck, and only had 240 bales altogether, all of which was stowed below the hatches. The vessel could easily take a much larger quantity below hatches. I am strongly of opinion from the appearance of the bales that the damage has been done by the bales being left on wet sand, as I found some particles of sand on the covers, moreover the bales are wet on one side only. Under these circumstances I do not think the damage has occurred on board the steamer.

W. D. Meares, Esq., Christchurch.

STEWART WILLIS.

SIR,—

6th March, 1902.

The following bales of wool *ex* s.s. "Wakatu," and marked "Wharanui," have been discharged in a more or less wet condition. On being discharged from the truck into the New Zealand Shipping Company's store, I will have them carefully examined and report more fully. The numbers of the bales are as follows: 34, 22, 53, 35, 31, 56, 32, 57, 63, 5, 6. Some of these bales are very slightly touched, and will not require scouring.

A. L. Parsons, Esq., Chairman.

STEWART WILLIS.

SIR,—

13th March, 1902.

Re wool *ex* s.s. "Wakatu" marked "Wharanui": The bales are all more or less damaged by salt water, and will require to be scoured prior to shipment.

A. L. Parsons, Esq., Chairman.

STEWART WILLIS.

SIR,—

27th June, 1902.

As instructed, I went to Timaru on Wednesday the 25th, to inspect the wool marked "Acland," some of which was reported to be in a heated condition. On my arrival I found that about 160 bales that had been stowed on board the s.s. "Papanui" had been broken out from amongst her cargo and put into the shelter-deck, and that the balance of the shipment—some 108 bales—had not been taken out of trucks or shed. On inspecting the wool as far as possible under the circumstances, I informed the agents of the ship that in my estimation there was only one course, and that, although it might seem an extreme measure, it was the only safe one: that was to land all on board and burst every dump of the whole shipment. I then wired you on the matter, and on receipt of your wire communicated its contents to the agents. They had just previously received a wire, and discharge was at once commenced. Under the circumstances I thought it advisable to remain in Timaru so as to personally examine the wool; and the result fully justified

my doing so. On the morning of the 26th I again saw Mr. Cotterill, and recommended that the bales be at once opened. This was done, with the result that I found the wool in a condition marked as under: Bales Nos. 162, 213, 214, 215, 220, 250, 248, 244, 240, 239, 233, 255, 228, 252 were found to be in a very heated condition, the temperatures ranging from 100° to 150°, wool much discoloured, and undoubted evidence of it having been packed in a very wet state. The following bales were found to be in a more or less damaged condition, and, although only marked "damp," had in several instances just begun to get slightly heated. Marks as follows: 133, 134, 136, 151, 152, 166, 169, 170, 174, 176, 185, 189, 191, 192, 194, 198, 200, 226, 229, 230, 231, 232, 234, 235, 237, 238, 249, 251, 202, 210, 216, 218, 219, 26, 69, 127, 128, 132, 136, 137, 144, 148, 153, 156, 157, 158, 159, 160, 161, 177, 190, 199, 207, 217, 242. After having examined some hundred bales I suggested to Mr. Cotterill, representing the New Zealand Shipping Company, that perhaps it would be as well to have an expert, to which he agreed. On this gentleman's arrival he went thoroughly through the bales that I had previously examined, and marked as heated or damp, and in only two instances did he disagree with me. I may say that the damp in these bales was of such a nature that it was really hardly worth noticing. The bales that I had put to one side and marked "Passable" he also examined, and up to the time of my departure he had found twenty-five bales which he did not consider to be thoroughly dried. These numbers I hope to have to-day.

I would point out that the majority of the shipment appears to me to have been very inefficiently scoured and carelessly packed. Had the two hot bales not been found in the store of John Mill there is no doubt whatever that in a very short period a serious fire would have occurred on board the "Papanui." I would point out in the strongest terms, to my mind, the criminal neglect on the part of the man who scoured this wool, and would strongly recommend the underwriters in their interests to push this matter to its extreme limits.

I may mention that on the way up from Timaru I had a long conversation with the Minister of Marine, the Hon. Mr. Hall-Jones, and he expressed himself to me as being most willing and anxious to do everything in the power of the Government to stop this objectionable practice of shipping damp or dangerous wool.

STEWART WILLIS.

A. Scott, Esq., Chairman.

Put in by Captain Willis, and embodied in his evidence:—

28/11/1893.	43 bales.	Shaw-Savill shed, for shipment "Halcione."
"	18 bales.	New Zealand Shipping Company's shed.
"	5 bales.	From Cheviot.
25/1/1895.	8 bales.	Ex "Kahu," in Shaw-Savill shed.
28/11/1895.	2 bales.	Shaw-Savill shed, from railway.
29/11/1895.	36 bales.	Opinion been wet in transit.
11/1/1897.	1 bale.	Ex "Kahu," carried on deck.
12/2/1897.	32 bales.	Ex "Kahu."
9/1/1900.	16 bales.	Ex "Jane Douglas," in Shaw-Savill shed.
9/2/1902.	13 bales.	Ex "Himitanga," salt-water damage.
4/3/1902.	4 bales.	Ex "Wakatu."
6/3/1902.	11 bales.	Ex "Wakatu," put into New Zealand Shipping Company's shed.

Heated.

16/7/1894.	1 bale.	On board s.s. "Gothic."
4/3/1895.		Shaw-Savill shed.
"	3 bales.	New Zealand Shipping Company's shed.
23/4/1895.	2 bales.	New Zealand Shipping Company's shed. Temperature, 110°.
13/1/1896.	2 bales.	On board "Pitcairn Island," burning condition.
Aug., 1897.	12 bales.	On "Otarama" at Timaru. Temperatures, 120°, 100°, 130°, 130° 82°, 120°, 120°, 64°, 130°, 54°, 110°, 58°.
"	5 bales.	"Otarama." Temperatures, 110°, 94°, 132°, 88°, 80°.
27/6/1902.	14 bales.	Temperature, 100° to 150°.
	55 bales.	Slightly heated. "Ackland," for shipment on board "Papanui."

EXHIBIT No. 22.

REPORT OF SPECIAL COMMITTEE ON FIRES ON SHIPS

Lloyd's, 29th June, 1904.

THE special committee appointed on the 25th November, 1903, to consider the question of fires on ships has held four meetings, and has collected a considerable amount of valuable information.

It has received and considered various returns of fires on ships, as well as communications from Departments of H.M. Government, the London County Council, Metropolitan Fire Brigade, dock companies, the Suez Canal Company, and various firms interested in systems for the chemical extinction of fires. This information will be found very interesting by any desiring to study the subject.

As a result of a careful analysis of ports or places at which the fires have occurred, the special committee has found that, in the great number of cases, they have taken place, or required extinction, in port, the actual figures being 403 cases of fire in port out of 627 cases, including all shipboard and craft fires recorded between the 1st January, 1902, and the 30th September, 1903. The list comprises numerous cases in which the loss to underwriters by fire and by the water freely used in the efforts to extinguish it—efforts not always successful—has been very disastrous. In seventy-five cases of investigated fires on steamers, during a period of about two years, previous to September, 1903, the causes, as far as can be traced, were as follows: Accidents and carelessness, 29; defective arrangements as to boilers and bunkers, 17; defects in electrical arrangements, 4; lamps and lamp-explosions, 10; spontaneous, 8; cabin-stoves, 3; not discovered, 4.

In view of the number and importance of these fires, of the vast size and great value of the cargoes now carried, and of the increasing carrying-capacity of merchant vessels, the special committee is strongly of opinion that the means ordinarily available for the extinction of fires on board ship are inadequate and obsolete, and that the various port and dock authorities, both at terminal ports and at ports of call, should be called upon to include in their equipment chemical apparatus of the most approved type.

The conclusions arrived at by the special committee are as follows:—

That the frequent occurrence of fire on board ship, with the danger of life and the great destruction of valuable property which attend it, calls for the serious attention of the shipping community.

That the use of water and steam as fire-extinguishers, while frequently abortive, is almost necessarily attended by serious damage.

That, as vessels in port, both loading and discharging, are exposed to greater risk of fire than vessels at sea, whilst, on the other hand, when fire occurs at sea it is usual to make for port, fires on board ship fall in the majority of cases to be dealt with by port and dock authorities.

That in view of the fact that scientific appliances are now available for extinguishing fires on board ship, especially on ships in port, promptly, effectually, and, as is believed, ordinarily without damage to ship or cargo, the principal home ports of the United Kingdom ought to be equipped accordingly; and that, if the provision of such scientific appliances were adopted at the ports of the United Kingdom, such an example would probably be followed at continental and oversea ports generally.

That, so long as the Port of London, the scene of many and disastrous ship-fires, continues to rely on water as an extinguisher, it will be difficult, if not impossible, to induce other ports to initiate reform; and that, this being so, no means should be spared to induce the London and India Docks Company to place their docks, in this important respect, on the level of modern requirements.

The special committee recommends that the Committee of Lloyd's should represent to the London and India Docks Company the urgent necessity for the adoption of appliances for the chemical extinction of fires on ships in the company's docks.

The attention of the committee has been called to a method of indicating the outbreak and locality of fires in ships' holds, invented by Mr. W. Rich, of New York, which appears to them valuable.

The special committee attach hereto certain data, in appendix form, interesting in this connection generally

HERBERT DE ROUGEMONT, Chairman.

APPENDIX A.

List of cases in which, so far as the committee can ascertain, chemical-gas appliances have been used for the extinction, &c., of fires on board ship, with the result:—

1871. "Whistler," with general cargo, returned to port on fire.—After ineffectual use of water, gas resulting from mixture of marble-dust with muriatic acid was conducted into hold, and completely extinguished fire without further damage to cargo.

1893. "Elmbank," with coal and sulphur, at San Francisco, from Japan.—Ditto.

1901. "Johannisberger" s., at Antwerp, loading for Bombay, cotton and general cargo.—Serious fire completely extinguished in less than an hour by chemical-gas apparatus from shore after ineffectual use of water and steam.

1902. "Aberlour" s., Tyne to Batoum.—Fire in bunkers (about 700 tons coal) extinguished by chemical-gas apparatus on board in about an hour.

1902. "Ama Begonakoa," Glasgow to San Francisco with coal.—Fire in No. 1 hold during voyage. Chemical-gas apparatus on board operated for three days, when fire was completely extinguished and holds cooled. Part cargo was then removed from hold, and several blocks of coal found consumed. Seat of fire such that it was considered impossible for water to have reached it without filling the hold.

1903. "Umkuzi" s., at Calcutta, loading for Cape.—Fire extinguished by carbonic-acid gas from cylinders obtained at Calcutta after ineffectual use of steam and water.

Prevention of fires on ships: Cases of heating of cargoes reduced by chemical-gas systems:—

"Wilhelmine," Birkenhead to Pisagua, with coal.—Temperature of cargo reduced 83–84° to 73·4° Fahr.

"Fennia," Leith to Rio with coal.—Cargo prevented from firing on passage.

- “ West Lothian,” Cardiff to Acapulco with coal.—Temperature reduced from 77° to 68° Fahr.
 “ Andora,” Baltimore to Iquique with coal.—Temperature reduced from 95° to 84° Fahr.
 “ Aberlour ” s., Bombay to Hull, general cargo.—Cargo heated. Temperature reduced without damage to cargo.
 “ Anna,” Port Talbot to Iquique with coal.—Temperature of cargo reduced from 86° to 53° Fahr.
 “ Nesaia,” Tyne to west coast of South America, with coal—Temperature reduced 16° in four hours.
 “ Olinda,” Greenock to Cape Town with coal.—Temperature reduced from 82° to 62° Fahr.

APPENDIX B (CONFIDENTIAL).

Copy of interesting letter with regard to the extinction of fires received from the Liverpool City Police, and the substance of communications from the Suez Canal Company, &c., with special reference to the case of the “ Persia ”:—

DEAR SIR,—

Liverpool City Police, 11th December, 1903.

In answer to your letter (E.D.D. 31,001) of the 10th instant, I beg to say that all our fire-stations are equipped with Babcock chemical engines—consisting of a cylinder of water, 40 gallons, with a charge of carbonate of soda and a bottle of sulphuric acid. The generation of carbonic-acid gas upon the reversal of the bottle charges the cylinder with gas at a high pressure, which leaves the nozzle and is carried to the flames along with the water.

This method is pre-eminently successful when a fire is attacked in its incipient stages, or is in a confined space small enough to be filled with the gas—for instance, between floor and ceiling. The majority of our fires are thus dealt with, and the saving of water damage by their use has amply justified the expense to which we have gone in providing the machines.

The machines, of course, are not of much use in ship-fires, except cabin-fires and as such as resemble domestic fires, because, as a rule, a fire on board ship is well established before it is noticed, and the filling of a hold with gas is beyond the capacity of our machines.

The principle, however, is just the same as that of the method described on page 131 (135) of your Calendar for 1901 (1904), and the provision of proper plant for generating carbonic-acid gas for fire-extinction in enclosed spaces is well worth consideration. In my opinion it would be as efficient and many times more economical than extinction by water or steam.

Yours, &c.,

LEONARD DUNNING,
Head Constable.

The Secretary, Lloyd's, London, E.C.

Suez Canal and Case of “ Persia.”

On the 9th March, 1904, the Anchor Line called attention to the case of their s.s. “ Persia,” which arrived at Port Said on the 18th February from Bombay. Shortly afterwards fire was discovered on board, and it was decided to fill the compartment, which only measures 370 tons cubical capacity, with carbonic-acid gas; but all the gear was of a most primitive description and was constantly breaking down from one cause or another, so that only after a protracted delay of eleven days the fire was ultimately extinguished, and then through the use of a steam hose, on account of the flames breaking out upon the hatches being removed. The delay and consequential loss to the vessel was very considerable; and the Anchor Line suggested that it was imperative that the Suez Canal Company should provide, both at Suez and Port Said, the most improved and modern appliances for promptly dealing with such outbreaks.

This was brought to the notice of the Suez Canal Company, who, in replying on the 16th March, stated that the captain of the “ Persia ” at first declined the offers of assistance made to him by the company, but was content to take the temperature of the 'tween-decks, while the Lotz apparatus, provided by the consignee of the vessel, injected carbonic-acid gas from the 18th to the 25th February. The captain then opened the hatches, and asked for the assistance of the company's apparatus, and injected steam and water, which rapidly extinguished the fire.

The Suez Canal Company's inquiries led to the conclusion that most of the important ports employed no gas apparatus for the extinction of fires, and that, even in London, none of the gas apparatus at present tried has given satisfactory results.

This was communicated to the Anchor Line, who stated that immediately the fire was discovered the captain of the “ Persia ” called in the assistance of a surveyor of shipping, who, along with another surveyor, who was subsequently called in, was in constant attendance until the fire was extinguished. The latter expressed himself satisfied that the best had been done prior to his arrival, having regard to the character of the appliances available at Port Said, which both surveyors characterized as most primitive.

This was communicated to the Suez Canal Company, who expressed their thanks for the same.

From correspondence subsequently received from Port Said, it appears that the gentleman who superintended the operations on the “ Persia ” stated that three gas-generators and two large tanks specially fitted for the purpose were used. These worked continuously for eight days, carbonic-acid gas being generated by using bicarbonate of soda, whitening, and sulphuric acid. In addition, the contents of forty steel tubes of the compressed gas, containing about 7,000 cubic feet, were injected. Good results were achieved, the ship being undamaged and no repairs necessary. Only about 100 tons of the cargo were damaged, and that slightly. Detention was only thirteen days, in comparison with considerably longer detention in previous cases.

The same gentleman was of opinion that a Clayton fire-extinguishing apparatus is a great necessity at Port Said, and that the underwriters, in their own interests, ought to send a complete plant out, the working of which some local authority would be glad to undertake.

It is suggested that at the request of underwriters, through Lloyd's, the Canal Company might purchase one or two first-rate gas-engines at £300 or £500 each, and let them out on hire at, say, £50 the first day and £30 a day afterwards; but there must be a man in authority.

APPENDIX C (CONFIDENTIAL).

Copy of a letter from the Institute of London Underwriters, forwarding one from the Bombay Underwriters' Association, with regard to fires on board ship:—

The Secretary, Lloyd's, E.C.

The Institute of London Underwriters,

DEAR SIR,—

1 St. Michael's House, Cornhill, E.C., 13th June, 1904.

In view of the fact that a special committee had been appointed by your committee to consider the question of ship fires, I am instructed to hand you copy of a communication received from the Bombay Underwriters' Association which may be of use.

I am, &c.,

C. H. STANLEY, Secretary.

The Underwriters' Association, Bombay, 21st May, 1904.

The Secretary, The Institute of London Underwriters,
1 St. Michael's House, Cornhill, E.C.

DEAR SIR,—

Fires on Board Ship.

The attention of our committee has been drawn to the question of coping with fire on board ship, which is gradually becoming a serious urgency in the East.

In a recent number of *Fairplay*, pages 417 and 418, an article under the heading of "Marine Insurance Notes" dealt at some length with the Clayton system of extinguishing and preventing fires by means of a dry inert gas.

Our committee are most anxious to see the old system of coping with fires with steam and water supplanted by the above-mentioned or any other scientific up-to-date system; but feel they can do nothing without the fullest advice of any trials that may have been made.

They would therefore be glad to know whether your committee consider there is any hope of the question being taken up seriously at Home, and are anxious to obtain any information you can give them on the subject. The Bombay Port Trust is an extremely energetic and up-to-date body, and, should any practicable system be found, there is little doubt they would adopt it for our docks. How important it is that something should be done is proved by the disastrous fire on the "Hilarius," in dock last September, when about eighty per cent. of the damage is certified as by water, while in the last month there have been some six to ten steamers with cargoes of coal on fire in the harbour here.

We are, &c.,

A. F. FERGUSON AND Co., Secretaries.

APPENDIX D.

A new invention for the extinction of fire by means of gas has just been brought under the notice of the Secretary of Lloyd's by Captain Gambier, R.N.

It is claimed that the apparatus for using this method only costs £50 instead of about £1,000, which the Clayton apparatus costs, and that the gas required can be derived from the controlled combustion of anthracite or any coal. It is composed of azote (nitrogen), carbonic acid, and traces of water. One hundred kilogrammes of coal, it is alleged, in this apparatus give about 1,000 cubic meters of inert gas, consisting of about 750 cubic meters of nitrogen or azote (N), 50 cubic meters of humidity (H_2O), and 200 cubic meters of carbonic acid (CO_2). If this be correct, the gas employed appears to be air, the oxygen of which has been transformed into carbonic acid.

This apparatus is being worked at Bagnoli, near Naples, in connection with a sulphur-mill. It is said that, instead of anthracite, ordinary coal (Newport and Newcastle) is used, and the effect is the same as anthracite, but with a little more damp in the apparatus.

The inert gas used is claimed to be much less poisonous to human life than carbonic acid, and therefore men could go much more quickly after its use to work in the hold than when carbonic acid is used.

The advantages claimed for this system are (a) very cheap installation and very cheap working; (b) very prompt action, and the restoration of the room or hold with fresh air after the fire is extinguished; (c) no damage to goods, as the inert gas is quite harmless to goods, which is not the case with sulphur gas (SO_2); (d) no special fuel is wanted, no sulphur, and no cooling; (e) the apparatus requires very small space to be mounted; (f) the apparatus can be placed in small vessels, in stores on shore, and wherever goods are to be protected; (g) repairs and replacing parts cost but a few shillings.

Hitherto it has been proposed to extinguish fires by the use of carbonic acid, but it has been found difficult to produce a sufficient quantity of carbonic acid in a short time and at the very moment when it is required. Further, the cost of the carbonic acid and the apparatus for its production is prohibitive.

According to Walter's invention, air is passed through a stove or furnace containing anthracite, charcoal, and the like; and the products of complete combustion, forming an inert gas, are

caused to displace the air from a chamber in which fire has broken out. These products of combustion contain no oxygen, but approximately 80 per cent. of nitrogen and 20 per cent. of carbonic acid. A forced-draught apparatus, such as a fan, is connected with the stove-outlet, and valve-controlled passages lead from the forced-draught apparatus to the bottom of the various chambers to be protected, and an outlet is provided at the top of each chamber to allow the air to escape. A valve-controlled escape-pipe is provided on the pipe leading from the stove to the fan, through which the fan may discharge when reversed. The forced-draught apparatus is arranged so that when working in one direction it forces the inert gas into the chamber to displace the air and extinguish the fire, and when working in the other direction withdraws the inert gas from the chamber and restores the air.

In one form of apparatus the stove comprises a vertical column or chamber, having at the bottom an adjustable iron grate through which air can pass. The surface of the grate is inclined downwards towards the back, and the whole grate can be moved backwards or forwards. The inlet to the grate is covered by a furnace-door, having air-inlet openings which can be regulated. Anthracite, charcoal, or coal is fed into the column through a removable door at the top, and completely covers the grate. The column is connected with the bottom with a second chamber, into which the products of combustion pass, and deposit ash and other solid material. A removable airtight door is provided to allow this compartment to be cleaned. Quite a small stove of this type can produce in a short time sufficient inert gas to extinguish a fire in a very large chamber. Leading from this second compartment is a pipe, which communicates directly with a forced-draught apparatus, such as a fan, which may be driven by a pulley or other gear. The discharge-pipe from the forced-draught apparatus communicates with several branch pipes, which lead to the bottom of the various chambers which are to be protected. Each branch pipe is controlled by a valve. At the top of each room or chamber an outlet-pipe is provided for the escape of air.

This invention is said to be particularly applicable to the holds of ships, which are now usually divided into many separate compartments, any of which can be readily isolated by closing the doors.

The operation of the apparatus is described as follows: As soon as an outbreak of fire is discovered in one of the holds of a ship or one of the rooms in a building, the doors are closed, the anthracite or the like in the stove is kindled, the forced-draught apparatus put into action, the passage leading to the chamber where the fire has broken out is opened, and the inert gas resulting from the combustion in the stove is at once driven into the bottom of the chamber and displaces the air therefrom. As soon as the inert gas has entirely filled the compartment and has extinguished the fire, the forced-draught apparatus is reversed. The inert gas is withdrawn and discharged through the escape-pipe, and the air is sucked into the chamber again through the opening in the roof.

EXHIBIT No. 23.

SIR,—

Akitio, 17th November, 1903.

I beg to state that there are sixteen of us shearing on this station, and through having signed a one-sided agreement we were compelled to shear wet sheep against our will. We have no union in this Island, and we either had to shear them or go away without our money; and there has already been too much of that sort of business. We have now shorn ninety-four bales of wet wool, and it is all pressed and dumped for shipment to England. I have the numbers and brands, which I will furnish you with. This is a crying shame, to pack wool to ship which may take fire on the voyage Home, and the crew lose their lives through it. There is a heavy fine for such an act, and I believe the person that reports it gets half or the whole of the fine if it is proven, and we are positive if the wool is tested that it will be only too true. It will be shipped from here by the "Kahu" to Wellington, and transhipped in Wellington for London. Now, we are ignorant of what course to take, and it struck us that you would know what steps to take: that is why we forward you the particulars. If you will report this matter to the proper person you can have any reward that may come from it, and if you don't care to take part in it send us the name of the proper person to report it to and we will do it ourselves. Now, I trust you will give this your kind attention, and reply by return post. The brands are as under: A over "Akitio," with C, D, E, or H under "Akitio," which denotes the class of the wool in each bale.

Address— C. McDougal,
Care of J. Handyside,
Akitio, East Coast.

T. G. Young, Esq., Secretary, Seamen's Union, Wellington.

P.S.—This wool belongs to F. Armstrong, Akitio Station, East Coast, and may be shipped by Armstrong Bros.

EXHIBIT No. 24.

SIR,—

Akitio, 1st December, 1903.

In answer to your letter of the 25th instant, we are very thankful to you for the trouble you have taken *re* wet wool, but I am doubtful about their having tried the right numbers, for I think the bales that were worst were only loaded here on Saturday last, and some of the bales were

discoloured after coming out of the dump. The wet wool started from 316 to 410—ninety-four bales in all; but there were some lambs' wool amongst them, but not many, and we are quite confident that the fleece wool was too wet to ship. However, now that it has been reported to them they may watch the whole clip. It is no use going to Murray, Roberts, and Co., as they are partners with Handyside, and a river divides the two places, and we are shearing the two runs under the same agreement.

* * * * *
Thanking you again for the trouble you have taken in this affair.

We are, &c.,

W. T. Young, Esq.

CHARLES MCDUGALL and H. C. FEELY.

You may address your next letter to either of the above names, as we both live in Masterton—to the Empire Hotel, Queen Street, Masterton.

GENTLEMEN,— Wool-fires Royal Commission, Wellington, 27th October, 1906.

I have the honour by direction to transmit to you herewith copies of two letters addressed to Mr. W. T. Young, of Wellington, Secretary of the Seamen's Union, and put in evidence by that gentleman before the Commission on the 26th instant.

I am further directed to ask that you will be so good as to endeavour to trace the shipment of wool referred to in the copies of letters enclosed, and furnish the Commission with the date of shipment, name of vessel which carried the wool, and the report of the London brokers on the outturn and sale in London, together with any further particulars which you think may be of assistance to the Commission.

I have, &c.,

Messrs. Murray, Roberts, and Co., Wellington.

O. F. D. COOPER, Secretary.

DEAR SIR,—

Wellington, 21st December, 1906.

We duly received your communication dated the 27th October, and, as we have since informed you verbally, we have been looking into the charges made in the letters addressed to the Secretary, Seamen's Union, dated the 17th November and 1st December, 1903, of which you sent us copies; and, in accordance with your request, we have traced the shipments you refer to, which consisted of 138 bales wool per "Ruapehu," sold 30th January, 1904; 110 bales wool per "Ionic," sold 30th January, 1904; 88 bales wool per "Kumara," sold 28th March, 1904; 227 bales wool per "Karamea," sold 28th March, 1904.

The London reports regarding the wool state that it arrived in excellent condition, with the exception of two bales which were damaged in transit, apparently between Wellington and London, as we held clean bill of lading for the whole shipment.

From an examination of the weights we find that the wool gained in weight from the time it was shipped by the owner from the station until it reached London by an average of 1lb. 4 oz. per bale.

From this we apprehend that you will have no hesitation in coming to the conclusion that the statements made in the letters of which you sent us copies as to the wool in question having been shorn while wet are absolutely without any foundation whatever.

Yours, &c.,

MURRAY, ROBERTS, AND CO.

The Secretary, Wool-fires Royal Commission, Wellington.

EXHIBIT No. 25.

SIR,—

Wellington, New Zealand, 29th August, 1906.

With reference to my letter to you of the 17th instant, in which I expressed a hope that some information would reach us by the San Francisco mail in connection with the fires in the "Gothic," I have now the honour to hand you copy of an expert report which has been obtained in London at the instance of Messrs. S.S. and A. Company, and which I think will prove of considerable interest to the Commission.

It seems pretty plain from the evidence that the slipped or washed wool was responsible for the fires on the "Gothic," and I may add that the general manager of S.S. and A. Company, in passing on this report to me, stated emphatically that flax was entirely innocent of contributing in any way to the outbreak of the fire.

Yours, &c.,

JOHN DUNCAN,

For the Shaw, Savill, and Albion Company (Limited).

The Chairman, Wool-fires Royal Commission,
Magistrate's Court House, Wellington.

FIRES ON S.S. "GOTHIC."

10th July, 1906.

GENTLEMEN,—

On the 14th June I called at your office in consequence of a telephone message of the previous day, and received your instructions re the above matter, together with information as to the situations of the holds in which the fires broke out and the locality of the ship at the time of the outbreaks.

I understand that the "Gothic" is an iron screw steamship trading between New Zealand and United Kingdom or other European ports, and that there are divisions by which she is separated into six holds, three before and three abaft the engine and boiler rooms. Of course, the four outer holds are specially constructed and used for the carriage of meat, which is kept at a very low temperature by the usual means; and the two inner holds—namely, those respectively immediately before and immediately abaft the engines and boilers, and which are numbered respectively No. 3 and No. 4—are used for general cargo. I am informed that both these holds contained usual cargo, including meat in cans or tins, packed, as is usual, in wooden cases; tallow in casks; and wool in bales. The latter was not fleeces removed from living sheep, but what is known as "sliped" wool, and was, in fact, removed from the skins of slaughtered sheep by the application of a depilatory to the flesh side of the hide, when the wool, having been thus loosened, can be scraped or sliped off the skin. I am informed that after this treatment the wool is slightly washed, dried, and baled for export.

The process of removal of the wool, hair, or other appendages of the skin by means of a depilatory is a well-known, and indeed old, process to which all skins which are to be used as leather in its ordinary forms are submitted, and it fundamentally consists in submitting the skin to a mild alkali. In ordinary tanning this is lime, the skins being soaked in pits in water to which lime is added. The action of the lime causes the fibres of the skin to become relaxed or flaccid, so that a drawing or squeezing process, such as dragging with considerable pressure a blunt knife or straight edge along the skin, will press and pull out the hair or wool.

Of recent years other depilatory agents have been introduced, especially sulphide of sodium, which is, I am informed, that actually used in obtaining the wool included in the cargo of the "Gothic." There is, however, no difference whatever in the action of these bodies; the sodium-sulphide acts as a mild alkali just as the solution of lime does, but owing to its greater solubility it can be applied as a stronger solution than is possible with the lime, and thus acts more quickly, the removal of the hair being effected in a few hours instead of some weeks; moreover, no sodium-compounds become permanently attached to the skin or wool, so that acid treatments are not essential, since water alone will remove the alkali.

The wool so removed was, as I have been informed, packed by strong compression into bales, after sufficient treatment with water to remove accidental fouling during removal and subsequent drying. It was not scoured or washed with an alkali, but contained the yolk, grease, or suint, or sweat, usual in sheep's fleeces. This amounts to a very large proportion of the total weight of the fleece, and may in some cases amount to a fifth or even fourth of the total weight thereof. It is a secretion from the skin of the animal, and is in fact the dry contents of the sweat, and is of very complex nature, containing as it does all the substances found in the urine of herbivorous animals, in addition to certain fats or oils which may amount to 8 per cent. of the weight of the fleece. Other extraneous matters are or may be present in small proportions, such as sand or earth, seeds, fragments of plants, and some of the constituents of washes or dressings applied to the sheep while living to destroy parasites, such as arsenic and sulphur.

I am informed that the ship, having been loaded, started on her voyage, and all proceeded well till she was at or near Teneriffe, when smoke began to issue from hold No. 3. This hold was accordingly entered, when, on rummaging, the cause of the smoke was found to be certain bales of the sliped wool, which were heated and smoking. These were accordingly removed and thrown overboard, when the hold, after examination, was closed, and nothing further happened during the voyage.

This proceeded until the ship was off the Lizard, when smoke began to issue from No. 4 hold. On opening this, white vapours or steam issued, immediately followed by such dense volumes of black smoke that it was impossible to enter the hold or to check the fire by ordinary means, and it was decided to drown the hold. When this was partly effected, however, the ship took so serious a list that it was resolved to send the passengers ashore at Plymouth, and the ship was then beached and the hold filled up. The water being subsequently pumped out, the voyage was continued to London, where the hold was entered and cleared.

On the 3rd July your messenger delivered to me a sack containing the following samples: viz.—

- A. A parcel marked "Sample of bale in No. 4 hold, 'Gothic,' mark 'C.M. Co. Ld.' No. 149."
- B. A parcel marked "Sample of wool (sliped) from bale which was found fired at the heart of the bale. Mark 'C.M. Co. Ld.' No. 750. Ex No. 4 hold of the s.s. 'Gothic.'"
- C. A parcel marked "Sample of sliped wool marked as under, which was found fired at the heart of the bale. 'C.M. Co. Ld.' No. 149. Ex No. 4 hold, 'Gothic.'"
- D. A small linen sample-bag marked "Sample of wool from bale marked as under, which had fired from the heart of said bale. Mark C.F.M. Bramdean. Ex No. 4 hold, s.s. 'Gothic.'"
washed
- E. A large parcel, weighing about 20 lb., sewn up in a sack. Marked in pencil on a card tally-label "S.S. 'Gothic,' No. of bale, 149" (in pencil "49" only; the "1" is in ink). Then, in ink, in another hand, "C.M.C. Ld."

The letters A–E have been added by me for convenience.

A. The contents of A is a mass of sheep's wool of two very distinct colours, about half being dark brown, the other half pale brown; the whole heavily saturated with grease, and having a strong smell of scorched wool and tallow. The impregnation of tallow was very great, and made the mass into a species of fibrous block.

B. The contents of B closely resemble A in odour and saturation with tallow, but it contained two large lumps of carbonised matter, quite black, and somewhat pitch-like or fused; the contents were also somewhat wet, and the paper much stained.

C. The contents of C consist of a brown mass similar to that in A and B, and a paler part much yellower than the pale parts of A and B. It has the same smell, is similarly saturated with tallow, or more so, as the paper is grease-stained.

D. The contents of D differ entirely: it contains a quantity of locks of wool, which can be separated quite easily, and some of which are quite or nearly undamaged. Certainly parts are quite uninjured by heat. It also contains locks in all conditions, from some scorched to a very deep brown to other parts only slightly yellowed. There are also a few fragments of coke or carbon, and some smoked or dirty but not scorched wool.

E. The contents of E is a large mass rounded on the outside with three faces meeting. It is apparently the angle of a bale. Towards the interior it is quite black, fused, and carbonised; at the outer sides it is deep brown, fading off to the corner where the faces meet, where it is only moderately discoloured. Where the mass is not so injured that the fibre is destroyed, it is very tallow-soaked, though less so than is the case with A.

The samples I have marked A, B, C, and E are so injured by fire and heat and so saturated with grease, apparently from some other part of the cargo, that no information as to the original condition of the bales can be obtained from them; where the wool is not actually melted or carbonised it is found on microscopic examination to be swollen, roasted, or more or less disintegrated, either by actual heat or by infiltration with heated tallow. Moreover, they are all contaminated by products of combustion which have distilled into and condensed in them after coming from hotter parts. The lighter-coloured parts of B, for instance, showed the fibre swollen to four times its normal diameter, the normal scales destroyed, the cylindrical reflection gone, the surface of the fibre pitted, and the elasticity and strength quite gone. All these effects I produced by gently roasting normal wool-fibre until it became a pale brown.

It became, therefore, necessary to carry on investigations on those parts of the small bag D which were nearly or quite uninjured. By careful examination of these it was found that small parts of the skin are removed by the slipping process in some cases, and may be found adhering to the skin-ends of the locks of wool. As it is well known that certain fungi when growing rapidly generate heat, as is known to be the case with the heating of hay-stacks, hot-beds, dung-heaps, &c., I infected selected portions of the uninjured wool, including some of these skin-fragments, with the spores of a fungus I had found growing on cold-stored butter, and with spores of common blue mould derived from mouldy-bread cultivations. On subjecting these to warmth and moisture, however, the wool proved to be sterile, and I failed in every attempt to induce the growth of fungi on it. Wool is not very susceptible of fungoid growths, but this is not the case with the skin, and the growth might have been expected thereon; but it did not take place until the sixth and seventh days. Heating from this cause—*i.e.*, fungoid growths—cannot be wholly dismissed from a list of possible causes of spontaneous combustion.

There now remains the question of external additions, such as the arsenic or sulphur used as dressings on the living sheep. I have detected both arsenic and sulphides as present in the wool, but I cannot find any traces of free sulphur, and with regard to these it may be pointed out that arsenic is already an oxidized or burned substance; it cannot by any known method be further oxidized by air without the intervention of powerful chemical agents. Moreover, it is present in extremely minute proportions—quantities so small that even if it had been combustible no perceptible heating effect could arise from it. As to sulphur, none is detectable, and, moreover, this element is not susceptible to rapid aerial oxidation except at very high temperatures. Sulphur has never been known to inflame spontaneously, or by aerial oxidation to attain a seriously high temperature. Sulphides of the alkalis or alkaline earths, such as sulphide of calcium or sulphide of sodium, may in large masses under exceptional conditions heat and give off deleterious vapours, causing injury to goods in their neighbourhood, but actual heating to a temperature approaching that at which combustion ensues is very highly improbable. Here, again, the question of quantity comes in. The clean wool of D shows the presence of sulphides when delicate chemical tests are applied, but the amount is too minute to be of any importance and may arise from the sulphides which animal matters, alive or dead, readily evolve.

There remains the aerial oxidation of grease on the wool-fibre. I find that carefully selected and uninjured locks of wool from D contain 7 per cent. of a soft grease or semi-solid fat, and the existence of this is, in my opinion, the cause of the firing of the bales. This oil is spread out in a very thin film on the fibres of the wool, and is thus very favourably placed for undergoing oxidation. This greasy fibre is subjected to very strong pressure in the process of baling, and the friction taking place during this process must heat the central parts of the bale to a considerable extent, and the well-known non-conducting character of wool tends to preserve this high temperature for some time. Some amount of moisture is also always present, and, of course, air is there, as it is not possible to prevent its penetration or diffusion into the interior of a bale, however closely compressed. Here, then, exist all the requisites for rapid oxidation of oils or fats—*viz.*, warmth, air, moisture—and exposure to these in very thin films or layers. Also, the pieces of skin afford pabulum for fungoid growths which generate heat in their life-processes, and thereby aid in increasing the rapidity of oxidation—*i.e.*, in the rapidity of generation of heat. I need not point out that the spores of the fungoid growths are certain to either exist on the wool of the sheep from its contact with vegetation during its life, or to be acquired either during life or after death from dust or as air-transported spores.

From a study of all the phenomena observed and experiments performed, I am of opinion—

1. That the fires on board of the s.s. "Gothic" arose from spontaneous combustion, mainly due to the aerial oxidation of damp greasy wool packed in bales in the holds of the said vessel.

2. That the said heating at a temperature at which combustion was possible was likely to be considerably hastened and aided by the growth of plants belonging to the order of moulds, mildews, or other fungus-like forms.

3. That these fungi are much more readily generated on fragments of the tissue of the skin than on the actual fibre of the wool itself. Such fragments may be found in "sliped" wool, and I have grown fungi on them, but not on the wool-fibre.

4. That the presence of these shreds of skin in "sliped" wool renders it a more dangerous cargo than wool cut from the skin by shears or other mechanical means not involving the introduction along with the wool of numerous fragments of skin.

5. That, although I look on the growth of fungi as a probable contributory cause, I do not say that without them the fires would not have occurred, but I consider the aerial oxidation of greasy wool arising from such wool being damp or insufficiently dried to be the efficient cause of the firing of the bales in question.

R. J. FRISWELL.

Messrs. Shaw, Savill, and Albion Company (Limited), 34 Leadenhall Street, E.C.

EXHIBIT No. 26.

WOOL-FIRES ROYAL COMMISSION.

SIR,—

Dunedin, 22nd September, 1906.

Evidence having been given before the Commission that in some instances a composition of lime and sulphur is used for the purpose of dipping sheep, I have the honour, by direction of the Commission, to ask if you will be so good as to inform them if it is still your practice to use such ingredients in the dipping of your sheep. I would be glad, also, if you will inform the Commission if it is within your knowledge that the ingredients mentioned are used by any other runholders for the purpose named.

I have, &c.,

Duncan Rutherford, Esq., Leslie Hills, Culverden.

O. F. D. COOPER, Secretary.

SIR,—

Leslie Hills, Culverden, 25th September, 1906.

I used the lime-and-sulphur ingredients for dipping the Leslie Hills flock up till three years ago, with the exception of two or three years. I used Little's for thirty years, and if it was not for the trouble of mixing the ingredients I should certainly continue using the lime-and-sulphur dip. My wool never looked better than when I used it, and the sulphur gave the wool a black tip, which protected the fleece from the weather. I never had a complaint from my London brokers nor had to make a claim for fire-damage during the twenty-five years I used the lime and sulphur. At present I do not know of any runholder who uses the lime-and-sulphur dip.

Yours, &c.,

O. F. D. Cooper, Esq.

DUNCAN RUTHERFORD.

EXHIBIT No. 27.

SIR,—

Marine Department, 7 Whitehall Gardens, London, S.W., 9th August, 1906.

With reference to previous correspondence relating to fires in wool cargoes shipped in New Zealand, I am directed by the Board of Trade to transmit to you, to be laid before the Earl of Elgin, the enclosed copy of a further letter received on the subject from Lloyd's.

I have, &c.,

The Under-Secretary of State, Colonial Office.

T. H. W. PELHAM.

SIR,—

Lloyd's, 31st July, 1906.

I have the honour, by direction of the Committee of Lloyd's, to beg that you will be so good as to request the President of the Board of Trade to refer to my letter of the 29th June with regard to the fires which are reported to have recently occurred on vessels with wool cargoes from ports in New Zealand.

My committee are now informed that the colonial Government is about to adopt measures to insure that wool stowed on board vessels is to be inspected up-country before it arrives at the port of shipment. As my committee consider that this will be a great advantage to the commercial community in general should it be carried out, they trust that the President of the Board of Trade may be good enough to move the Colonial Office to give such support as the Secretary of State for the Colonies properly can to assist the colonial authorities in carrying out the suggested inspection.

I am to add that the number of fires which have recently occurred on vessels loaded with wool coming from New Zealand is very likely to cause a considerable rise in premiums on these cargoes. This would be a great disadvantage to the British manufacturer, and therefore it appears to my committee that the Board of Trade might very advantageously assist, as far as lies in their power, the colonial authorities in establishing an efficient system of inspection.

I am, &c.,

The Secretary, Board of Trade, S.W.

H. M. HOZIER, Secretary.

SIR,—

Downing Street, 17th August, 1906.

I am directed by the Earl of Elgin to acknowledge the receipt of your letter (M. 16055) of the 9th instant regarding fires in wool cargoes shipped in New Zealand, and to state that, while His Lordship would, of course, be glad to give any assistance in his power, the matter appears to be one entirely for the colonial Government.

2. A copy of this correspondence will be forwarded to the Governor to be laid before his Minister.

I am, &c.,

H. BERTRAM COX.

The Assistant-Secretary, Marine Department, Board of Trade.

EXHIBIT No. 28.

SIR,—

Marine Department, 7 Whitehall Gardens, London, S.W., 6th July, 1906.

I am directed by the Board of Trade to transmit to you, to be laid before the Earl of Elgin, the enclosed copy of a letter received from Lloyd's on the subject of the recent fires in wool cargoes shipped in New Zealand, and to request that you will be so good as to move His Lordship to cause the same to be brought to the notice of the New Zealand Government.

I have, &c.,

WALTER H. HOWELL.

The Under-Secretary of State, Colonial Office.

SIR,—

Lloyd's, 29th June, 1906.

I have the honour, by direction of the Committee of Lloyd's, to beg that you will be so good as to point out to the Board of Trade that a considerable number of fires have recently occurred on vessels with wool cargoes from ports in New Zealand.

The vessels that have sailed from Wellington, in their exact order, are as follows: "Pitcairn Island," "Sardhana," "Perthshire" s., "Waimate" s., "Gothic" s., "Star of New Zealand" s., "Rimutaka" s., "Delphic" s.

Of these vessels, the "Pitcairn Island" was totally lost by fire, and the "Perthshire" s., "Waimate" s., "Gothic" s., and "Rimutaka" s. have all had serious fires, and all occasioned apparently by spontaneous combustion of the wool. The "Sardhana," "Star of New Zealand" s., and "Delphic" s. have not yet arrived.

It has been thought that this may be due to some new preparation which has been adopted for dressing the wool before shipment, and the Committee of Lloyd's would be grateful if you would be so good as to move the Board of Trade to allow some representation to be made to the Colonial Office, in order that some measures may be taken for the inspection of the wool when it is being dressed and pressed before shipment, with a view to the prevention of fires which may cause not only considerable damage to the cargo and to the vessel, but may also tend to loss of life.

I am, &c.,

H. M. HOZIER, Secretary.

The Secretary, Board of Trade, S.W.

EXHIBIT No. 29.

SIR,—

Department of Navigation, Sydney, N.S.W., 1st September, 1906.

I have the honour, by direction of the Superintendent, to acknowledge the receipt of your telegram of the 21st ultimo, and of letter of same date confirming it, and asking me to forward by first mail particulars of cases of heating in wool or fires in wool cargoes at this port.

In reply, I beg to state I have been supplied by the secretary to the Sydney Marine Underwriters' and Salvage Association with certain particulars, which I now forward for the information of the Commission, and I trust they will be of service. I also enclose circular letter forwarded to me by Messrs. McArthur and Co. (Limited), which may be of interest to you in connection with the subject of your inquiry.

I have, &c.,

NORMAN C. LOCKHART, Secretary.

The Secretary, Wool-fires Royal Commission,
Magistrate's Court House, Wellington, N.Z.

SIR,— Insurance Department, 13 and 15 Macquarie Place, Sydney, 14th August, 1906.

With reference to our previous letters to you dealing with the question of fire protection on board ships, and more especially with reference to the system of the Clayton Fire Extinguishing and Ventilating Company, we are in receipt of further interesting details from the London office, which we trust, on your carefully considering the same, will result in your installing these machines on board your vessels.

We informed you of the result of the fire on board the "Turakina" s.s., which was successfully extinguished with the Clayton gas, and the recent fires on board the "Gothic" s.s. and "Waimate" s.s. will doubtless still be in your recollection. That of the "Gothic" s.s. has been a most serious affair, the total damage to ship and cargo being estimated at about £200,000. The fire on board the "Waimate" s.s. was discovered some ten days before her arrival at her home port. Having on board a Clayton machine, this was got to work at once, and the fire kept under. On arrival at Plymouth the temperature of the holds was normal, and she was able to proceed to London after taking a few hundredweight of sulphur on board. On examination there appear to have been two fires on the "Waimate" s.s., one in the wool in No. 4 'tween-decks, and one at the bottom of No. 4 lower hold, also in wool. Both these fires were rapidly controlled with the Clayton apparatus, and held in check without difficulty; the vessel was never in danger, and the total damage to the wool and the hull is very slight.

The third case of fire reported amongst New Zealand steamers is that of the "Perthshire" s.s., and not having a Clayton machine on board, water had to be used. This fire was subdued in about nine hours, but in consequence of the use of water no doubt there is a considerable amount of damage.

Quite recently we had brought before our notice a circular issued by the British Ship-fire Protection Syndicate containing certain observations on the Clayton apparatus, and more especially dealing with the case of the "John Ena." In this case, as pointed out by our head office, the Clayton machine was badly handled, and the extinguishing gas could not be introduced into the hold; this was unfortunate for all concerned, but neither the machine nor the system were at fault. Navigators occasionally make mistakes in their observations or calculations, but no one dreams of condemning the sextant, the chronometer, or the tables in consequence. A steamer sometimes breaks down, but no one suggests that steam should be discarded on that account. The fact that in the cases of the sailing-ships "Wilhelmina," "Andora," "Kineo," "Acme," and others carrying dangerous coal cargoes, the heating of cargoes was promptly arrested; the case of the "Ama Begonokoa," on which a fire broke out in a cargo of Glasgow coal, and was effectually extinguished, the vessel arriving safely at San Francisco after a passage of 154 days; of bunker-fires extinguished on board steamers "Aberloura," "Navua," "Alcana," and others; the fire in the fore-castle of the steamer "Bordera," promptly suppressed; and the recent fire in the cargo of flax, wool, &c., in the steamer "Turakina"—all these cases prove the value of the Clayton patent, and that the "John Ena" mistake was one of the exceptions which prove the rule; and the number of other fires which have been promptly suppressed show that when the machines are properly handled good results are certain.

The alleged scientific explanations (?) of the failure of the Clayton machine to prevent or extinguish fire indicate an ignorance on the part of the author, or presume an ignorance on the part of his readers, that a mere tiro in physics or chemistry would be ashamed to admit. The recommendation to shipowners to carry a large supply of expensive gas in a highly compressed form is, we think, hardly likely to be favourably considered, in view of the fact that this gas is classed as dangerous, and has to pay a special rate whenever accepted by public carriers.

The case of the German sailing-ship "Nesia," on fire on the west coast of South America, and of the German sailing-ship "Hans," on which an explosion occurred with disastrous results some days after she left a Welsh port, may be cited against the claims of the infallibility of the fire-extinguishing method that is so modestly put forward in the circular in question.

From a reprint of the *Hansa* German shipping journal, dated the 2nd June, 1906, we learn that by the use of the generator-gas apparatus in the case of the steamer "Hertzog" two men lost their lives. This paper states that it is the second time that human life has been sacrificed through the use of this non-odorous gas. When this generator-gas is used it is necessary that the vessel be cleared of its entire crew, and to extinguish all fires. Should any one remain behind he is certain to be irrevocably lost, as it is impossible to discern the danger. With the use, however, of Clayton gas the smell is so strong that every one is warned in good time of his danger; and the fact that there are now over 250 apparatus scattered throughout the world shows that the objectors to the Clayton system are now practically convinced that this system is the best.

In conclusion, we are informed that the North German Lloyd have discarded the Gronwald system in favour of the Clayton system. This was decided after very exhaustive tests, showing that the Clayton gas guarantees the most perfect disinfecting which can be effected during the voyage of a ship while crew and passengers remain on deck, and subsequently no time is lost in quarantine. Special reports have been made by Professor Hapke, on behalf of the German Maritime Association, on the respective merits of the Clayton and Gronwald systems. His conclusion is that he considers the Clayton system as the most perfect and up to date, for the reason that it is the most effectual in overcoming one of the greatest dangers to which a ship is exposed while at sea—danger from fire.

We trust that you will give this matter your very careful consideration, and that we may be favoured with instructions to procure machines for your vessels.

We are, &c.,

W. AND A. McARTHUR (LIMITED),

Per A. W. H. VADFIELD,

Manager, Insurance Department.

Captain Edie, Superintendent, Department of Navigation, Sydney.

FIRES IN WOOL CARGOES.

October and November, 1894.

“*Woolloomooloo*” s.s.—Some bales of wool shipped at Sydney were found to be heated, and were landed at Melbourne and examined. The Analyst reported as follows:—

“I think it is probable that the spontaneous combustion has been caused by some of the wool being in a damp condition, and thus becoming heated, being assisted by the fatty matter present. From the inspection and examinations made, I am of the opinion that it would be advisable to have the bales of wool sorted, and rescouré.”

“*Port Victor*” s.s. and “*Hubbuck*” s.s.—Some bales of wool shipped at Sydney were found to be heated, and were landed at Melbourne, surveyed, and recommended to be reconditioned.

November, 1894.

A number of bales of wool awaiting shipment were examined in the Central Wharf Stores, Sydney, by Mr. A. Hawkesworth, Lecturer in charge of the Sheep and Wool Department, Technical College, Sydney, who reported that some were found to be in a heated condition and unsafe for shipment.

Mr. Hawkesworth also visited the works where these wools were scouré, and he concluded his report as follows:—

“In conclusion, I would say without reserve that the whole of the fault in the objectionable bales of wool is certainly due to the manner in which the wool is rushed through the washing-machines and the drying. It simply wants more time in all stages of handling, and then all trouble will end.”

Other vessels with fires on board, homeward bound, were the “*Hollinwood*” (1898), “*Strathgryfe*,” and “*Waterloo*.”

FIRES ON SHIPS.

[Extracts from *Insurance and Banking Record*, 20th July, 1906.]

FIRES, fires, fires—always fires! And by no means confined to the Australasian trade. Still, the Australasian trade just now is more notorious in this respect than any other. The “*Pitcairn Island*,” with its £100,000 total, is hardly out of the way when it is followed successively by news of outbreaks on the “*Waimate*” s., the “*Perthshire*” s., and the “*Gothic*” s. Fires will happen, no less at sea than on the land, but what do not “happen” are scientific methods of extinction—these must be provided. So far the shipowners who are content to remain with no such provision are a pretty solid body. Their own and other people’s experiences, however, must be—and in fact are—beginning to send a little trickle of common-sense into their reluctant ranks. The case of the “*Turakina*” s. was a splendid and convincing object-lesson on the side of sense; the owners of that vessel must have congratulated themselves over and over again on their decision to equip their ships with the Clayton gas extinguisher. In the case of the “*Waimate*” s. they would seem to have fresh cause for congratulation, for the cable announces that the fire on board was subdued, once more, by the Clayton apparatus. Turn from her to the “*Gothic*” s. After vain attempts by steam and water-hose, on the seas and in Plymouth Sound, to subdue the fire, the sea-cocks had to be opened, and two holds, each as big as a Baptist chapel, and crammed full of costly produce, flooded with sea-water—once more the miserable story.

The fires that have occurred in wool cargoes from Wellington have naturally occasioned much uneasiness in underwriting circles. The information cabled from London is, however, of a fragmentary character, and the mail will, no doubt, bring fuller details. On the 24th June another casualty occurred, a fire breaking out in the wool cargo of the “*Rimutaka*” in dock in London. In this case the damage would have been slight, the Clayton fire-extinguisher being on board, but the police took the matter into their own hands, and sent for the fire brigade. The fire brigade was equal to the occasion by deluging the wool with water, causing more damage than was necessary. Underwriters have asked the Board of Trade to suggest to Lord Elgin, Minister for the Colonies, that an inquiry should be held in New Zealand as to the cause of the fires. Underwriters in London, impressed by the efficiency of the Clayton extinguisher, are now, it is stated, quoting preferential rates for ships fitted with it. The Melbourne Branch of the Australian Workers’ Union have taken the matter up, and on the 3rd instant adopted the following resolution: “That this meeting of members of the Australian Workers’ Union affirms the desirability of a bonus being offered for an invention for the testing of wet sheep as a means of preventing trouble in the shearing-sheds and fires on board ship whilst the wool is being exported.”

Reference is made to the fires in “*Marine Insurance Jottings from London*,” which appears on another page.

The marine-insurance correspondent of the *Times* reported the fires day by day as follows:—

8th June.—There could hardly be a more strongly marked contrast than in the results of the fires in the *White Star* steamer “*Gothic*” and in the *New Zealand Steamship Company’s* “*Waimate*.” Both vessels were from New Zealand for home, and their cargoes were of a similar nature. In both cases fires broke out in the wool cargoes. But here the similarity ends. The “*Gothic*,” after burning for several days, has had to be beached at Plymouth with enormous loss to her valuable cargo, a loss which may quite possibly exceed £200,000. The “*Waimate*,” in this respect unlike the “*Gothic*,” was equipped with the Clayton sulphur-dioxide fire-extinguishing machine, and has by its use been able to keep the fire under for about ten days. When she arrived at Plymouth the temperature in the holds was normal, and after taking on board 6 cwt. of sulphur for the machine

she was able to leave this afternoon for London. It is hardly possible to imagine a better lesson in the advantages arising out of the equipment and use of a scientific fire-extinguishing system: the saving in money alone may in this case be reckoned in hundreds of thousands of pounds.

9th June.—After the fire in the "Gothic" had been extinguished and the water pumped out she was refloated, and left Plymouth this morning for London. While the cargo is not necessarily a total loss, yet its great value (upwards of £200,000), and the perishable nature of a large part of it, will make the casualty one of the heaviest of its kind. The "Waimate" has safely reached Tilbury with the fire apparently extinguished. But the cooling and circulating system of the Clayton apparatus will be kept going until Monday, when the discharge of cargo will begin.

11th June.—An examination of the cargo of the "Gothic" shows that the damage by fire and water was principally confined to hold No. 3, containing wool, flax, tallow, skins, and 2,000 cases of potatoes. This hold was completely flooded. The loss in the frozen meat in No. 2 hold is not likely to be as heavy as was feared, and so far this meat is being landed in good order. There is little doubt that this serious fire was caused by the spontaneous heating of the wool, as some bales were found which were burned to a cinder inside, while the outside retained its normal condition. Spontaneous heating by chemical decomposition becomes more and more common as cargoes are packed more tightly.

12th June.—The steamers "Waimate" and "Gothic" are now both in the Royal Albert Dock, and the vessels have been visited by many people interested in the wool trade. Astonishment is expressed at the small damage done to the "Waimate" and her cargo in comparison with the destruction shown in the case of the "Gothic." There appears to have been two fires in the "Waimate"—one in the wool in No. 4 'tween-decks, and one at the bottom of No. 4 lower hold, also in wool. Both fires were rapidly controlled by the Clayton apparatus, and held in check without difficulty. I understand that when the "Waimate" last left London the pipes for the apparatus had not been completely installed, owing to lack of time, and temporary arrangements were made, which in the event proved to be quite efficient. The vessel was never in danger, and the total damage to the wool and the hull is very slight. A survey of the "Perthshire"—the third case of fire in New Zealand steamers—shows that the fire was confined to No. 4 hold and 'tween-decks; it was subdued in about nine hours by pumping in water. This vessel is also in the Royal Albert Dock.

EXHIBIT No. 30.

Westminster Chambers, 13 Victoria Street, London, S.W., 27th July, 1906.

SIR,—

Fire on s.s. "Gothic."

I beg to forward herewith a short report by the Produce Commissioner, Mr. H. C. Cameron, giving extract from a report made by Mr. R. J. Friswell, F.I.C., to the Shaw, Savill, and Albion Company (Limited), on the origin of the fire that occurred on the s.s. "Gothic" amongst the wool cargo while on the last voyage from New Zealand.

The Hon. the Premier, Wellington, New Zealand.

I have, &c.,
W. P. REEVES.

Westminster Chambers, 13 Victoria Street,
London, S.W., 26th July, 1906.

SIR,—

With reference to my report of the 26th June concerning the series of fires on board steamers carrying cargo from New Zealand, as I informed you, samples of wool taken from ignited bales at the seat of the fire on the "Gothic" were submitted for analysis by the Shaw, Savill, and Albion Company (Limited). Mr. Friswell was the specialist selected, and the following is an extract from the report made by him on the subject:—

Extract from a Report made by Mr. R. J. Friswell, F.I.C., to Shaw, Savill, and Albion Company, dated London, 10th July, 1906.

"From a study of all the phenomena observed and experiments performed, I am of opinion—
"1. That the fires on board of the s.s. 'Gothic' arose from spontaneous combustion mainly due to the aerial oxidation of damp greasy wool packed in bales in the holds of the said vessel.

"2. That the said heating to a temperature at which combustion was possible was likely to be considerably hastened and aided by the growth of plants belonging to the order of moulds, mildews, or other fungus-like forms.

"3. That these fungi are much more readily generated on fragments of the tissue of the skin than on the actual fibre of the wool itself. Such fragments may be found in 'sliped' wool, and I have grown fungi on them, but not on the wool-fibre.

"4. That the presence of these shreds of skin in 'sliped' wool renders it a more dangerous cargo than wool cut from the skin by shears or other mechanical means not involving the introduction along with the wool of numerous fragments of skin.

“5. That, although I look on the growth of fungi as a probable contributory cause, I do not say that without them the fires would not have occurred, but I consider the aerial oxidation of greasy wool arising from such wool being damp or insufficiently dried to be the efficient cause of the firing of the bales in question.”

The fires arose in each instance amongst the “sliped” wool. It is held that in the process of “sliping” small tissues of skin are removed and adhere to the wool. These particles are said to conduce materially to heating, consequently the risk arising from imperfectly dried “sliped” wool is greater than in the case of fleece wool.

The shipping companies maintain that this season in New Zealand there had been unusual haste displayed in preparing wool for shipment, and that, owing to the high price ruling on the London market, every pound available was rushed forward. They say that insufficient time had been allowed for getting the wool thoroughly dried.

I have, &c.,

H. C. CAMERON.

The High Commissioner of New Zealand, London, S.W.

EXHIBIT No. 31.

SIR,—

Wool Exchange, Macquarie Place, 22nd August, 1906.

In reply to your cable of the 21st instant, I have the honour to state that full inquiries have been made as to cases of heating in wool and of fires in wool cargoes shipped from this port. Wool-selling brokers, shipping-offices, and insurance authorities have been interviewed on the subject, and the only case of fire that can be traced so far is one affecting a few bales of wool, an outbreak among which took place on an outward-bound vessel when between Sydney and Melbourne some twelve or fourteen years ago. The wool had been scoured in Sydney and shipped before it was properly dry, and it was considered by those competent to express an opinion that spontaneous combustion was caused thereby. The wool on arrival at Melbourne was found to be smouldering and considerably charred. This case occurred about the time that drying-machines were first introduced.

I am making further inquiries into the matter, and if any other case than the one above mentioned is brought to light I will have much pleasure in advising you of same at the earliest opportunity.

I have, &c.,

JOHN LEACH,

Secretary, Sydney Wool-selling Brokers.

A. McArthur, Esq., Chairman,

Royal Commission on Fires on Wool-ships, Wellington, N.Z.

SIR,—

Wool Exchange, Macquarie Place, 3rd September, 1906.

Referring to my letter of the 22nd ultimo, I have now much pleasure in appending some additional information as to outbreaks of fires in wool cargoes from this port.

In regard to the case mentioned in that letter, I have since ascertained that the outbreak occurred on the steamer “Woolloomooloo,” which left Sydney in October, 1894. The Analyst’s report was as follows:—

“I think it is probable that the spontaneous combustion has been caused by some of the wool being in a damp condition and thus becoming heated, being assisted by the fatty matter present. From the inspections and examinations made, I am of opinion that it would be advisable to have the bales of wool sorted and rescoured.”

About the same date minor outbreaks were discovered on the s.s. “Port Victor” and s.s. “Hubbuck.” In both cases a few bales shipped at Sydney were found to be heated, and were landed at Melbourne, surveyed, and recommended to be reconditioned.

In November, 1894, a number of bales of wool awaiting shipment in the Central Wool Stores, Sydney, were examined by Mr. A. Hawkesworth, the lecturer in charge of the Sheep and Wool Department of the Technical College, Sydney, who reported that some were in a heated condition and unsafe for shipment. Mr. Hawkesworth visited the works where these wools were scoured, and reported as follows:—

“I would say without reserve that the whole of the fault in the objectionable bales of wool is certainly due to the manner in which wool is rushed through the washing-machines and the drying. It simply wants more time in all stages of handling, and then all trouble will end.”

The Sydney Underwriters’ Association have on record three other cases—viz., on board the “Hollinwood” in 1898, and on the “Strathgryfe” and the “Waterloo”—but no details concerning them can be found.

I have, &c.,

JOHN LEACH,

Secretary, Sydney Wool-selling Brokers.

A. McArthur, Esq., Chairman,

Royal Commission on Fires in Wool-ships, Wellington, N.Z.

EXHIBIT No. 32.

SCHEDULE OF PERIODS OF DIPPING throughout New Zealand, with DIRS and CHEMICALS used.

Inspector at	Period of Dipping.	Latest Date of Dipping.	Particulars of Dipping-materials.	Chemicals used in fellmongering
Ohaeawai	February to April..	Letter end of April	Usual proprietary dips	Nil.
Whangarei	1st January to 31st March..	May	Principally Cooper's	Sulphur and lime.
Auckland	January to March..	30th April	Usual proprietary dips. No home-made dips	Sulphide of sodium, alum, sulphuric acid, and arsenic.
Thames	January to April ..	28th April	Usual proprietary dips	Nil.
Hamilton	1st January to 31st March ..	..	Cooper's, Little's, Lawes's, Quibell's. No home-made dips	"
Tauranga	February to April..	20th May	Usual proprietary dips. No home-made article	"
Kihikihī	1st January to 31st March..	30th April	"	"
Te Puia, Waipiro Bay	February to March ..	25th April	Murton's and Cooper's ..	"
Gisborne	"	Few in April ..	Little's fluid and powder, Murton's, Lawes's, Quibell's, Highland, McDougall's fluid and paste. Home-made: Arsenic and soda	Sulphide of sodium and lime.
Wairoa	"	May	Cooper's, Little's, Murton's. Home-made: Arsenic, soda, sulphur, and soft-soap	Nil.
Hastings	1st January to 30th April ..	Occasionally dry ewes with lice, July	Cooper's, Little's, Lawes's, Highland, Quibell's, McDougall's, Murton's, White's. Home-made: Arsenic, sulphur, soda	Sulphide of sodium and lime.
Waipukurau	1st January to 31st March ..	End of April ..	Cooper's powder, Little's, White's, Murton's, Lawes's, McDougall's. Home-made: 10 lb. arsenic, 4 lb. caustic soda, 10 lb. soft-soap, 10 lb. sulphur	Nil.
Woodville	February to March ..	End April; few lousy sheep, middle May	Cooper's, McDougall's, Murton's, Highland, Owen's, White's, Quibell's, Little's, Fison's. No home-made dip.	Sulphide of sodium and lime.
New Plymouth	1st January to 31st March ..	14th April	Principally Cooper's, Murton's, and Little's. No home-made dip	"
Stratford	February to March ..	25th April	Cooper's, Murton's, Little's, Murton's, Lawes's. Almost entirely Cooper's	"
Hawera	15th February to 31st March ..	Hoggets sometimes as late as September	Cooper's powder, Little's powder and liquid, Murton's, McDougall's, Lawes's, Owen's, Quibell's, Economic, Highland. Home-made: Arsenic, soda, and water	Caustic soda and lime.
Wanganui	1st February to 31st March ..	30th April ..	Little's liquid and powder, Murton's, Owen's, Cooper's, Quibell's, McDougall's, Lawes's, Highland, Fison's, Thomas's paste dip. Home-made: Arsenic and soda	Sulphide of sodium. Ammonia is used for sweating.
Hunterville	1st January to 31st March ..	April	Cooper's, Little's powder and fluid, Murton's, Owen's, Holden's (Makino), Quibell's, Lawes's, Darby's, McDougall's, arsenic and soda, arsenic and potash, carbolic	Nil.
Felding	"	Third week in April	Cooper's, Little's fluid, Owen's, Murton's, McDougall's, Lawes's, Quibell's, arsenic	"
Masterton	February to March ..	..	A1, Brooke's, Fison's, Hatch's, Highland, Lawes's, Little's, Murton's, McDougall's, Makino, Ness's, Owen's, Quibell's, White's, Clenzit, Cannon's, and Cooper's. Cooper's and Little's predominate. Home-made: Arsenic, soda, and sulphur; potash and arsenic; arsenic, sulphur, and carbolic	Sulphide of sodium and lime.
Carterton	"	27th April	Cooper's	Sulphide of sodium.
Palmerston North	1st February to 30th April ..	15th May	Antiseptic, Brooke's, Cooper's, Cannon's, Gibb's, Highland, Holden's, Little's, Lawes's, Murton's, McDougall's, Major's, North of Ireland Antiseptic, Owen's, Quibell's, Home-made: Arsenic and soda; arsenic, soda, and sulphur; potash, arsenic, and sulphur	Sulphide of sodium and lime.
Wellington	February to March ..	..	Little's, Cooper's, Lawes's, Highland	Sulphide of sodium and lime, caustic soda and lime. Small quantity hydrofeline washing-powder.
Nelson..	February, March, and April	Early in May; occasionally few lousy sheep, September	Cooper's, Little's, Cannon's, Lawes's, White's, Murton's, Climax, Brooke's, Hayward's, Adams's. Home-made: Kerosene and soap; arsenic	Sulphide of sulphur and lime.

SCHEDULE OF PERIODS OF DIPPING throughout New Zealand, with DIPS and CHEMICALS used—continued.

Inspector's Station	Period of Dipping.	Latest Date of Dipping.	Particulars of Dipping-materials.	Chemicals used in fellmongering.
Blenheim	March to end April	End of May	Cooper's, Little's, McDougall's, Murton's, Lawes's fluid and powder, Highland, White's; carbolic, arsenic, and soda	Caustic soda, sulphuric acid, muriate of lime, sulphide of sodium.
Kaikoura	Middle February to middle April	..	Little's, Cooper's, Cannon's, Murton's. Home-made: Arsenic and soda	Sulphide of sodium and lime.
Rotherham	1st February to 30th April	..	McDougall's, Little's, and Cooper's	Nil
Rangora	March and April	August	Cooper's, Little's, McDougall's, Lawes's, Ness's, (Jimax, Thomas's, White's, Brooke's, Calvert's, Highland, Oldfield's; some carbolic and some arsenic chief ingredients; lime and sulphur, carbolic, or arsenic solution	Sulphide of sodium and lime, or caustic soda, lime, and sulphur.
Lincoln	1st February to 30th April	End of May	Cooper's, Little's, White's, McDougall's, Lawes's, Murton's, Quibell's, Orr's, Highland. No home-made	Nil
Ashburton	..	Middle of June	Cooper's, Little's, McDougall's, Highland. No home-made	Sulphide of sodium.
Fairlie	1st March to 30th April	14th May	Cooper's, Little's powder and fluid, Calvert's, McDougall's, Highland, Quibell's	Nil.
Timaru	March to April	A few hoggets in May	Cooper's, Little's, McDougall's, Highland, Calvert's, Quibell's, and Oldfield's (a local production, composed of arsenic, soda, carbolic acid, grease, and water)	Sulphide of sodium and lime.
Naseby	1st February to 30th April	1st September	Cooper's, Little's, Fison's, McDougall's, Thomas Ness's, Lawes's, Highland, Quibell's. No home-made dips	Nil.
Oamaru	March to end April	July	Cooper's, Highland, Little's, Kempthorne Prosser's, McDougall's, Fison's	Sulphide of sodium and black or soft soap.
Queenstown	Early January to end April	September	Cooper's, Highland, Ness's, Fison's, Little's, McDougall's, Kempthorne Prosser's	Nil.
Palmerston South	1st February to 30th April	Hoggets sometimes second time in September or October	Cooper's powder, Little's powder and fluid, Highland, McDougall's, Quibell's. No home-made dip	..
Mosguel	1st to 30th April	16th May	No return of dips used. No home-made preparation	Sulphide of sodium 5 lb., lime 14 lb., 12 gallons water per 100 skins.
Lawrence	1st February to 30th April	20th May	Cooper's, Highland, Fison's, Quibell's, Kempthorne Prosser's, Little's. No home-made	Nil.
Tapanui	..	End August	Cooper's powder, Little's, McDougall's, Kempthorne Prosser's, Hatch's. Home-made: Arsenic, soft-soap, and sulphur	..
Gore	..	May	Cooper's, McDougall's, Fison's, Cannon's, Highland, Brooke's, Little's, Hatch's, Kempthorne Prosser's, Lawes's, White's, Crescent, Ness's. No home-made dips	Sulphide of sodium and lime.
Balclutha	End March to April; sometimes fortnight later	August	Quibell's, Lawes's, Cooper's, Murton's, Fison's, Highland, McDougall's, and Little's	Nil
Invercargill	Middle March to 1st week in May	31st May; some owners dip twice, once in autumn and once in spring	Highland, Little's (2), Cooper's (2), Quibell's, McDougall's, Lawes's, Kempthorne Prosser's, Hayward's, Hatch's, Crescent, Brooke's, Murton's, Fison's. Home-made: Arsenic mixture, carbolic mixture, glycerine mixture	Sulphide of sodium, soap, and lime.

EXHIBIT No. 33.

COLONY OF NEW ZEALAND, TO WIT.

“The Shipping and Seamen Act, 1903.” (Wrecks and Casualties.)

DEPOSITIONS OF WITNESSES BEFORE THE COLLECTOR OF CUSTOMS.

THE examination of John Thomas Rolls, of Albert Thomas Norton, of John Ryan, of Maurice Caffyn, of Joseph Cable, and of James Gerald Stokely Doorly, taken on oath this 25th day of October, in the year of our Lord 1906, at Dunedin, in the colony aforesaid, before the Collector of Customs at Dunedin, in the presence and hearing of the master of the ship hereinafter mentioned, touching the fire on board a certain ship called the “Tarawera,” of the Port of Dunedin, J. T. Rolls, master, and belonging to the Union Steamship Company of New Zealand (Limited), of Dunedin, which sailed from the Port of Gisborne on the 17th day of October bound to Auckland; and which investigation is made in pursuance of the provisions of “The Shipping and Seamen Act, 1903.”

The deponent *John Thomas Rolls*, being duly sworn on his oath, saith as follows: I am a master mariner. I hold a certificate of competency—No. 602, New Zealand. I am master of the s.s. “Tarawera.” I left the Port of Gisborne about 9.30 a.m. on the 17th October. The shoremen left the No. 3 hold about 6 a.m. At 10.45 p.m. on the 17th instant the engineer on watch, Mr. J. Cable, observed smoke entering the tunnel from No. 3 hold. He at once informed the third officer, who was on the bridge, and the latter immediately called me and the officers and crew. Two fire-hoses were promptly coupled on to the deck connections, and when all was ready I had one side of No. 3 hatch opened, but battened down again, leaving only room to get two streams of water poured into the hold on to the fire, which was by this time plainly visible, and burning fiercely in the ‘tween-decks on the port side. I also had hand-grenades thrown down, which greatly assisted in quelling the outbreak. At 11.20, in order to minimise draught, I reduced speed to “slow,” which was maintained until 12.34 a.m., when I again went “full speed.” I had all boats swung out and extra provisions placed in them. The passengers were called and assembled on the poop deck. Had hoses cut in saloon-deck and water poured through them, a Rex extinguisher being also used. By 2 a.m. the heat in the hold appeared to be diminishing, and at 3 a.m. the smoke had cleared sufficient to allow the chief officer and myself to enter the hold and make a thorough examination, when we found a number of cases of transhipments *ex* “Ionic” damaged by fire, while some were quite destroyed. I could not, however, discover anything likely to cause the outbreak. At 3.30 a.m. I stopped the pumps, as there was no further signs of fire, leaving, however, the hoses connected and having a man in the hold on watch. At 7.30 a.m. another small outbreak occurred in the same spot. This was, however, a small affair, and ten minutes sufficed to extinguish it. The weather at the time of the fire was fine, there being a moderate south-west wind and smooth sea. Upon arrival at Auckland I called a survey and noted and extended a protest. Upon discharging the cargo the damage done to the ship was not found to be very extensive, there being nothing to prevent her sailing from Auckland at her advertised time. The damage to the cargo was considerable, being mostly caused by water. The whole of the fire was in No. 3 hold. There was no fire elsewhere. The hatch is in the main deck, just in front of the saloon-doors and companion-way to poop. The second officer was in charge of that hold while the cargo was being worked. The company’s regulations against smoking below hatches are strictly enforced. I have paid particular attention to that myself. The cargo in No. 3 hold was a quantity of general cargo, transhipments from the “Ionic” at Wellington, but the bulk of the cargo was wheat, shipped at Lyttelton. There were no matches in the after hold. I do not know where the lime was stowed. There is no access whatever to No. 3 hold except down the hatch. The No. 3 hatch was on, and battened down all day from the time work was finished. It would be almost impossible for any person to have access to No. 3 after the hatch was on, without the officers being aware of it. I see no way by which the fire could have originated in the hold after the hatches were put on. The fire appeared to have originated in one particular case in the hold, which was practically burnt out, only three sides of the case being left and a little of the contents in the bottom. The contents appeared to be straw goods, similar to hats, closely packed. The mark was almost gone, but I am under the impression that it was a case transhipped *ex* “Ionic.” The fire seemed to have begun in this case, in the middle, and burned outward, as if it had caught fire in the middle. It was a close-boarded case. I cannot say if it was zinc-lined. There are only two small goose-neck ventilators in No. 3 hold, neither of them near the case I speak of. There are no open ventilators at all. I think it would be impossible for any person to throw anything alight from the deck into No. 3 after the hatches were on. The cargo generally was shipped in dry weather. There were no acids in the hold. I do not think it possible that any person could have had access to this hold in order to pillage cargo after the hatches were on. When the alarm was first given I was the first at the hatches, and found them securely battened and fastened down as usual. I have not any theory as to how the fire started.—

JOHN THOMAS ROLLS.

Albert Thomas Norton, being sworn, saith on his oath as follows: I am a master mariner. I hold a certificate of competency—No. 858, New Zealand. I am chief officer of the “Tarawera.” I remember the fire on board her on the 17th instant. I was called about 11 p.m. by the third officer, who said No. 3 hold was on fire. I ran to the after hatch. I saw thick smoke coming from the hold. The covers were on and battened down. They were as usual—two tarpaulins, fastened with bars and wedges. I put my hand on the hatch-cover, and found it very hot. Before this the watch was running the hoses from the main fire-pump and from the deck donkey-engine. The hose was 3 in. rubber hose in good order. The hose was ready in a very few minutes, and the master

ordered the tarpaulins to be lifted on one side of the hatch. The water was then coming through the hose. When the hatch was lifted we saw the fire on the port side, but the smoke was too thick to tell whether it was in the 'tween-decks or the lower hold. The fire appeared to gain very rapidly for a few minutes, but we soon stopped it from spreading, and confined it to the original seat. We also used chemical hand-grenades, which appeared to smother the flame at once. The captain then ordered several holes to be cut in the saloon-deck, over where the fire seemed to be, and we led the hose through these holes, and also used a Rex chemical fire-extinguisher. After a time we found less smoke, and the deck was getting cooler. Soon after, the master had the hatch-covers taken off, and he and I went below. We found that several cases of general cargo had been burnt, and were still smouldering. These were transhipped *ex* "Ionic" at Wellington. They were put into the "Tarawera" two days previously. There was then no sign of fire or heating about the "Ionic's" cargo. I examined the burnt cargo. I could come to no conclusion as to the origin of the fire. I saw a case which contained straw hats—it was almost entirely burnt. I think the fire in that case started at the top, and burned down, and did not start in the centre. I have a theory about the origin. I afterwards saw the remains of what appeared to be a roll of American cloth lying in the case of straw hats. The roll was not entirely burnt, but very much charred. It looked as if this roll had caught fire, and burned into the case. Four or five hours later this same roll was found to be on fire again after having been well saturated with water. I saw it well soaked myself in the first outbreak. I have had no experience myself, but I have been told that American cloth contains a good deal of naphtha in the paint or glaze, and is subject to combustion. I was in No. 3 hold at Gisborne, after the Gisborne cargo was discharged. There was no sign of fire then. The men were out of this hold before 6 a.m., and the fire did not break out until after 11 p.m. I do not regard it as in the least degree feasible that any person should be allowed to smoke or use matches in the hold. We generally use electric lights in the hold and sometimes hurricane lamps; but at Gisborne we used no light at all. All the cargo in that hold was taken in during dry weather. I consider it quite impossible for any person to have got into the hold after the hatch was put on.—A. T. NORTON.

Albert Thomas Norton, recalled.—I was not in No. 3 hold while cargo was being discharged in Gisborne, but I was standing at the hatch most of the time. I could see all the cargo, and the men working it. I can say positively that no matches were used, and there was no smoking, nor any light used.—A. T. NORTON.

John Ryan, sworn, saith: I am a mariner. I hold a certificate—035682, London. I am third officer of the "Tarawera." I remember the fire on board on the 17th. I was on the bridge about 10.50 p.m. on that night. One of the greasers came to me and reported that there was a fire in No. 3 hold. I called the captain and chief officer, and ordered the watch to connect the fire-hose—one to the donkey-pump and one to the fire-pump. I was in charge of No. 2 hold. There were some bags of lime and cases of matches in that hold: neither of them were damaged. I have no idea how the fire originated.—JOHN RYAN.

Maurice Caffin: I am purser, s.s. "Tarawera." I remember the fire on board on the 17th instant. It occurred after leaving Gisborne. I receive cargo on the wharf. The cargo at Gisborne was only a few tons—about 4 tons—and was put in No. 2 hold. There was some lime shipped at Dunedin—thirty bags, or 3 tons, I think. Some of the lime was put in the lower No. 3 hold, and some forward. The matches were shipped in Dunedin. They were discharged in good order. I saw some of the lime in the shed in Auckland after being discharged; it was set pretty hard and solid with the water. The bags were not destroyed, as far as I saw, but they were discoloured with heat, but had not actually been on fire. I do not think any of the matches on board were burnt. Thirty drums of sheep-dip were shipped at Napier for Auckland. They were discharged all right; there was no sign of fire about them. I saw all the "Ionic" transshipment at Wellington on the wharf and being put into the ship. They were all in good order, except two cases of earthenware, which got wet owing to the bursting of a main, and were refused. The case supposed to contain straw hats, which was burned, was *ex* "Ionic" for Auckland, and marked "H J F" in a diamond, followed by "100," as near as I could make out. I saw a roll lying in the shed in Auckland. I was told by the chief officer that it had been lying in the burnt case of hats. I examined it. The outside was burned away. It looked to me like a coarse brown canvas. It certainly was not American oilcloth. It was more like the canvas of which clothes-bags were made. There was no mark or number on it, nor outer covering. It seemed to have been burnt off. It did not seem to have been burned from the inside—the centre was not burned. We turned back some of the outer layers to see what the stuff was like. I was unable to form any idea how the fire originated.—M. CAFFIN.

Michael Caffin recalled.—I was in No. 3 hold, 'tween-decks, while cargo was being discharged at Gisborne—the whole time. No lights were used, and I am positive that no smoking went on, and no matches were struck or used. The men were working right up against the Auckland cargo that was burnt, and there was no sign of heat or smoke then.—M. CAFFIN.

Joseph Cable, being sworn, saith: I am a marine engineer. I hold a first-class certificate of competency—No. 221, New South Wales. I am second engineer of the s.s. "Tarawera." I remember the fire on board on the 17th instant. I was on watch from 8 p.m. to midnight. About 10.45 p.m. I noticed a slight smell of burning coming from the shaft-tunnel and went to examine it. There was a hole in the side of the tunnel, where a rivet had fallen out. I smelled at this, and found a smell of burning like bags or tarred rope. I knew there must be a fire in No. 3 hold, and sent a greaser to call the chief engineer and inform the officer on the bridge. The smoke then began to get thick. It was grey smoke, not black and heavy, such as oil or tar would make. I think the smell and appearance was rather like that of burning straw. The pumps were started pouring water into the hold, and half an hour after I felt the port side of the tunnel, under No. 3 hold, towards the roof, getting hot. It remained hot for about two hours, and by that time the water

began to rise in the hold, and it cooled off. I went into No. 3 lower hold when the fire was out, and saw no sign of fire about the part of the tunnel that was hottest. I believe grain was stowed about that part and on the port side of it. I saw some bags of lime on the starboard side, but there was no appearance of fire about them at all. There was no sign of burning about the lower hold. I saw a roll of what seemed to me a kind of waterproof cloth, pretty severely burned. I do not know, but I suppose this was the roll the chief officer found in a burned case of straw hats. It was about 3 ft. long by 6 in. or 8 in. in diameter, and there was no wrapping or mark on it. It was a dark-grey or brown colour, but I did not examine it particularly.—JOS. CABLE.

James Gerald Stokeley Doorly: I am second officer of the s.s. "Tarawera." I hold a first mate's certificate—No. 301, Tasmania. I was in charge of No. 3 hold on last voyage from Dunedin to Auckland. We took general cargo in that hold. There was some lime in the lower hold under the hatch. We had no matches or acids of any kind. We had a lot of general cargo at Wellington, including transhipments *ex* "Ionic." I saw it all taken in and stowed. There was nothing to draw my attention to any particular package. It was all in good order. Had anything been wet or heated, I should have rejected it. I remember a roll about 3 ft. long and 6 in. or 8 in. in diameter coming in at Wellington with the "Ionic's" transhipments. I do not remember the marks and numbers. It was sewn up in sacking. There was nothing special about it. It was stowed in the 'tween-decks, port side, on top of some cases *ex* "Ionic." I saw it in Auckland after the fire. It appeared to me to be oilcloth or linoleum. The outside was burned, but I could not say if it was sound in the centre. I was in the hold at Gisborne after cargo was discharged, and had a look round. Everything was in good order. There was no smell or appearance of burning. There were a few packages of passengers' luggage in No. 3 hold. They were not burned, and were discharged at Auckland. We arrived at Gisborne about 4.40 a.m., and finished work in about an hour and a half—all in daylight. The Gisborne cargo was all under the hatch, and we had no need to go away aft for it. There was very little of it. I have no idea of how the fire originated. I examined the burnt cases in Auckland, but could get no idea from them. I did not see anything of the second outbreak of fire in the hold. I saw the hatches put on in Gisborne. They were properly secured as usual. I do not think any person could have access to the lower hold without being observed, after the hatches were on. I saw the hatches at the time of the fire, before the tarpaulins were taken off. They appeared exactly as I saw them in the morning. The seat of the fire was not under the hatch, but in the wing on the port side in a direct line with the after side of the hatch, and close up to the upper deck, as far as I can judge, in a place which would have been very difficult to get at from the hatch—almost impossible. This place is the same in which I stowed the roll spoken of, or as near as may be.—GERALD S. DOORLY.

EXHIBIT No. 34.

SIR,— Westminster Chambers, 13 Victoria Street, London, S.W., 28th September, 1906.

In continuation of my letter of the 21st instant, No. 3326, transmitting lists of damaged cargo and reports by the Shaw, Savill, and Albion Company, and the Salvage Association respectively in regard to the recent fires on New Zealand steamers, I have now the honour to forward herewith copy of a further letter received from Messrs. Shaw, Savill, and Albion Company, covering a survey report made by Captain Walker, who was in attendance to represent the owners' interest on arrival of the s.s. "Gothic" in London.

It will be seen that the suggestion that this fire originated from a spark or other cause introduced from outside is not borne out by the evidence of Captain Walker.

I have, &c.,

WALTER KENNAWAY,

For the High Commissioner for New Zealand.

The Hon. the Premier, Wellington, N.Z.

34 Leadenhall Street, E.C., 27th September, 1906.

"Gothic" Fire.

SIR,—

In view of a suggestion that we hear has been made that this fire may have originated from a spark or other cause introduced from outside, it occurs to us that the enclosed extract from a survey report made by Captain Walker may be of interest to you.

Captain Walker was in attendance to represent the owners' interests on arrival of the steamer in London; he saw the condition of the cargo, and thoroughly investigated the circumstances in so far as it was possible for this to be done in London.

We understand that Captain Mowatt, who was associated on behalf of the underwriters with Captain Walker, can corroborate the latter's report.

Yours, &c.,

SHAW, SAVILL, AND ALBION CO. (LIMITED),
(J. A. POTTER, General Manager).

The High Commissioner for New Zealand.

EXTRACT FROM REPORT made by Captain J. H. WALKER, Marine Surveyor, *re* "Gothic" at London, dated 25th September, 1906.

Upon removing the wool from saloon-deck (*ex* No. 4 hold), found two bales to be smouldering. These, after being deluged with water, were cut open, when it was found that the heart of each bale was completely calcined, while the exterior wool was little affected. Subsequently another bale of wool from same hold was found in a similar condition, the firing having again taken place at the centre of the bale.

No. 3 hold: As the discharge from this hold proceeded, found that the fire appeared to have had its origin amongst the bottom tier of bales of wool, in the lower hold, at a point slightly abaft the mainmast, on the starboard side. Judging from the buckled and twisted condition of vessel's structure, the fire at this point had been of the fiercest description, being fed by tallow and other combustible goods stowed in the vicinity. As the discharging continued, found that smaller out-breaks had taken place amongst bales of wool stowed in the after part of this hold.

EXHIBIT No. 35.

Westminster Chambers, 13 Victoria Street, London, S.W.,
21st September, 1906.

SIR,—

With further reference to my letter of 31st August last, No. 2879, regarding recent fires on vessels in the New Zealand trade, I beg to transmit herewith lists of damaged cargo, supplied by the New Zealand Shipping Company, as follow:—

1. "Rimutaka": List of bales of wool damaged by fire.
2. " " " " " water and [or] smoke.
3. " " " " " hemp " "
4. "Waimate" " " wool damaged by fire.
5. " " " " " water and [or] smoke.

Similar lists from the Shaw, Savill, and Albion Company, together with a copy of letter from them containing their remarks in respect to the "Gothic" fire, are also herewith forwarded.

I also send herewith copy of communications received from Messrs. Tyser and Co., underwriters, in reference to inquiries regarding the various fires. You will note it appears that the underwriters interested in the vessels and cargoes have made no investigations beyond those undertaken by the Salvage Association. The reports by the latter body, although containing some significant points—such as the discovery of bales of wool charred inside and intact outside—supply practically nothing beyond what had been already gleaned from the shipowners.

I have, &c.,

The Hon. the Premier, Wellington, New Zealand.

W. P. REEVES.

Shaw, Savill, and Albion Company (Limited), 34 Leadenhall Street, E.C.,
20th September, 1906.

SIR,—

"Gothic" Fire.

In compliance with the request contained in your letter of the 23rd ultimo, we beg to hand you herewith list of cargo surveyed here for damage.

Some of this cargo you will observe was quite uninjured, and a large proportion was damaged by water used to extinguish the fire.

Two bales on fire (marks and numbers unknown) were thrown overboard while at sea; other bales were so damaged that the contents were useless; others lost their identity, and the contents or parts had to be bulked.

Yours, &c.,

J. A. POTTER, General Manager,
Shaw, Savill, and Albion Company (Limited).

The High Commissioner for New Zealand.

16 Fenchurch Avenue, London, E.C., 11th September, 1906.

SIR,—

Fires on "Gothic," &c.

We have made inquiries amongst the underwriters and companies on the above matter, but up to the present we have only been able to obtain information from the Salvage Association, nor can we find that the underwriters have made any investigations beyond those undertaken by the Salvage Association, of whose letter we enclose a copy.

If we can get any further reports we will do so.

The High Commissioner for New Zealand, London.

Yours, &c.,

TYSER AND CO.

SIRS,—

Salvage Association, 19 Birchin Lane, London, E.C., 7th September, 1906.

I duly received your letter of the 28th ultimo, with the enclosed copy of a letter from Mr. Kennaway, written on behalf of the High Commissioner for New Zealand. I fear that we are not in a position to throw much light upon the cause of the fires referred to, as our knowledge of the

subject is limited to the information gleaned by the surveyors we appointed on behalf of the underwriters on the cargo in the cases of the "Gothic," "Perthshire," and "Rimutaka," and on behalf of the underwriters on the ship in the case of the "Waimate." I have pleasure in passing on this information, as follows:—

"*Gothic*."—In this case our surveyor found considerable evidence of fire, principally in the cargo contained in No. 3 hold, consisting of wool, tow, flax, skins, &c., and about two thousand casks of potatoes, and he was informed that in the course of extinguishing the fire at sea several bales of wool had been removed from the hold, and with the exception of two had been jettisoned. The two remaining bales were carried on deck, and these the surveyor examined and found them still smouldering. His report says, "We had them cut open, and found that the wool in the interior was burnt to a cinder, while the greater part of the exterior retained its normal condition. It is therefore apparent that the fire originated spontaneously in these bales, and no doubt the same occurred in the few bales of wool which we understand were jettisoned at the time the fire was first discovered."

"*Perthshire*."—The fire on this vessel occurred early in June before her arrival at Las Palmas. It appears to have been confined to the No. 4 hold, and was extinguished by water introduced into the hold after about two hundred and fifty bales of wool and tow had been jettisoned. On the vessel's arrival in London on the 11th June, our surveyor found the cargo remaining in the affected hold considerably damaged by water, but was unable to explain the cause of the fire. In this instance the bale goods appear to have been stowed on three or four heights of casks of tallow.

"*Rimutaka*."—In this case the fire occurred after the vessel's arrival, and was reported to have been due to spontaneous combustion amongst the wool cargo. Our surveyor, however, was unable to throw any light on the cause of the fire, which he found originated in No. 5 lower hold, in which the cargo consisted of wool, flax, hair, and skins.

"*Waimate*."—In this case the fire was reported to have broken out at sea on the 16th June among the flax, wool, and tow cargo, but our surveyor had no opportunity of investigating the cause of the fire.

Messrs. Tyser and Co., London.

Yours, &c.,
JOS. LOWREY, Secretary.

16 Fenchurch Avenue, London, E.C., 12th September, 1906.

SIR,—

"*Gothic*" Fire.

We have just received the enclosed information from the Secretary of the Salvage Association, and trust that it may be of use to you. (Copy of letter dated 12th September herewith.)

The High Commissioner for New Zealand, London.

Yours, &c.
TYSER AND Co.

Salvage Association, 19 Birchin Lane, London, E.C., 12th September, 1906.

SIRS,—

"*Gothic*."

I beg reference to my letter of the 7th instant on the subject of the fire on this and other steamers from New Zealand, and now have to say I have this morning received the report of our cargo expert, and think it may be of interest to quote for the information of the High Commissioner for New Zealand the following paragraphs:—

"This vessel arrived in London on the early morning of the 10th June, and immediately commenced to unload her cargo out of the damaged holds—namely, Nos. 2, 3, and 4—and the discharge was continued night and day until all these holds were finally unloaded. No. 2 finished on the 14th, No. 4 on the 15th, and No. 3 on the 18th June.

"As already reported to you, fire was at first discovered in No. 4 'tween-decks. The damaged wool from there was brought on deck, and the fire was extinguished without any water being poured into this hold. The bales which were the most damaged were afterwards kept on deck for the remainder of the voyage.

"Later on fire was discovered in No. 3 hold, which had eventually to be flooded before it could be extinguished.

"When the discharge at first commenced we noticed that two bales marked C. M. C. Ltd., X X X

Nos. 149 and 170, which had been carried on deck after the fire in No. 4, were still smouldering at the time they were discharged. We lowered these into the water to extinguish the fire, and afterwards opened them, and found that the interior of the bales was badly burned, the wool being charred to a cinder, while the exterior, with the exception of a small hole which had formed an outlet for the fire, had retained its original appearance.

"As the discharge proceeded in No. 3 hold we found on the starboard side of the lower hold, a little abaft the mainmast, that the tier of wool stowed there on top of casks of tallow had burned with great fierceness, and in our opinion the seat of the fire was at this spot. Several of the casks of tallow were nearly burned out, and no doubt the fierceness of the fire is due to its being fed by the melted tallow.

"Nearly all of the cargo damaged by fire came from that part of the vessel both in the lower hold and 'tween-decks.

"We found as the discharge of No. 2 hold proceeded that the water from No. 3 had penetrated through the insulated bulkhead."

Messrs. Tyser and Co., London.

Yours, &c.,
JOS. LOWREY, Secretary.

S.S. "RIMUTAKA."

Voy. 14.

List of Wool damaged by Fire.

June, 1906.

Marks.	Nos.	Quantity.
Clent Hill	1; 14, 15 dup.; 28 dup.	4
D X N	31, 82, 86	3
K T	25	1
"E M" over "Waiiau"	383, 868, (?)	3
Two hearts	477, 483	2
"C M Co L" over "X X"	442, 44x, 445, 571, 589, 58x	6
"C F M" in parallelogram over "B B" in diamond	126, 135	2
B B	555	1
"Washdyke" over "T"	250-252, 2 x 7	4
"D H" in parallelogram	73	1
"S C H" in parallelogram	21	1
"C F M" in parallelogram, over a circle enclosing five dots and a dash	(?), (?)	2
"C F M" in parallelogram over "T T"	(?), (?)	2
"C M Co L" over "T" in circle	102, (?)	2
T	240, 262, (?), (?)	4
Kaputone	903	1
Fairfield	278, (?)	2
Mt Stewart	73, 77, 79, 86, 89, 92, 93, 95, 96	9
"Kaiwarra" over "Amuri"	(?)	1
"C M Co L" under a triangle	715, 770	2
"C M Co L" over "X X"	558, 561, 567, 575, 579, 599, 408, 409, 460, 490, 494, 501, 508, 515, 532, 544, 548, 551, 554	19
"C M Co L" over a diamond	811, 866, (?)	3
"C F M" in parallelogram over "M N X"	278, (?)	2
"J W" in diamond over "P G"	1	1
"C M Co L" over "X X X"	(?)	1
"C F M" in parallelogram over "D C," over "H B" conjoined	49	1
B B	743, 762, (?)	3
C & Co	32, (?)	2
"C F M" in parallelogram over "B B" in diamond	42, 73, 74, 93, 95, 96, 127, (?), (?)	9
(Marks obliterated)	(?), (?), (?), (?), (?)	5
U M U	174	1
Muiarua	227	1
"A C" over "D"	422, 385, 383, (?)	4
"07" in parallelogram	185, (?)	2
Little Roderick	50, 53	2

S.S. "RIMUTAKA."

Voy. 14.

List of Wool damaged by Water and [or] Smoke.

June, 1906.

Marks.	Nos.	Quantity.
Ayrburn	79-88, 91, 92, 94, 97, 101, 103, 104, 108, 116-118, 121, 123-127, 129-134, 139, 140, 143, 144, 146, 150, 151, 156, 159-161, 166-171, 174, 176, 178, 179, (?)	54
Clive	1, 2, 8	3
Tihi	3 (?), 6 (?), 9, 12, 13	5
"I" over "J"	4, 6, 8, 11, 12, 14, 15, 17	8
Moteo	1, 2, 4	3
Clifden	1-8, 10, 12-17, 18-24, 26, 28, 30-37, 40-49	42
Clarence	376, 387, 392	3
Clent Hill	3-8, 11, 15 dup., 17, 25-27, 28 dup., 32, 33, 35-37, 43, 55, 58, 61, 68-70, 73, 75, 78, 81, 85, 101, 103, 107, 120, 122, 127, 128, 130-132	40
D X N	10, 11, 12 dup., 17, 28, 30, 32-36, 38, 40 dup., 43 dup., 46 dup., 48, 50, 52, 56, 70, 71, 73, 76, 80, 81, 89, 101, 127	31

S.S. "RIMUTAKA."

Voy. 14

List of Wool damaged by Water and [or] Smoke—continued.

June, 1906.

Marks.	Nos.	Quantity
Dome	85, 86	2
H F	1, 3-7, 9-12, 15	11
K T	28	1
" M " under a half-circle	1, 2, 4-9, 11-26, 30, 31, 34-36, 39, 49, 55, 57, 59, 60	35
Mount Linton	4, 5, 9, 11	4
Walter Peak	1, 2, 4-7, 10-12, 15, 18-20, 22, 24-26, 29-32, 35, 38, 39, 41, 43, 44, 45, 47-49, 52, 58, 62-64, 61, 71, 76, 81, 89, 92, 94, 147. Dups., 2, 6, 7, 20, 25, 26, 38, 49	52
" Mataura " over " W L " in diamond	1-4	4
" Nokomai " over a cross	195-197, 199, 201-203	7
Opon	818, 821, 824, 825, 1123	5
V B	22	1
J B W	720	1
Ruru	5, 7, 12	3
Aima	2, 6, 11, 12, 14, 18, 21-24, 27	11
G W H	851	1
S D	1-8, 10-12, 14, 16-36, 38-44, 46, 48, 52, 54, 56, 63	46
" U V " over " R O "	3, 11	2
" I V " under a line	4, 8	2
" E M " over " Waiau "	14, 17, 100, 128, 193, 277, 279, 288, 360, 381, 316, 459, 466, 483, 481, 866, 867, 479, (?)	19
Homeside	18, 26, 42, 45, 49-55, 58, 59, 61-66, 68-70, 73-76	26
V C R M	1	1
" E C " over " M "	50, 52	2
W M E Co	1770	1
" D " under a half-circle, over " Riverock "	15	1
Welds Hill	298	1
T J B	1, 3	2
" C F M " in parallelogram over " B B " in diamond	102	1
B B	749	1
B D	3, 9	2
" Washdyke " over " T "	235, 238, 243, 245, 246, 249	6
" H R H " over " ——— "	61, 63, 73, 74	4
R T	173, 177, 186, 187, 193-202, & 212	6
" M E " in parallelogram	52, skins	1
" C " in circle over " Otekaike "	573, 580-582, 584-586, 588	8
Station Peak	237	1
" C M Co L " over " A D J "	20	1
" H R " over " B " in diamond	41, 43, 44, 46-48, 50, 51, 60	8
" S C H " in parallelogram	20, 24, 25	3
" C F M " in parallelogram, over a circle enclosing five dots and a dash	395, 403, 425, 432, 441, 473, 478, 479, 488, 494, 400, 501, 507-509, 514, 517, 552, 556, 560, 568, 573, (?)	23
" C F M " in parallelogram over " W W & Co "	154, 157, 160, 164, 173	5
Kaipoi	109, 120, 198, 320, 323	5
" C F M " in parallelogram over " T T "	104, 316, 325, 328, 331, 339, 343, 349, 355, 360, 364, 374, 380, 382-387, 411, 414, 415, 417, 419-424, 429, 448, 463, 468. Dups., 421, 423	36
" C M Co L " over " T " in circle	54, 56, 62, 80, 84, 88, 91, 107, 117, (?)	10
Mt Somers	1	1
T	242, 243, 245, 246, 249-255, 259, 287, 294, 296, 299-301, 303	19
Kaputone	2-5, 7, 9, 13, 14, 16, 19, 21, 22, 24, 26, 29, 31, 32, 34, 35, 41-46, 52, 54, 57, 58, 72, 73, 76	32
"	82, 84-86, 89, 90, 92-94, 96, 100, 103, 109, 112, 113, 115-118, 603, 622, 624, 626, 629, 635, 638, 641, 643, 645, 647, 669, 665, 666, 670, 678, 679, 685, 690, 691, 694, 702, 707, 712, 718, 721, 722, 726, 734, 739, 743, 745, 752, 767, 777, 778, 780, 782, 785, 789, 790, 798, 800, 802, 806, 808, 811, 813, 814, 839, 842, 853, 882, 892, 896, 897, 900, 913, 918, 928, 934, 945, 949, 953, 959, 961, 964, 981, 982, 985, 986, 988, 991, 993, 955-1000, (?)	101

S.S. "RIMUTAKA."

Voy. 14. List of Wool damaged by Water and [or] Smoke—continued. June, 1906.

Marks.	Nos.	Quantity.
"Woodbank" over "T" in square ...	8, 11	2
CW	33, 34	2
Two hearts	315, 317, 323, 327, 331-335, 339-341, 343, 346, 349, 350, 352, 354, 356, 359-361, 364, 366, 368, 369, 375, 377, 379, 380, 382, 384, 388, 392, 396, 398, 399, 402, 403, 405-409, 414, 417, 422, 424, 426, 467, 482, 501, 727-729, 732, 740, 754, 760, 843, 846, 848, 852, 853, 856, 860, 861, 954, 956-958, 965, 966, 970, 975, 986, 988, 989, 1013, 1015	79
Hinemoa	5, 7, 14, 47, 50, 52, 54-58, 67, 81, 83, 84, 87, 91, 92, 1019, 1134	20
"WW" over "W," in triangle above two hearts	858	1
St Helens	572, 656	2
RHo Borough Downs	56, 64, 66	3
Richmond	119, 131, 138-141, 149, 156 dup., 158, 168, 178, 201, 213, 216, 220, 223, 224, 227	19
Mt Stewart	70, 72, 75, 76, 82, 84, 88, 90	8
"Kaiwarra" over "Amuri"	341	1
"Mataura" over "TB & S"	123, 126-128, 130, 131, 134-138, 140-148, 154-156, 158, 160, 161, 163, 165-167, 170	31
Lily Bank	45, 47, 51, 61, 66, 67, 69, 73, 75-77, 81, 82, 85, 89-91, 94, 95, 98, 103, 63	22
"Haldon" under parallelogram	3, 12	2
GWT	57, 799	2
GHM	24	1
"CFM" in parallelogram, "CXC" over triangle	23	1
CMCoL	718, 721, 742, 760, 760 dup.	5
"CMCoL" over two triangles super- imposed	422, 437, 439, 448, 458, 485, 479, 507, 520, 537, 549, 557, 562, 612, 614	15
"CFM" in parallelogram over "Fair- field"	36	1
"CMCoL" over a diamond	797, 815, 826, 829, 830, 833, 851, 894, 912	9
"CFM" in parallelogram over "MNX"	213, 265, 279	3
"CMCoL" over parallelogram	148	1
Akaloa	3, 4, 13, 14, 17, 20, 21, 43	8
An oval enclosing a diamond	7	1
"JW" in diamond over "PG"	5	1
"CMCoL" over "XXX"	858	1
"CFM" in parallelogram over "DC" over "HB" conjoined	40, 42-45, 48	6
TF	16, 50	2
Two hearts	335	1
Kaipoi	221	1
ALJ	38-43, 45, 46	6
Avon	1, 17, 18, 22, 23, 28, 29, 32, 33, 35, 50, 54, 55, 57, 59, 61, 65, 72, 73, 76-78, 82-87	28
BB	718, 744, 747, 750-752, 756, 757, 759, 761, 787, 792, 793, 798, 799, 800, 804, 805, 928	19
Broadlands	34, 35	2
Badeno	75	1
C & Co.	6, 12, 13, 17, 18, 20, 24	7
"CFM" in parallelogram over "BB" in diamond	1, 2, 14, 17, 23, 26, 36, 37, 47, 53, 59, 64, 66, 72, 82	15
Ditto	88, 89 dup., 98, 110, 114, 115, 123	8
BT	56, 58, 62	3
Toroa	1, 10	2
"S" over "CC"	1, 3, 4, 6, 7, 13	6
AH	164, 175, 181	3
"JF" in diamond	2, 9, 10-12	5
OP	8, 9, 13, 15, 18, 25, 26, 29, 45, 49, 55, 56, 60, 68, 78	15
Takiri	4, 7, 9, 12-14, 18, 19, 28	9
"K" under half-circle	171, 174, 178	3
AC	6	1
"H2" over "M"	1, 3	2

S.S. "RIMUTAKA."

Voy. 14. *List of Wool damaged by Water and [or] Smoke—continued.* June, 1906.

Marks.	Nos.	Quantity.
"HF" conjoined ...	5 ...	1
"J H K" over a goblet ...	1-18, 20 dup., 21-37 ...	37
H ...	3 ...	1
"K" over "WG" in a rhomboid ...	1, 4 ...	2
"TAL" over "P" ...	2 ...	1
"MB" in an oval ...	406, 413, 421, 422, 429, 432, 452, 473, 503, 395 ...	10
"WW" over "W" ...	12, 49 ...	2
"R" over "RR" ...	2 ...	1
"P" above a half-circle ...	5-7, 10, 16, 19, 20, 24, 25 ...	9
Wisconsin ...	4, 5 ...	2
Cliff ...	286 ...	1
Castle ...	23 ...	1
"SB" over "C" ...	70, 73, skins ...	2
"SB" over "W" ...	24, skins ...	1
Kanapa ...	1049-1051, 1054 ...	4
"1" under a half-circle, over "MS" ...	1, 11, 12, 14, 17, 18, 23, 24, 30, (?) ...	10
3Y ...	27 ...	1
"J" followed by "J" reversed ...	3 ...	1
UMU ...	9, 17, 21, 23, 28, 45, 47, 58, 59, 88, 176, 46 ...	12
HM ...	3 ...	1
"WM" under a half-circle ...	1, 3, 4 ...	3
Wall ...	7, 9, 11, 17 ...	4
Reay ...	832, 833 ...	2
JC 789 ...	813, 814 ...	2
JC 973 ...	1074, 1078-1080, 1084 ...	5
JC 190 ...	1055 ...	1
EFK ...	652 ...	1
"JW" in diamond over "PG" ...	15, 16, 21 ...	3
JC 86 ...	1159 ...	1
Owetea ...	28, 42, 57, 80, 98, 108, 128 ...	7
Muiarua ...	103, 116, 145, 155, 198, 216, 253, 277, 290, 302, 309, 314, 325, 341, 348, 349, 299, 235, 172 ...	19
"KT" in diamond ...	1, 2 ...	2
Ruru ...	272, 273, 274, 12 ...	4
"K" in diamond ...	43, 44 ...	2
"AC" over "D" ...	378, 380, 382, 428, 445, 468, 470, 472, 475, 481, 489, 490, 500, 498, 502, 532, 533 ...	17
Lake Heron ...	6, 11, 14, 20, 25, 27, 29, 31, 32, 57, 63, 67, 70 ...	13
WME Co ...	1769, 1801, 1802, 1824, 1836, 1855, 1863, 1866 ...	8
AMPA ...	22, 26 ...	2
Cheviot Hills ...	3, 4 ...	2
"GS" in oval ...	15, 17 ...	2
"JMcK" in parallelogram ...	1 ...	1
Pouparae ...	11, 12 ...	2
Little Roderick ...	49, 51, 52, 54-56 ...	6

S.S. "RIMUTAKA."

No. 14. *List of Bales of Hemp damaged by Water and [or] Smoke.* June, 1906.

Marks.	Nos.	Quantity.
XCI ...	672-674, 675-686, 688-695, 715-725 ...	34
Kia Ora ...	319-322, 324, 326-329, 331, 333, 336-340, 342, 343, 346, 347 ...	20
T & JP ...	306-309, 311, 313-316 ...	9
Weka ...	177-181, 184-186, 187-192, 183 ...	15

S.S. "RIMUTAKA."

No. 14. *List of Bales of Hemp damaged by Water and [or] Smoke—continued.* June, 1906.

Marks.	Nos.	Quantity.
EGH	17, 18, 20, 21	4
MBW	2, 3, 6, 7, 9, 10, 12, 13, 14 dup., 15, 16, 90, 94, 95, 97, 100	17
XCA	23, 24	2
BEN	463, 465, 466	3
"	429, 430, 432, 435, 437, 439-442, 444, 445, 448, 451-453, 457, 460, 461	18
"	467, 468, 470-473, 476	7
XCI	670	1
KCB	1-11, 73, 75-85, 98-100	26
T. S. & Co.	352-363	12
WBR S	177, 180, 190	3
GBG	271	1
Wairakiki	313-315, 318	3
LORA	43-52, 53 dup.	12
HBO	57-60, 61 dup., 62 dup., 63-66	12
CBR	45-51	7
BEN	399	1
BBF	13, 14	2
CCCBX	108-115, 129-137	17
CCB	1, 2, 3	3
LORA	18, 19	2
WJBN	64, 65, 70, 90, 92, 93	6
OTAHU	149, 156-157, 170-179, 180-187, 189, 191-198	30
OBB	31-49	19
BBF	1, 2, 18, 19, 21-24, 88, 96-100	14
Argyle	217, 218, 220, 223-228	9
"	224 dup., 230, 232-236, 239, 243, 254-256, 258-265	20
MBW	1, 4, 8	3
BEN	178-180, 182-194, 196-198, 199 dup., 200-205	26
ABG	311-319, 321, 322 dup., 323-327, 330-336	24
XCI	696-714, 726, 729, 740-744, 746-748	29
BEN	474	1
XCI	727, 728, 730-739	12
DCC	25-27, 29-34	9
OBB	31-49	19
KCB	38, 40, 46, 56, 59, 89, 91-93, 96	10
DAK	222-249	28
NMC	607-619	13
WCI	59-70, 72, 75-80	19
Carie	248, 249, 251, 253, 254	5
SMS	241, 248, 250, 251	4
GBC	239-242, 245-252	12
JGWC	30, 31, 33, 34, 32, 35, 37-39	9
KCI	23-30	8
FBP	55, 57, 58, 60	4
BL	248-251	4
"1" over "BBP"	50-53, 55, 58, 59, 62, 65, 66 dup., 67-71, 73, 74, 76, 77	20
RBW	91-104, 106, 108-117, 334-348	40
"	314-333	20
GSB	353-360	8
CCCB	116-128, 138-141, 42-56, 58-70	45
"G" over "GG"	16-23, 26-29	12
Mark lost (unidentifiable), double dump		2
" " " quantity of loose hemp representing 1 bale		2
CCCB	137	1
GBG	271	1
Argyle	226 dup.	1
BBP	50, 57, 60-62, 64, 70, 72	8

S.S. "WAIMATE."

No. 18.

List of Bales of Wool damaged by Fire.

June, 1906.

Marks.	Nos.	Quantity.
"A P" in diamond		1
Avon		12
"B" in diamond		2
"C" in diamond "		1
C M Co L		6
"C F M" in parallelogram under diamond, over "M N X"		6
"C F M" in parallelogram		19
"T. Borthwick & Son" over "Cliff"		1
Clarence		1
"D H" in rhomboid		2
Fairfield		2
"G" over "A"		1
H H		3
Howard		1
"J S" in oval with a line at ends		1
"O 7" in square		1
Otamita		4
Paku		1
Rana		2
St. James		2
T		2
T O I		1
Tawumu		1
"W H" over "C"		3
Parallelogram divided into quarters, with "W," "T," "&," "S" in respective quarters		2
Wharanui		2
No marks		6

The numbers of all the bales in this list were obliterated or undecipherable

S.S. "WAIMATE."

No. 18.

List of Bales of Wool damaged by Water and [or] Smoke.

June, 1906.

Marks.	Nos.	Quantity.
"A P" in diamond	2, 6, 8	3
Avon	606, xx6, 567, 608, 609, x18, 604, 61x, x17, 573, 561, 563, 594, 612, 607, 595, 594, 614, x 13, 596, 593	21
"B" in diamond	334, 346, 356, 363, 858, 860	6
"B A" in diamond	92, 114, 109, 101, 106, 89, 76	7
B M	37, 41	2
Bruce	9	1
"C" in diamond	100, 117, 118, 97, 10x, 99, 93, 113	8
C M Co L	134, 136, 726, 711, 706, 650, 93	7
"C M Co L" under a diamond and a tri- angle	67	1
"T. Borthwick & Son" over "C F M" in parallelogram, over "T O I"	29	1
"C F M" in parallelogram, followed by "M N X"	174, 178, 181, 186, 148, 142, 133, 175, 182, 121, 136, 215, 157, 159, 200, 187, 134, 128, 173, 166, 134, 179, 183, 201, 131, 128	26
C F M" in parallelogram	139, 214, 149, 156, 158, 153, 162, 168, 116, 173, 158, 156, 146, 144, 145, 160, 191, 513, 76, 118, 120, 168, 183, 184, 180, 189, 150	27
		12

S.S. "WAIMATE."

No. 18. List of Bales of Wool damaged by Water and [or] Smoke—continued. June, 1906.

Marks.	Nos.	Quantity.
"T. Borthwick & Son" over "Cliff" ...	229, 265, 261, 191, 251, 258, 213, 206, 221, 220, 281, 269	3
Clarence ...	301, 281, 304	3
"DH" in rhomboid ...	53-55	2
E G W ...	233, 238	2
"FP" in diamond ...	69, 50	14
Fairfield ...	1, 2, 4, 5, 177, 184, 390, 394, 13, 16, 74, 26	1
"G" over "A" ...	24	1
Glen ...	40	3
H H ...	4, 6, 7	2
H U I ...	6, 20	4
H U I A ...	20, 22, 26, 29	13
Howard ...	126, 192, 196, 145, 139, 84, 97, 91, 89, 186, 158, 98, 94	2
"J L" over "R" in a triangle ...	38, 40	4
"J S" in oval, with a line at ends ...	97, 93, 106, 85	6
Kelso ...	147-149, 152, 115, 130	2
Kyeburn ...	191, 194	3
"LP" in diamond ...	59, 65, 53	2
M B ...	16, 17	1
Moawhanga ...	19	1
"M" over two hearts ...	336	7
"R C B" over "Ngaruru" ...	154-157, 163, 179, 180	1
"07" in square ...	173	2
"O L" over "M" ...	53, 55	17
Ohoka ...	168, 184, 956, 958, 148, 146, 194, 145, 159, 957, 940, 60, 63, 156, 152, 173, 183	9
Otamita ...	185, 187, 142, 143, 145, 146, 100, 17, 147	4
"P" in square ...	318, 341, 324, 325	2
"P A W" in diamond ...	2, 9	3
P A K U ...	13, 18, 21	2
R O ...	3, 12	10
Raua ...	103, 105, 73, 80, 99, 90, 99, 87, 64, 71	4
Scott ...	29, 31, 7, 10	30
St James ...	366, 416, 425, 354, 389, 349, 226, 217, 323, 327, 417, 347, 401, 386, 358, 340, 350, 384, 362, 342, 397, 298, 377, 405, 419, 378, 251, 415, 426, 432	20
T ...	226, 22x, 197, 231, 236, 202, x91, 10x, 233, xx4, 176, 177, 208, 209, 201, 195, 187, 183, 189, 199	6
T O I T O I ...	144, 140, 116, 118, 2, 102	5
T O I ...	80-82, 70, 84	1
Taurimu ...	20	1
W X ...	2	18
"W H" over "C" ...	204, 205, 90x, 314, 319, 320, 329, 330, 326, 312, 307, 308, 282, 272, 261, 265, 322, 315	2
Parallelogram divided into quarters, with "W," "T," "&," "S" in respective quarters	26x, 131	8
Wharanui ...	1, 6, 9, 13, 15, 16, 18, 20	1
Woodlands ...	81	
<i>Skins.</i>		
"A T" in parallelogram ...	1	1
Clarence ...	2	15
"G G" in parallelogram ...	17-31	4
"G U I" in parallelogram ...	7, 8, 9, 10	3
"P B" in parallelogram ...	1-3	

LIST OF CARGO SURVEYED FOR DAMAGE EX S.S. "GOTHIC."

Voyage 32.

Wool.

Reported 11th June, 1906.

Port shipped.	Marks.	Description of Goods.	Shippers.	How damaged.
Wellington	Avondale A R D	38 bales wool	Murray, Roberts, and Co.	35 damaged by smoke and water and 3 in good order.
"	"	7 "	Levin and Co.	6 " " and 1 by fire and water.
Lyttelton	" Ashburton," " Ashburton" followed by "CFC" in rhomboid, and "Ashburton"	89 "	Bank of New Zealand	84 " " and 5 ditto.
"	Balmoral	11 "	Dalgety and Co.	11 damaged by smoke and water.
"	Bracken Field	14 "	National Mortgage and Agency Company	14 " " and tallow.
"	"8" over "Beaumont"	12 "	"	10 " " and 2 by fire and water.
Lyttelton	"CMCoL" followed by a diamond	91 }	Christchurch Meat Company	60 " " and 17 in good order (few with wrappers smoke-stained).
"	"CMCoL" followed by "AS"	9	Borthwick and Sons	5 " " fire and water.
"	"CMC" over "T. Borthwick & Son"	9	"	9 " " fire and smoke (4 bales with wool loose) smoke and water.
"	CO	10	National Mortgage and Agency Company	9 " " and 1 by fire and water.
"	CFM, G D G	9	Dalgety and Co.	7 " " 2 "
"	CFM, M B K	50	Sims, Cooper, and Co.	46 " " 4 "
"	CFM	12	"	8 " " 4 "
"	CFM	105	"	41 in good order; some wrappers smoke-stained; 16 damaged by fire and smoke, 30 by water and smoke, and 18 by fire and water.
"	CFM, Bramdean	74	Canterbury Frozen Meat and Dairy-produce Export Company	67 in good order; some wrappers smoke-stained; 7 damaged by fire and smoke.
"	Cheddah Valley	10	"	9 bales damaged by water and smoke, and 1 by fire and water.
Not manifested	CF	2	"	2 bales damaged by fire and water.
Wellington	D 7	4	Bank of New South Wales	4 " " " and 1 by water and smoke.
"	Deer Park	2	G. A. Scales	1 " " " and 13 ditto.
"	D J B...	18	Murray, Roberts, and Co.	5 " " " 12 "
"	"DB" over "M" in diamond	15	"	3 " " water and smoke.
"	D M G	3	Bank of Australasia	3 " " " "
"	"FG" over "N"	4	Levin and Co.	4 " " " "

X—H. 29.

LIST OF CARGO SURVEYED FOR DAMAGE EX S.S. "GOTHIC"—continued.
Wool—continued.

Port shipped.	Marks.	Description of Goods.	Shippers.	How damaged.
Wellington	"F F" over "W"	10 bales wool	Levin and Co.	9 bales damaged by water and smoke, and 1 by fire and water.
"	G E M	1	W. and G. Turnbull, for Bank of New South Wales	"
"	"G J B" over "B"	6	Murray, Roberts, and Co.	and tallow.
"	"G B" over "N"	5	Levin and Co.	"
"	"G C F" over "F," or "G C F" over "G"	2	"	and 1 by fire and water.
Lyttelton	Gough Bay	6	National Mortgage and Agency Company	and 2 ditto.
"	G	16	"	"
"	"H" in diamond	5	Bank of New Zealand	"
"	Islington	4 bales skins	"	and 1 by fire and water.
Wellington	J B M	19 bales wool	Andraeae and Co.	and 3 ditto.
"	"J" over "M K"	6	Murray, Roberts, and Co.	and tallow.
"	"J G G" over "W"	2	"	"
"	"J G" over "B"	2	"	"
Not manifested	"J A G" over "W"	1	"	"
"	J G	1	"	"
Wellington	Jack	1	Levin and Co.	and 5 by fire and water.
"	"J B M" over "W"	14	Andraeae and Co.	and 1 ditto.
Lyttelton	"R" in diamond, followed by "H"	8	A. T. Milnes	"
"	K K K	10	Levin and Co.	10 in good order.
Wellington	"K K" over "K," in oval	12	National Mortgage and Agency Company	12 damaged by water and smoke.
Lyttelton	Longburn	13	"	and 6 by fire and water.
Wellington	"L D" over "K"	135	"	" 14
Not manifested	Mt. Grey	5	"	"
Lyttelton	M A I	24	National Mortgage and Agency Company	4
Wellington	McM	7	Murray, Roberts, and Co.	4
"	Orautaho	24	"	4
"	"P & S" over "J R F"	6	"	"
"	"P & S" over "J & S" over "P H C"	1	W. and G. Turnbull and Co.	1 damaged by fire and water.
"	Waitanga Hills	1	"	"
Lyttelton		10	National Mortgage and Agency Company	and 3 by water and smoke.

Wellington	“R B” over “M”	2 bales wool	Murray, Roberts, and Co.	1	damaged by water and smoke, and 1 by water, tallow, and smoke.
“	“R G C” over “F”	3	Levin and Co.	3	damaged by water and smoke.
Lyttelton	Radley	55	A. H. Turnbull and Co.	40	“ and 15 by fire and water.
Wellington	“SG” over “W,” followed by “Released” over “J G” over “W”	7 bales skins (? wool)	Murray, Roberts, and Co.	7	“ and by fire and water.
“	Spring Hills	22 bales wool	Levin and Co.	18	“ and 4 by fire and water.
“	“S M” over “D,” followed by “Released” over “J M” over “D”	6	“	4	“ “ 2
Lyttelton	“J” and “T” combined	40	National Mortgage and Agency Company	33	“
Wellington	T M N	1	W. and G. Turnbull, for Bank of New South Wales	1	“
“	“TK” in diamond	2	New Zealand Loan and Mercantile Agency Company	2	bales in good order.
“	T B G	4	Murray, Roberts, and Co.	4	damaged by water and smoke.
“	“T” over “T T”	11	“	9	“ and 2 by fire and water.
Not manifested	“T T”	1	“	1	“
“	“W P” over “B”	1	Murray, Roberts, and Co.	1	“
Wellington	W L	19	Levin and Co.	15	“ and 4 by fire and water.
“	“W I” over “W,” in diamond.	10	F. W. Swift and Co.	10	“
Wellington	“W E M” over “M”	1	Bank of Australasia	1	“
“	76	15	Levin and Co., agents for Jackson and Co.	15	“
“	7 P	1	Andraeae and Co.	1	“
Lyttelton	“5” in circle	102	National Mortgage and Agency Company	90	“ and 12 by fire and water.
“	Repacks (equal to) and a quantity loose wool	90	“	84	bales damaged by fire and water, and 6 by water and smoke. The loose wool damaged by fire, water, and smoke.
Not manifested	“M” under a half-circle, over “Greasy Hills”	1 bale skins	“	1	bale damaged by water and smoke.
Wellington	“T K” in diamond	1	New Zealand Loan and Mercantile Agency Company	1	“
Lyttelton	“H” in diamond	1 bale hair	Bank of New Zealand	1	“
<i>Hemp.</i>					
Wellington	A H & F A	9 bales hemp	Levin and Co.	“	All in good order.
“	A K A	2	“	“	“
“	A S P	53	Levin and Co.	28	bales in good order.
“	“	“	J. A. Lutz	4	“ damaged by water and slightly discoloured.
“	“	“	A. S. Paterson and Co.	21	“ “

LIST OF CARGO SURVEYED FOR DAMAGE EX S.S. "GOTHIC"—continued.
Hemp—continued.

Port shipped.	Marks.	Description of Goods.	Shippers.	How damaged.
Wellington	A W A	27 bales hemp	J. A. Lutz; New Zealand Loan and Mercantile Agency Company; Levin and Co.	All in good order.
"	Ashlea	1	Levin and Co.	Damaged by smoke only.
"	GLP	4	Murray, Roberts, and Co.; A. S. Paterson and Co.	All in good order.
"	Crown	69	Levin and Co.	22 bales in good order, 2 smoked - stained, and 45 damaged by water and smoke.
"	CCC	4	"	3 bales in good order and 1 smoke-stained.
"	DBB	3	"	All in good order.
"	EMU	29	Murray, Roberts, and Co.	28 bales in good order and 1 damaged by smoke.
"	GGG	4	"	All in good order.
"	Heaton	3	Levin and Co.	"
"	Herston	85	J. A. Lutz; Murray, Roberts, and Co.	68 bales in good order, 2 water-stained, and 15 damaged by water and smoke.
"	Herrington	6	Levin and Co. (Limited)	All in good order.
"	JHH	16	"	15 bales in good order and 1 damaged by water.
"	JWP	10	"	4 bales in good order, and 6 damaged by water and smoke.
"	Kara	4	Joseph Nathan and Co.	All in good order.
"	"	2	"	"
"	KKK	8	J. A. Lutz; Levin and Co.	6 bales in good order and 2 damaged by water.
"	Kiwi	10	Levin and Co.	10 bales damaged by water and smoke.
"	Linton	7	"	All in good order.
"	Maru	2	"	"
"	Moutoa	20	"	9 bales in good order, 1 damaged by water, 4 by water and smoke, 4 by fire and water, and 2 by smoke and heat.
"	Moa	2	"	2 bales damaged by water and smoke.
"	MSW	4	"	All in good order.
"	Oturoa	48	"	6 bales in good order, 39 damaged by water and smoke, and 3 by fire and water.
"	Oroua	33	"	All in good order.
"	Puke	4	"	"
"	Puriri	23	"	22 bales in good order and 1 damaged by fire.
"	Poplar	46	Levin and Co.; J. A. Lutz	15 bales in good order, 29 damaged by water and smoke, and 2 by fire and water.

Wellington	Rata	...	...	4 bales hemp	New Zealand Loan and Mercantile Agency Company	All in good order.
"	River	...	...	8	Levin and Co. ...	"
"	SXC	...	...	22	J. A. Lutz; Levin and Co. ...	{ 24 bales in good order, 42 damaged by water and smoke, and 3 by fire and water.
"	SXCX	...	...	47	Levin and Co.; Murray, Roberts, and Co. ...	All in good order.
"	SDL	...	...	11	Levin and Co. ...	"
"	SMB	...	...	2	Joseph Nathan and Co. ...	"
"	Te Tori	...	...	2	Levin and Co. ...	"
"	Tane...	...	...	18	"	17 bales in good order and 1 damaged by fire.
"	Te Kopai	...	...	14	"	13 " "
"	Tupu...	...	...	2	"	All in good order.
"	Takapu	...	...	1	"	"
"	Tui	...	...	10	"	"
"	"WAL" over "TK"	...	...	18	Levin and Co.; J. A. Lutz ...	"
"	A star between the new moon's horns	...	...	10	Levin and Co. ...	11 bales in good order, 6 damaged by water and smoke, and 1 slightly wet.
...	No marks	...	...	24	...	All in good order.
...		...	...			8 bales in good order, 14 damaged by water and smoke (some with bands broken), and 2 damaged by fire and water.

Wellington	...	...	...	6 casks tallow	Levin and Co., for Bank of New South Wales	Damaged by water and smoke.
Wellington	B	...	...	3	Murray, Roberts, and Co. ...	"
Lyttelton	CHT	...	...	74	Christchurch Meat Company	"
"	"CM Co L," followed by "K" in diamond	...	...	51	"	Casks wet and dirty; otherwise in good condition.
"	"CM Co L," followed by "L" in diamond	...	...	99	"	"
"	C MC	...	...	32	Canterbury Frozen Meat and Dairy-produce Export Company	"
"	"C," "F," "M," "Co," in the four angles of a cross	...	...	140	Ditto	138 ditto; 2 damaged by fire and water.
"	"F" over "CM" over "Co," in a circle	...	...	115	"	Casks wet and dirty; otherwise in good condition.
Wellington	PRM	...	...	17	Murray, Roberts, and Co. ...	"
"	"MR & Co" over "Patea"	...	...	2	Levin and Co. ...	"
Lyttelton	WHS	...	...	6	W. H. Downer ...	"
"	WHD	...	...	45	"	"
"	Unidentifiable	...	...	4 casks tallow and a quantity loose	...	Damaged by fire and water.
"	"	...	...	1 cask tallow	...	" water and smoke.

Tallow.

LIST OF CARGO SURVEYED FOR DAMAGE EX S.S. "GOTHIC"—continued.

Port shipped.	Marks.	Description of Goods.	Shippers.	How damaged.
Wellington	"S. Oppenheimer" in a half-circle over "96 to 98 Pearl St., New York," followed by "G"	68 casks casings	W. and G. Turnbull and Co.	Damaged by water and smoke; casks wet and dirty; some leaking.
"	Ditto, followed by "FWP"	16 "	W. Hirsch and Co.	Damaged by water and smoke; some casks leaking.
"	Sheep, I	13 "	"	"
"	" II	13 "	"	"
"	" III	2 "	"	"
"	Lamb, I	14 "	"	"
"	" II	2 "	"	"
"	"WH" over "L" over "Hanks"	7 "	"	Damaged by water and smoke.
"	"WH" over "S" over "Hanks"	2 "	"	"
Wellington	"DB" over "W," in diamond	3 casks pelts	Murray, Roberts and Co.	Damaged by water and smoke.
Lyttelton	BB	56 "	Bowron Bros.	"
"	"BB" over "L"	10 "	"	"
"	REX	11 "	"	"
"	"L & Co" in diamond	40 "	"	and some leaking.
"	"CFM" in rhomboid, over "MHX"	13 "	Sims, Cooper and Co.	and pressure.
"	No marks	3 "	"	"
Teneriffe	MS	100 cases potatoes	V. E. Percy	Damaged by fire, water, and smoke.
"	QV	63 "	F. H. Garner	"
"	JH	47 "	W. H. Clemson	"
"	"MC" over "BM" over "S"	54 "	Teneriffe Fruit Agency	"
"	J&F	50 "	"	"
"	GGR	113 "	"	"
"	GER	12 "	"	"
"	BGG	14 "	"	"
"	CIV	40 "	"	"
"	GGR	66 "	"	"
"	JRR	64 "	"	"
"	VCL	102 "	"	"
"	AMC	29 "	"	"
"	FF	620 "	"	"
"	DG	919 "	"	"
"	LLL	69 "	Teneriffe Forwarding Company	"

Sundries.

Monte Video	"KF" over "MCF C"	65 bales rubber	Edward Cooper and Co.	4 bags rubber marked "KF" over "MCF C" damaged by water, smoke, and heat; 35 bags rubber, unidentifiable, damaged by water, smoke, and heat; 29 bags and 13 bundles, unidentifiable, damaged by fire, smoke, and water; 2 (loose) bundles, unidentifiable, damaged by fire, smoke, and water; a quantity loose pieces, unidentifiable, damaged by fire, smoke, and water.
"	"KF" over "FBL"	5 "	"	Damaged by water and smoke; wrappers stained and dirty.
"	KF	6 "	"	Ditto.
"	"KF" over "BC"	11 "	"	All more or less destroyed.
"	ECH	33 "	"	19 bales leather damaged by water and smoke.
"	"KF" over "ELB"	18 bales ipecacuanha	"	A quantity of loose leather damaged by fire, water, and smoke.
Rio de Janeiro	JFM	7 ditto	Rio Janeiro Flour-mills and Granaries (Limited)	1 bale basils damaged by water and smoke.
"	"RFM" over "Remoido"	1000 bags sharps	"	Damaged by water and smoke; also 40 empty cases damaged by fire.
Wellington	"FG" over "N"	3 bales leather	Levin and Co.	Damaged by water and smoke.
Lyttelton	LA & Co	11 "	Bouron Bros.	" " " " and heat.
"	SC	9 "	"	" " " " " also 7 empty cases damaged by fire.
Wellington	WME Co, 75	339 cases preserved meat	Wellington Meat Export Company	Ditto; also 1 empty case damaged by fire.
"	"BF	87 ditto	"	Damaged by fire and smoke; also 105 empty cases damaged by fire.
"	"V	127 "	"	19 cases damaged by water and smoke; also 1 empty case damaged by fire.
"	"L	5 "	"	5 cases in good order; 1 case damaged by fire and water, 6 cases by fire and smoke (tins dented and leaking).
"	"HS	99 "	"	Damaged by water, smoke, and heat (tins rusty and leaking).
"	"OC	18 "	"	25 cases damaged by fire and smoke, and 4 by fire and water; 8 tins damaged by water; all tins in same dented and leaky, some rusty.
"	Unidentifiable	1599 tins ditto	"	Damaged by water, smoke, and heat.
"	WME Co, D	20 cases meat-extract	Wellington Meat Export Company	In good order externally.
"	"SMP" over "Winton"	14 ditto	Murray, Roberts, and Co.	
"	Parrot	2 "	"	
Lyttelton	"CMC" over "L"	33 "	Christchurch Meat Company.	
"	Unidentifiable	29 cases and 8 tins meat-extract	"	
Lyttelton	"CFM" in rhomboid, followed by "B & Co" over "L"	25 cases sheeps' tongues	Canterbury Frozen Meat and Dairy-produce Export Company	
"	OW	2 cases weasands	"	

EXHIBIT No. 36.

SHIPMENTS of WOOL and SHEEP-SKINS out of New Zealand for the Year ending 30th September, 1906.

Port.	Wool.	Sheep-skins.		
	Bales.	Bales.	Number.	Weight.
				Lb.
Wellington ...	92,924	4,135	206,720	...
Lyttelton ...	79,349	...	118,003	1,023,442
Napier ...	58,104	...	50,674	...
Dunedin ...	35,871	4,276	245,231	1,643,905
Timaru ...	33,674	802	...	...
Gisborne ...	32,874	485	...	227,394
Bluff ...	23,932	...	237,182	780,626
Wanganui ...	15,467	...	40,276	306,860
Waitara ...	2,861	5	...	...
New Plymouth ...	2,855	27	1,472	...
Auckland ...	13,415	...	165,824	372,578
Oamaru ...	11,093	...	3,738	29,507
Picton ...	10,381	359	18,386	139,295
Nelson ...	2,125	67	3,536	27,178
Patea ...	1,378	...	...	...
Greymouth ...	220	...	4,488	33,074
Hokitika ...	120	...	1,050	...

EXHIBIT No. 37.

TABLE showing EXTRAORDINARY RISE in VALUES of WOOL in the HOME MARKETS during the Past Four Seasons.

	May, 1902.	May, 1903.	May, 1904.	May, 1905.	May, 1906.
	d.	d.	d.	d.	d.
Super 70's merinoes ...	23-23 $\frac{1}{2}$	27 $\frac{1}{2}$ -28	26-26 $\frac{1}{4}$	26 $\frac{1}{2}$ -27	30 $\frac{1}{2}$ -31
Super 60's ...	22-22 $\frac{1}{2}$	25 $\frac{1}{4}$ -26	23 $\frac{1}{2}$ -23 $\frac{3}{4}$	24 $\frac{1}{2}$ -25 $\frac{1}{2}$	28 $\frac{1}{2}$ -28 $\frac{3}{4}$
60's ordinary ...	21 $\frac{1}{4}$ -21 $\frac{1}{2}$	24 $\frac{1}{4}$ -25	22 $\frac{1}{4}$ -23 $\frac{1}{4}$	23 $\frac{1}{2}$ -24 $\frac{1}{2}$	27-27 $\frac{1}{2}$
58's crossbred ...	19 $\frac{3}{4}$ -20-17	22 $\frac{1}{4}$ -23 $\frac{1}{2}$	20 $\frac{1}{4}$ -21	21 $\frac{3}{4}$ -23 $\frac{3}{4}$	26 $\frac{1}{2}$ -27
56's " } New Zealand	17 $\frac{1}{2}$ -18	19 $\frac{1}{2}$ -20 $\frac{3}{4}$	18 $\frac{1}{2}$ -19 $\frac{1}{4}$	20 $\frac{1}{4}$ -22 $\frac{1}{4}$	25 $\frac{1}{2}$ -26
50's " } wools	13 $\frac{1}{2}$ -15	16 $\frac{3}{4}$ -17 $\frac{1}{4}$	16 $\frac{1}{2}$ -16 $\frac{3}{4}$	18-20	24-24 $\frac{1}{2}$
40's " }	9 $\frac{1}{2}$	10-10 $\frac{1}{2}$	13 $\frac{1}{4}$ -13 $\frac{3}{4}$	13-15 $\frac{3}{4}$	18 $\frac{1}{2}$ -18 $\frac{3}{4}$
36's " }	8 $\frac{1}{2}$	9-10 $\frac{1}{4}$	12 $\frac{1}{4}$ -12 $\frac{3}{4}$	12 $\frac{1}{2}$ -15 $\frac{3}{4}$	17 $\frac{1}{2}$ -17 $\frac{3}{4}$
32's " }	8	8 $\frac{1}{2}$ -9 $\frac{3}{4}$	11 $\frac{1}{4}$ -12 $\frac{1}{4}$	12-14 $\frac{3}{4}$	16 $\frac{3}{4}$ -17
North hogs (best) ...	8 $\frac{1}{2}$ -8	8 $\frac{1}{2}$ -8 $\frac{5}{8}$	10 $\frac{3}{4}$ -10 $\frac{1}{2}$	12-13 $\frac{1}{4}$	15 $\frac{1}{4}$ -15 $\frac{1}{2}$
Yorkshire hogs (best) ...	9 $\frac{1}{2}$ - $\frac{3}{4}$ - $\frac{1}{4}$	8 $\frac{1}{2}$ -8 $\frac{5}{8}$	10-9 $\frac{3}{4}$	11 $\frac{1}{2}$ -12 $\frac{3}{4}$	14 $\frac{3}{4}$ -15
Lincoln hogs ...	7 $\frac{7}{8}$ -7 $\frac{1}{4}$	6 $\frac{7}{8}$ -6 $\frac{3}{4}$	9 $\frac{1}{4}$ -9 $\frac{1}{2}$	11 $\frac{1}{4}$ -13	14 $\frac{1}{4}$ -14 $\frac{1}{2}$
" wethers ...	5 $\frac{1}{4}$ -5	6-6 $\frac{1}{4}$	9 $\frac{1}{4}$ -9 $\frac{1}{2}$	10 $\frac{3}{4}$ -12 $\frac{1}{2}$	12 $\frac{3}{4}$ -12
Ordinary halfbred hogs ...	7 $\frac{3}{8}$ -7	7 $\frac{3}{4}$	9 $\frac{1}{2}$ -9 $\frac{3}{4}$	11 $\frac{1}{2}$ -12 $\frac{1}{2}$	14 $\frac{1}{2}$ -14 $\frac{3}{4}$
" wethers ...	6 $\frac{1}{8}$ -6	7-7 $\frac{1}{2}$	9 $\frac{1}{2}$ -9 $\frac{1}{2}$	11 $\frac{1}{2}$ -12 $\frac{1}{4}$	13 $\frac{3}{4}$ -14
Irish hogs (selected) ...	7-6 $\frac{1}{2}$	7 $\frac{1}{2}$ - $\frac{1}{4}$ - $\frac{1}{2}$	9 $\frac{1}{4}$ -9 $\frac{1}{2}$	11 $\frac{1}{2}$ -13	14 $\frac{1}{2}$ -14 $\frac{3}{4}$
" wethers ...	5 $\frac{3}{4}$ -5 $\frac{1}{2}$	7	9-9 $\frac{1}{4}$	11 $\frac{1}{4}$ -12 $\frac{1}{2}$	13 $\frac{3}{4}$ -14
Kent " ...	5 $\frac{3}{4}$ -5 $\frac{1}{2}$	7 $\frac{1}{4}$ -7 $\frac{1}{2}$	9 $\frac{1}{4}$ -9 $\frac{1}{2}$	11 $\frac{1}{4}$ -12	13 $\frac{3}{4}$ -14
Pick Shropshire hogs ...	8	8 $\frac{3}{4}$ - $\frac{3}{4}$ - $\frac{1}{4}$	10	11 $\frac{3}{4}$ -13	15 $\frac{1}{4}$ -15 $\frac{1}{2}$
" " wethers ...	7 $\frac{1}{4}$ -7	8	9 $\frac{3}{4}$	12 $\frac{1}{2}$ -12 $\frac{3}{4}$	14 $\frac{1}{4}$ -14 $\frac{1}{2}$

EXHIBIT No. 38.

SIR,—

Wool-fires Royal Commission, Wellington, 6th December, 1906.

I have the honour, by direction of the Commission, to forward herewith a statement of shipments of wool damaged by fire on the s.s. "Rimutaka," s.s. "Gothic," and s.s. "Waimate," and to ask if an official of your company can supply the Commission with the following (and other) particulars: Quality of wool in each bale; condition of such wool; date received in your works; date and method of treatment; period of time such wool remained in your works; date of leaving your works; date of shipment.

The Commission is also desirous that such official should produce all books and documents in support of such information, and supply such other information as the Commission may desire in order to ascertain the foregoing particulars.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Managing Director, Canterbury Frozen Meat Company (Limited), Christchurch.

CANTERBURY FROZEN MEAT COMPANY (LIMITED).

S.s. "Rimutaka."

1.	Fairfield. No. 278, No. (?)	...	...	...	...	...	2 bales.
2.	C. F. M. in parallelogram over five dots with a dash under them within an oval ring. Nos. (?), (?)	...	...	...	...	...	2 bales.
3.	" over T T. Nos. (?), (?)	...	...	...	...	...	2 bales.
4.	" over MNX. Nos. 278, (?)	...	...	...	...	...	2 bales.
5.	" over D. C. over HB conjoined. No. 49	...	...	...	...	...	1 bale.
6.	" over B B in a diamond. Nos. (?), (?), 42, 73, 74, 93, 95, 96, 127	9 bales.

S.s. "Gothic."

7.	C. F. M. in parallelogram over Bramdean over Washed	74 bales.
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S.s. "Waimate."

8.	C. F. M. in parallelogram over MNX. Nos. (?), (?), (?), (?), (?), (?)	6 bales.
9.	" Nos. (?), (?)	19 bales.
10.	Fairfield. No. (?), (?)	2 bales.

DEAR SIR,—

Christchurch, 13th December, 1906.

I delayed answering yours of the 6th instant until I could give you information with regard to the questions asked. I will now take the list attached to your letter and go through each seriatim.

1st line (the "Rimutaka"—Fairfield): We did not ship a bale No. 278 by this boat. We sent a bale 78, which consisted of superfine X-bred lambs.

2nd line (2 bales): We cannot identify whether they came from Belfast or Fairfield without numbers, nor can we give descriptions or dates.

3rd line (2 bales): Again without the numbers we cannot identify these. In the case of this wool, we forwarded it to the New Zealand Shipping Company, Lyttelton, and the owner, Mr. T. Robson, made his own shipping arrangements.

4th line (No. 278): Contains super X-bred lambs. We forwarded to Lyttelton about the 2nd of May. Messrs. Sims, Cooper, and Co. arranged the shipping.

5th line: This bale is part of the shipment of 16 bales, and consists of super X-bred lambs. It left the Fairfield Works about the 11th of April. Messrs. Gould, Beaumont, and Co. arranged the shipping.

6th line: This line is from Belfast, and is part of a line of 139 bales. The numbers mentioned consisted of super $\frac{1}{2}$ -bred lambs and superfine X-bred lambs. They left our works about the 12th of April. We forwarded them to Lyttelton, and Bowron Bros. made the shipping arrangements.

7th line: This is part of a shipment of 104 bales, and was an accumulation of wool on account of Mr. A. E. Tutton, of Amberley, from the 1st of January to the 22nd of March. It left the works about the 19th of April. The wool consisted of the ordinary mixed lines of our freezers' slipes. The Union Bank made the shipping arrangements.

8th line: This bale was from Fairfield, on account of Mr. C. R. Clark. We forwarded to Lyttelton early in April. We cannot identify descriptions without the numbers.

9th line: Without information as to numbers and submarks we cannot identify this.

Last line: We did not ship any wool by this vessel with the mark named.

If you can give us any further information as to the details required I will endeavour to give you further particulars, and in the meantime I do not think the foremen in charge of our respective fellmongeries, by producing books, &c., could give any more information.

Yours, &c.,

F. WAYMOUTH, Managing Director.

The Secretary, Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 15th December, 1906.

Referring to the Secretary's letter of the 6th instant and your reply of the 13th, I beg respectfully to say that you have not given the information required by the Commission. Surely your books will show—(1) Quality of wool in each bale; (2) condition of such wool; (3) when received in your works; (4) date and method of treatment; (5) period of time such wool remained in your works; (6) date of leaving your works; and (7) date of shipment. As to No. 7, as shipment would be made by various parties the Commission admits that you may not, yourselves, be able to give this information, but submits that under the other six heads you can give the information desired without necessitating the Commission specially visiting Christchurch and summoning your officials to produce your books in order that the information may be extracted.

Will you kindly appreciate the importance of an early reply?

I have, &c.,

A. McARTHUR, Chairman.

The Managing Director, Canterbury Frozen Meat Company (Limited), Christchurch.

DEAR SIR,— Christchurch, 24th December, 1906.

I am in receipt of yours of the 15th instant, and having been out of town recently has caused the delay in replying. I do not think you quite understand the position with regard to freezing-works and the wool. In our case the wool is being collected from the skins on account of clients mostly daily, or rarely is their delivery less than once a week, and the wool is forwarded to Lyttelton in most cases as soon as a truck-load is ready, but in some cases for smaller clients it is held back in our works till sufficient has accumulated for a shipment. From this fact you will see that without the number of the bale, by which alone we can trace, we cannot give dates for either packing or forwarding, nor when the wool was received in the works.

As to the condition of the wool and method of treating, it would all be in the ordinary condition of our sliped wool, for which the process is as follows: The skins are washed with the wool on; they are then painted, pulled, and classed; the wool is then dried by machinery, and, after a sufficient length of time has elapsed for cooling, is packed in bales and it is then ready for shipment.

The answers to your questions categorically are as follows:—

No. 1: Cannot be given without bale-number.

No. 2: Ordinary sliped wool, cold-water wash on skin.

Nos. 3, 4, 5 and 6: Cannot be stated without bale-number.

Yours, &c.,

F. WAYMOUTH, Managing Director.

The Chairman, Wool-fires Royal Commission, Wellington.

SIR,— Wool-fires Royal Commission, Wellington, 12th January, 1907.

I have to acknowledge the receipt of your letter of the 24th December last, but the information therein contained is clearly not that which you were asked to supply. Although you may not be able to answer certain of the questions in the absence of the bale-numbers, you have not furnished me with the information desired in relation to those lines of which the numbers were supplied.

The Commission feels that were you desirous of so doing you might have furnished much fuller and detailed information than is contained in your letters, and, having a desire to put you to as little inconvenience as possible, I have to request that you will be so good as to furnish me with the answers asked for touching the various brands of wool not later than Wednesday next, the 16th instant, failing which it will be necessary to subpoena your officials to Wellington to produce your books in support of the information which the Commission has already indicated.

I trust you will realise the urgency of a prompt reply in as full a form as you can possibly give.

I have, &c.,

The Managing Director, Canterbury Frozen Meat

A. McARTHUR, Chairman.

and Dairy Export Company (Limited), Christchurch.

DEAR SIR,— Christchurch, 16th January, 1907.

I duly received yours of the 12th. I am going to Fairfield to-morrow myself, and I will see if I can obtain there the information you require and forward it by Friday's mail.

Yours, &c.,

F. WAYMOUTH, Managing Director.

Dr. McArthur, Chairman, Wool-fires Royal Commission, Wellington.

(Telegram.)

CHAIRMAN and Secretary will arrive Christchurch Saturday morning to confer with you re correspondence. Will you have information and officials available?

A. McARTHUR,

Chairman, Wool-fires Royal Commission.

Managing Director, Canterbury Frozen Meat Company, Christchurch.

DEAR SIR,—

Christchurch, 18th January, 1907.

In further reply to yours of the 12th instant, I have now made further inquiries at the respective works with regard to the wool.

The first lot asked for, per "Rimutaka"—Fairfield: As already advised, we did not ship a bale No. 278 by this vessel. We did ship a bale No. 78. This contained superfine X-bred lambs' wool. It was despatched from Fairfield on the 3rd May, 1906, and consigned to the New Zealand Shipping Company's shed. This wool belonged to a client who is constantly delivering, and we cannot therefore state the date the skins were delivered into the fellmongery.

C.F.M. in parallelogram over MNX: Bale No. 278 contained slipped super X-bred lambs' wool. This also left the works on the 3rd May, and for the same reason as in the former case we cannot give the date of receipt.

C.F.M. in parallelogram over DC over HB: Bale No. 49 contained super X-bred lambs' wool, part of a shipment of sixteen bales; left the works on the 11th April, was received at the works on the 28th February.

C.F.M. in parallelogram over BB in a diamond: Bales Nos. 73, 74, and 96 were superfine X-bred lambs'; Nos. 42, 93, 95, and 127 were super $\frac{1}{2}$ -bred lambs', part of a shipment of 139 bales. These were consigned from Belfast on the 12th April, and were from wool collected during February and March.

The treatment of all these bales was similar—viz., cold-water wash on the skins, the skins then painted, the wool pulled and dried, stored in bins between three and five days before baling, then baled up and forwarded to Lyttelton to the owner's order.

Further particulars asked for have already been supplied, and I regret that without the bale-number we cannot complete your list.

Yours, &c.,

F. WAYMOUTH, Managing Director.

Dr. McArthur, Chairman, Wool-fires Royal Commission, Wellington.

DEAR SIR,—

Christchurch, N.Z., 7th February, 1907.

Following on our correspondence with regard to list of wool reported damaged from London and my interview with your Secretary, I have now to advise you that I have been able to obtain the London reports on the whole of the C.F.M. in a parallelogram over Brandean wool per "Gothic," special report on one bale of which is made by Mr. Friswell in the parcel which he marks "D." From the London reports and warehouse weights I extract the following: Warehouse gives weights of 102 bales landed. Three bales—viz., No. 42, containing superfine X-bred lambs; No. 101, containing 3rds, X-bred lambs; and No. 104, containing 2nds, $\frac{3}{4}$ -bred lambs—had their numbers obliterated, and were renumbered, and, in weighing, these three bales showed an increase in weight of 2 cwt. 2 lb., which would be accounted for by their being reported upon as "Fire-, tallow-, and water-damaged." Two bales—viz., 100 and 102—are reported as short from the ship; No. 100 contained super X-bred scoured pieces, and No. 102 contained first slipped merino. If Mr. Friswell's sample was taken from either of these bales, it would be from bale No. 100, as the slipped merino would contain more than the 7 per cent. of grease which he referred to. Our records show that bale No. 100 was packed at the end of March, and bale No. 102 was collected between the period from January to the end of March.

Although the dock's weights show two bales short, Messrs. Helmuth Schwartz and Co., wool-brokers, give a report on the whole 104 bales, which shows 48 to be in sound condition and 56 damaged, and the bale marked J 100, above referred to, is reported amongst the sound as two bales (the number of this description in the shipment) scoured $\frac{1}{2}$ -bred super pieces, valued at 1s. 3d. per pound, the remarks being, "Fair quality and condition, little stained." The two bales of merino are reported upon, one bale as sound, and one as smoke-damaged, the reports being, on the first, "Value 1s. 0 $\frac{1}{2}$ d., good quality, fair condition, rather short"; on the second, "Value 1s. 0 $\frac{1}{2}$ d., smoke-damaged."

For your information I enclose you a copy of the broker's report, which, as I have already said, is on the whole shipment of 104 bales. The comparison of London and colonial weights may also be of service to you:—

	Loss.	Gain.
	Lb.	Lb.
1-10	28	4
11-20	17	8
21-30	21	53
31-40	7	30
41, 43-51	12	42
52-61	10	41
62-71	—	61
72-81	7	42
82-91	8	51
92-99 and 103	37	115
	147	447
		147

* Gain in 99 bales.

300*

Yours faithfully,

F. WAYMOUTH, Managing Director.

Dr. A. McArthur, Chairman of the Wool-fires Royal Commission, Wellington.

REPORT ON 104 BALES WOOL EX "GOTHIC" FROM NEW ZEALAND, IMPORTED BY THE UNION BANK OF AUSTRALIA (LIMITED), LONDON.

Description.	Mark.	Bales.	Valuation.	Remarks.
Sliped merino 1st	C.F.M. in parallelogram over Bramdean over Extra Light	1	s. d. 1 0½	Good quality, fair condition, rather short.
Sliped ½-bred super clo. (22) ..		4	1 3½	Good quality and condition, dry, fair length.
Sliped X-bred superfine (2) ..		3	1 3	Shorter, not so light.
Sliped X-bred superfine (H) ..		1	1 3	Fair length, good condition, little strong quality.
Sliped X-bred, seedy (Y) ..		3	1 2	Good lustre, but stronger quality.
Sliped X-bred, seedy (Y) ..		1	1 0	Fair length and condition faulty.
Sliped ½-bred super lambs (L) ..		4	{ 1 5 1 5½	Good quality and length, bright, light.
Sliped " (L) ..		7	1 5		Not so bright or light.
Sliped ½-bred 1st lambs (LL) ..		1	1 3½	Good quality and length, fair condition.
Sliped X-bred superfine lambs (N) ..		5	1 4½	Fair quality, good length, lustre condition.
" (N) ..		3	1 4	Not so bright.
" (P) ..		5	1 3	Fair quality, good length, lustre condition.
Sliped X-bred fine 1st lambs (NN)		1	1 1½	Good length, fair condition.
Sliped ¾-bred 2nd lambs (GG) (2 sorts)		4	1 1	Fair quality and length, little wasty.
Sliped X-bred 3rd lambs (R) ..		1	10 0	Good length, but tippy ; little wasty.
Scd. ½-bred super, pieces ..		1	1 4	Fine quality, fair bulk and condition.
" ..		2	1 3	Fair quality and condition, little stained.
Scd. ½-bred super lambs, pieces ..		..	..	Soft quality, good condition.
		48		

Description.	Mark.	Bales.	Valuation.
Sliped merino 1st, smoke-damaged	C.F.M. in parallelogram over Bramdean	1	s. d. 1 0½
Sliped ½-bred super clo., smoke-damaged ..		1	1 3½
" " water-damaged		2	1 4
" " "		1	1 3
Sliped X-bred superfine, smoke-damaged ..		3	1 3
" " "		4	1 2
" " smoke- and tallow-damaged ..		1	1 2
" " fire-damaged		1	1 2
Sliped X-bred 2nd clo., smoke-damaged ..		1	1 0
Sliped ½-bred super lambs, smoke-damaged ..		7	{ 1 5 1 5½
" " "		2	1 5½
" " fire-damaged		7	1 5
" " smoke-damaged		1	1 5
Sliped X-bred superfine lambs, smoke-damaged ..		1	1 4½
" " "		8	1 4½
" " fire-damaged		2	1 4½
" " smoke-damaged		2	1 4
" " "		3	1 3
Sliped X-bred superfine 1st, smoke-damaged ..		1	1 1½
Sliped ¾-bred 2nd, smoke-damaged		3	1 1
" " fire-damaged		1	1 1
" " water-damaged		2	1 1
" " fire-, water-, and tallow-damaged ..		1	1 1
Sliped X-bred 3rd, fire- and water-damaged ..		1	0 10
		56	

Total, 104 bales.

London, 9th July, 1906.

HELMUTH SCHWARTZ AND Co.

Summary of Description of 104 Bales branded C.F.M. in Parallelogram over Bramdean, forwarded to Lyttelton from Belfast on the 19th April, 1906, consigned to the Shaw, Savill, and Albion Company's Stores, and subsequently shipped per s.s. "Gothic."

1	...	...	DC	Super $\frac{1}{2}$ -bred lamb pieces, scoured.
27	...	...	L	Super $\frac{1}{2}$ -bred lamb.
21	...	...	N	Superfine X-bred lambs.
8	...	...	P	
11	...	...	GG	2nds, $\frac{3}{4}$ -bred lambs.
6	...	...	Z	Super clothing, $\frac{1}{2}$ -bred.
2	...	...	V	1st merino sliped.
9	...	...	WW	Super X-bred.
4	...	...	H	Superfine X-bred.
1	...	...	JD	" pieces, scoured.
5	...	...	ZZ	Super $\frac{1}{2}$ -bred.
2	...	...	S	" pieces, scoured.
2	...	...	R	X-bred lambs, 3rds.
1	...	...	Y	Seedy X-bred.
2	...	...	NN	1st fine X-bred lambs, part 1st X-bred lambs.
1	...	...	LL	1st $\frac{1}{2}$ -bred lambs.
1	...	...	T	2nd clothing X-bred.

104

EXHIBIT No. 39.

SIR,—

Wool-fires Royal Commission, Wellington, 6th December, 1906.

I have the honour, by direction of the Commission, to forward herewith a statement of shipments of wool damaged by fire on the s.s. "Rimutaka," s.s. "Gothic," and s.s. "Waimate," and to ask if an official of your company can supply the Commission with the following (and other) particulars: Quality of wool in each bale; condition of such wool; date received in your works; date and method of treatment; period of time such wool remained in your works; date of leaving your works; date of shipment.

The Commission is also desirous that such official should produce all books and documents in support of such information, and supply such other information as the Commission may desire, in order to ascertain the foregoing particulars.

I have, &c.,

O. F. DUNREATH-COOPER, Secretary.

The Managing Director, Christchurch Meat Company (Limited), Christchurch.

CHRISTCHURCH MEAT COMPANY (LIMITED).

S.s. "Rimutaka."

Triangle over C. M. Co. Lt. Nos. 715, 770.

C. M. Co. Lt. over T in a circle. No. 102(?).

C. M. Co. Lt. over XX. Nos. 442, 44(?), 445, 571, 589, 58(?).

C. M. Co. Lt. over XXX. No. (?).

S.s. "Gothic."

C. M. Co. Lt. No. 149 (sliped), No. 750.

C. M. Co. Lt. over XXX. Nos. 149, 170.

S.s. "Waimate."

C. M. Co. Lt. over diamond. No. (?), (?), (?), (?), (?), (?), 6 bales.

SIR,—

Wool-fires Royal Commission, Wellington, 12th January, 1907.

With reference to the Secretary's letter of the 6th December last, wherein you were asked to furnish the Commission with certain information relative to certain lots of wool shipped by you and bearing your brands, which wool was damaged by fire on the s.s. "Rimutaka," s.s. "Gothic," and s.s. "Waimate," I would draw your attention to the fact that no reply has been received to such letter.

The Commission is desirous of giving you an opportunity of furnishing replies to the questions set out in the letter above mentioned, but as the absence of such information is causing the Commission considerable inconvenience, delay, and expense, I would ask that you will be so good as to furnish me with a reply to the several questions asked not later than Wednesday next, the 16th instant, failing which it will be necessary to subpoena your officials to Wellington to produce your books in support of the information which the Commission has already indicated.

I trust you will realise the urgency of a prompt reply in as full a form as you can possibly give.

I have, &c.,

A. McARTHUR, Chairman.

The Managing Director, Christchurch Meat Company (Limited).

SIR,—

161 Hereford Street, Christchurch, 14th January, 1907.

We have to acknowledge receipt of your favour of the 12th instant, and much regret the delay in supplying you with the information required as to wool damaged by fire on the several steamers named therein. The queries contained in your original letter are by no means easy to answer, and were handed over to one of the officials of the company in order that every possible investigation might be made before replying to same. Owing to the extraordinary pressure of work which has been experienced during the last two or three weeks, on account of the dry season in Canterbury, the investigations have been somewhat interfered with, and hence the delay, for which we must apologize. We need scarcely say that we wish in every way to facilitate the investigations of the Commission, and hope, so far as in our power, to reply fully to your letter not later than Wednesday next.

Yours, &c.,

For the Christchurch Meat Company (Limited),

W. MURRAY, Manager.

The Chairman, Wool-fires Royal Commission, Wellington.

(Telegram 17/1/07.)

CHAIRMAN and Secretary will arrive Christchurch Saturday morning to confer with you *re* correspondence. Will you have information and officials available.

A. McARTHUR, Chairman, Wool-fires Royal Commission.

Managing Director, Christchurch Meat Company, Christchurch.

(Telegram 18/1/07.)

COMPLETED investigations. Letter already posted containing all information available, but will be pleased to see you to-morrow. Will have witnesses and information ready.

CHRISTCHURCH MEAT COMPANY.

Chairman, Wool-fires Commission, Wellington.

SIR,—

Hereford Street, Christchurch, 17th January, 1907.

As promised, I now beg to send you herewith as much of the desired information as we find it possible to give in connection with the shipments of wool damaged by fire on the s.s. "Rimutaka," s.s. "Gothic," and the s.s. "Waimate."

C. M. Co. L. over triangle (bales Nos. 715 and 770): These two bales were shipped from our Smithfield Works, near Timaru. Bale No. 770 contained Leicester lambs' wool, seconds, ordinary slipped, whilst bale No. 715 contained Leicester pelt, slipped. As far as can be known, the condition of the wool in each bale was that of ordinary slipped wool which had been pulled from painted skins and has received a slight washing through the dollies, as is the custom at most of the freezing-works in New Zealand. It is impossible for us to state when this wool was received in the works, as, naturally, it is not possible at factories such as ours to identify the wool in any particular bale with a specific lot shipped. We have also no means of ascertaining actually when the wool in these particular bales was treated, but in the ordinary course it would be within a week or two of the date of shipment. The bales referred to left the works on the 26th April, 1906, and appear to have been shipped on the 30th of the same month, having probably been in store at the Port of Timaru for the few days intervening.

C. M. Co. L. over T in a circle: The only information that we have in connection with this wool, which was shipped and fellmongered on account of a client, is that it contained half-bred lamb, slipped, so far as is known, absolutely in normal condition. This wool left the works on the 30th April, and appears to have been shipped on the same day.

C. M. Co. L. over XX, Nos. 442, 44(?) , 445, 471, 589, 58(?): As far as we can judge, there appears to be some mistake in connection with the marks under this heading. We cannot trace having any wool marked "XX" on board the s.s. "Rimutaka," nor had we any bales on board that steamer bearing these particular numbers. All the wool shipped from our Islington Works by the s.s. "Rimutaka" bears numbers from 800-odd upwards, whilst from Timaru the shipment is nothing under 600. We find, however, that we had the following wool on board this vessel bearing marks XXX with the following Nos.: 827, 839, 840, 841, 842, 853, 932, and 947. All of the above bales contained wool of the quality known and designated by us as "cross-bred pelt washings." The first numbers, 827 to 853 inclusive, appear to have left the works on the 18th April, No. 932 on the 20th, and No. 947 on the 23rd, and ought to have been shipped, so far as can be ascertained, on the 30th April. The wool designated under the above brand consists of the trimmings and odd pieces saved from the limed pelts in process of manufacture, and whilst it does not, so far as we can judge, contain an unusual amount of moisture, there is no doubt that it does contain an exceptionally large percentage of fatty matter. Moreover, this fatty matter is not the natural grease of the wool, but is what might be termed foreign fat. It is impossible for us to give the exact date when the wool contained in these bales was received. It is more than likely that it was from four to eight or nine weeks prior to the date of shipment. The method of treatment of this wool is briefly as follows: These "washings," after being saved from the department which manufactures the pelts, are placed, until they can be dried, on concrete beds in the open air, where they generally lie from two to eight days. The length of time on which they lie there is not part of the treatment, and they are only to be there until such time as they can be conveniently handled. During the year 1906 this wool after being taken off the concrete beds was washed in dollies with usual revolving rollers in water at a temperature of 120 degrees. It was then taken out of the dollies and passed through an ordinary centrifugal hydro-extractor, where it received about ten minutes wringing in the first place. The centrifugal was then stopped and the wool stirred up and the machine again run for a second period, generally somewhat shorter than the first—say, for five or ten minutes. There is a jet of cold water allowed to run into the hydro, and also a separate jet supplying steam, the steam jet thus heating both water and wool up to a tem-

perature of about 120 degrees. By this means a large proportion of the fat in the wool passes away with the warm water into the save-alls, where it is afterwards collected. After removing the wool from the extractor it was then again dollied with water at 120 degrees to which a small quantity of sulphuric acid was added in the proportion of about 12 lb. to each 180 lb. of dry wool. The effect of the sulphuric acid was to act as a solvent for what fat might be left. After being dollied for generally about half an hour the wool was placed on the open wire tables in the open air, and it was there dried from one day to several days, according to general weather and atmospheric conditions. Whilst on these tables it was also handled and turned in order to facilitate drying. From these tables the wool when dried was removed to the wool store, where the practice is to allow it lie until sufficient accumulates to warrant baling. No record of actual dates has been kept, but the invariable practice that has been followed is that no wool of this description is sent from the works store for shipment until some considerable time after baling, generally about four weeks at least.

With regard to the s.s. "Gothic" wool, no bale bearing the brand No. 149 was shipped in this vessel, but two bales of XXX wool, cross-bred pelt washings, bearing the marks Nos. 749 and 750 were on board this vessel, together with another bale of the same quality marked No. 770. These bales are, we think, the bales referred to on the list supplied with your letter. These wools are of the same class, and have been treated according to the same process as above fully described in connection with the "Rimutaka" shipment. These bales were despatched from the works on the 9th April, and appear to have been shipped on the 11th April.

In the s.s. "Waimate," eight bales of the same class of wool, "cross-bred pelt washings," left the works as follows: On the 2nd April, bale No. 511; on the 4th April, bales Nos. 720 and 721; on the 5th April, bales Nos. 554, 649, 650, 651, and 652. We can add nothing further in connection with the treatment of these than has been above detailed.

We regret that we cannot supply the information exactly in the form required in your letter, but the above embodies all that we can ascertain with regard to these shipments. Should you desire any further information which we can possibly secure we shall be pleased to try and furnish same.

Yours, &c.,

For the Christchurch Meat Company (Limited),
W. MURRAY, Manager.

The Chairman, Wool-fires Royal Commission, Wellington.

SIR,—

Christchurch, 21st January, 1907.

We expected to have seen you on Saturday, as arranged, but understand that on account of the steamer's delay your arrival in Christchurch was so late that it was impossible to do anything on Saturday.

Since writing you on the 17th instant fully with all the information then in our possession relating to the shipments enumerated in your query of the 6th December, we have had an experience at our Islington works which we think is of the utmost importance. Late in the afternoon of the 17th instant, after our letter had been written, we received telephone advice from Islington that the foreman of the wool department had just detected a smell of fire amongst some of the wool received into his store *ex* our special wool recovery department, which treats with the wool saved from the process of pelt manufacture. This is the wool which has been shipped under the brand XXX, designated "cross-bred pelt washings."

As reported to the Secretary of your Commission to-day, when certain suspicion was thrown last year upon wool of this quality, the writer issued instructions that no more wool of this description should on any account be shipped until we were in a position to judge clearly as to whether there was particular danger of spontaneous combustion from this class of wool. Since about July of last year, therefore, no shipments of this class have been made.

The wool in which the spontaneous combustion took place was lying loose in the wool store at Islington, and had not been subject to any particular pressure. It has been reported to me that the rays from the sun at a certain time of the day struck upon this heap through a roof window, and it was suggested that possibly this might have accounted for the ignition. We may say, however, that from the evidence before us, which points clearly to the fact that ignition took place within the heap and not on the outside, that it would appear as if spontaneous combustion alone had been responsible.

We attach hereto copy of our chemist's report upon the incipient fire, from which you will notice that the amount of actual moisture in this wool appears to be abnormally low. On the other hand, the amount of foreign fat, as already reported, is very high.

We have handed to your Secretary two samples of the wool—one as ready for shipment, and the other after the spontaneous combustion took place on the afternoon of the 17th instant. The latter sample is wet, on account of the wool having been thrown out and having been subject to heavy rain during the night.

Should the Commission desire to conduct a special experiment with this class of wool, we shall be very pleased to forward a bale or more, as may be desired, at any time on receipt of advice. We have explained to your Secretary that it is only within the last season or two that any attempt has been made to save and ship this particular class of wool, and there is therefore practically only the experience of the shipments of the latter end of 1905 and the season 1906 to guide us in forming conclusions as to its safety or otherwise.

We feel it our duty to inform you fully as to this, as it undoubtedly may help the Commission to arrive at a sound conclusion as to on what class of wools there are dangerous possibilities of spontaneous combustion.

Whilst it is obviously our duty to assist the Commission in every way in its labours, we trust that you will see that no undue publicity is given to the information which we now forward you. We have felt it our duty to place these facts very fully before you, and all that we desire is that

the general public should not be led to erroneous conclusions, and probably pass immature judgment on our factory should the name of our firm or factory be prominently mentioned in the Press or elsewhere.

Yours, &c.,

For the Christchurch Meat Company (Limited),
W. MURRAY, Manager.

The Chairman, Wool-fires Royal Commission, Wellington.

DEAR SIR,—

Christchurch, 18th January, 1907.

In reference to the incipient fire in wool from wool recovery yesterday, I was afforded an opportunity to see the nature and condition of the wool affected, and since numerous analyses of this quality wool have been made I believe that this throws a very important light upon the subject of fire in wool.

This wool contained only 6 to 10 per cent. moisture, and 34 to 36 per cent. fat, and since the moisture could not possibly be a consideration, the whole weight is thrown upon the fat content, which is not a natural wool fat, but an animal fat of poor quality.

The outside temperature of the heap was 87° Fahr., and strong pungent odours of pyridine and burning albuminous substances were plainly noticeable. On removing the outer wool the mass was charred and smouldering; the thermometer read 450° Fahr. immediately above the discoloured material, and on insertion into the charred mass registered over 660° Fahr., which is the highest temperature that this instrument records.

Some of this wool had been kerosene treated, but since kerosene evaporates completely at much below 450° Fahr., and since if kerosene had been present it would have ignited the whole material, the fact of some of the wool having been kerosene treated had no connection with the outbreak.

The rays of the sun were striking the heap, but since the charred material was at least 3 ft. inside the mass this consequently was not a cause of the outbreak.

Yours, &c.,

A. M. WRIGHT.

The Manager, Christchurch Meat Company.

EXHIBIT No. 40.

To the Wool-fires Royal Commission, Wellington, New Zealand.

Petone, Wellington, 25th January, 1907.

HAVING been deputed by you to carry out some experiments and tests of various classes of wool as usually shipped from New Zealand, similar as possible to a ship's hold, I beg to report that I have done this, and the method adopted by me was as follows:—

After obtaining the qualities of wool that I thought suitable, I had the wool opened and added the different percentages of moisture to the different qualities; had them repacked and dumped, placing an iron tube 18 in. long, closed at the end, in each bale, to enable me to take the temperatures. This tube was securely closed by a plug, or cork, and kept so, excepting when taking the temperatures. After the bales were dumped they were placed in a large box, 11 ft. long, 6 ft. high, and 6 ft. wide, double lined, and insulated with sawdust; all timbers and joints were securely nailed, and the box closed up after the wool was put in. The temperatures were taken through small port-holes at the side, which were kept closed and securely locked.

The wool was damped on 4th December, 1906, repacked 5th December, dumped on 6th December, and closed in the box on 7th December. The temperatures were first taken on 11th December, six days after repacking and five days after dumping. All wools were examined by the Commissioners after damping and before repacking. Attached is a description of the wool used, together with the moisture added, date of reading and the temperatures of the respective bales, weight of each bale before adding the moisture, amount of moisture added, and the weight of wool after the box was opened. The wool was reweighed on the 16th January, 1907. You will note the low-quality skin pieces show a large decrease in weight, while most of the good qualities show a slight increase. I may say that on opening the bales Nos. 13, 4, 5, 7, 9, 11, 14, and 16, when the Commissioners were present, the wool showed very little signs of damage either to colour or staple; but on careful examination of the different lots of wool after cooling down some of it showed signs of discoloration, and the staple tender. The following is a general summary of each lot after examination:—

No. 1 (greasy pieces): Slightly discoloured, but sound staple.

No. 2 (greasy fleece): Discoloured on top of staple; very tender.

No. 3 (scoured pieces): Rather discoloured; tender in staple.

No. 4 (skin pieces): Bad colour; staple very tender; very strong smell of tallow; inclined to cake. I consider this quality suffered more than any other, and had a very brown appearance.

Nos. 8 and 9, which are much similar in quality to No. 4, show a heavy decrease in weight.

Nos. 5 and 6, slipe C, are only slightly discoloured.

The greasy locks are much discoloured, and have a heavy, brown appearance; staple tender.

The bales of skins after being opened and allowed to cool became very much discoloured in the wool; the pelt sound, but very hard, and had a very strong smell, like burnt tallow.

The bales of skin pieces were free from all particles of skin, which is not the case with many lots shipped.

This particular quality of wool (skin pieces) is very treacherous, unless care is taken to have it properly dried and prepared for shipment, on account of the animal-fat mixing with the wool while removing it from the skins.

Those bales which I have opened and examined I have redried and packed, and can be examined at any time. The balance of the bales, which have not been opened, may be shipped when necessary.

Yours, &c.,

S. V. BURRIDGE.

WOOL EXPERIMENTS.

No.	Description.	Condition of Contents.	Moisture added.	Temperatures.																Weight before Manipulation.	Weight of Moisture added.	Weight at Testing.	Variation.
				December								January.											
				10	11	12	13	14	15	17	18	18	20	24	26	29	2	5	10					16
5	Slupe C	..	Per Cent. 20	70	75	90	90	95	120	110	110	110	108	104	108	79	80	86	Lb. 423	Per Cent. 20=85	Lb. 508	Per Cent. Lost 3	
10	B and P Slupe	Painted slupe wool. Coarse .. Slupe wool mixed with painted pieces, with lime showing in pieces	20	120	123	138	132	135	130	140	140	140	140	100	100	80	81	81	Lb. 423	20=71	426	Gain 3	
6	Slupe C	Slupe skin wool removed off skin by depilatory; what is known as "painted"	24	70	75	85	91	99	100	110	110	120	100	100	110	100	90	90	Lb. 423	24=95.76	494.76	Lost 15	
12	"	Slupe Lincoln, painted, extra moisture ..	24	75	85	85	85	110	112	110	110	110	100	100	100	84	81	88	Lb. 423	24=78.96	407.96	Gain 4	
4	Skin pieces	Skin pieces, sweated, low moisture ..	15	140	140	140	140	140	130	120	110	110	100	90	90	84	86	100	Lb. 423	15=47.25	365.25	Lost 13	
9	"	" " increased moisture ..	18	140	140	130	125	142	150	150	135	120	90	90	85	82	80	90	Lb. 423	18=71.28	467.28	Lost 20	
8	"	" " " ..	22	140	140	140	140	140	130	130	110	108	90	90	85	89	84	97	Lb. 423	22=81.40	451.40	Lost 23	
14	Scoured pieces	Scoured pieces and crutchings with vegetation and small particles of broken dags. Similar in condition to ordinary country shipping lots	18	140	140	140	140	135	100	100	100	100	90	90	80	85	81	81	Lb. 423	18=50.58	331.58	Gain 5	
3	"	Ditto. Increased moisture ..	24	120	130	125	130	130	120	100	105	98	80	82	80	80	80	83	Lb. 423	24=66.72	344.72	Gain 4	
11	Greasy pieces	Greasy pieces ..	12	70	75	80	80	100	120	110	105	110	100	90	90	80	80	85	Lb. 423	12=53.28	497.28	Gain 3	
1	"	" " " ..	15	70	80	80	80	100	100	110	110	110	100	90	90	80	82	86	Lb. 423	15=68.40	524.40	Gain 2.5	
15	Skins	Damp sheep-skins with plenty of fat on ..	Damp	120	120	120	120	120	120	120	110	120	110	110	110	102	90	81	Lb. 423	..	..	..
16	"	" " " ..	"	120	120	120	121	120	125	125	115	110	98	100	94	90	88	..	Lb. 423	..	..	..
13	Locks	Greasy locks, with percentage of vegetation and particles of dags; heavy in grease	12	70	70	75	76	98	100	110	110	110	82	80	85	85	84	512	Lb. 423	12=62.64	574.64	Lost 8.7	
2	Fleece	Greasy fleece; low moisture ..	18	70	90	108	110	120	115	110	110	110	100	90	90	84	80	90	Lb. 423	18=49.68	325.68	Gain 13	
7	"	" " increased moisture ..	25	70	80	80	80	110	120	120	120	100	98	100	100	100	98	Lb. 423	25=69.25	346.25	Gain 3		

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