

GUIDING CHANCE FROM THE "SCHOOL BOARD" TO THE ETH BOARD

**HOW THE ORGANISATION
OF SCIENCE HAS EVOLVED
IN SWITZERLAND**

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Urs Hafner
Bern, 2 February 2021

FOREWORD

Dear reader

Founded in 1855 as a national “incubator” for engineers, ETH Zurich is now a university of world renown. The ETH Board, which set to work at the same time as the “school board” of what was then known as the “Polytechnic”, is much less well known. Over the decades, the university was joined by a number of other institutions: Empa, WSL, Eawag, and later also EPFL and the PSI. Together, these two Federal Institutes of Technology – along with the four research institutes – form today’s ETH Domain. The duties of the ETH Board have evolved accordingly: from being the supreme authority of the “Poly” to becoming the strategic management and supervisory body for six institutions, while also representing them in dealings with policy-makers and the Confederation.

This complex system whereby the six institutions are woven into the ETH Domain has proven very successful. I should like to enlarge on this briefly. Autonomy plays a central role here – and at several levels. On the one hand, the ETH Board handles its business independently within the framework of the law, representing the ETH Domain vis-à-vis policy-makers and the Confederation. And on the other hand, ETH Zurich and EPFL plus the four research institutes are autonomous federal institutions of the Confederation which are subject to public law: they have their own legal personality and manage their own affairs independently. This arm’s length relationship to political bodies is a key element contributing to the success of Swiss science. The ETH Domain and its institutions must be able on their own to define their strategy and the focal areas of their research activities. Only the researchers themselves – fully motivated and given sufficient freedom – will address the topics that truly matter.

This “dual autonomy” is duly reflected in the financing arrangements: parliament approves a funding framework extending over four years, while the Federal Council defines strategic goals for the ETH Domain over the same period. The ETH Board determines how the funds should be distributed among the institutions. It is then up to the two Institutes of Technology and the four research institutes to decide how they deploy their allocation in the areas of teaching, research, knowledge and technology transfer, infrastructure and personnel.



President of the ETH Board since February 2020:
Michael O. Hengartner
› Ruben Wyttenbach/ETH Board

This highly complex system, which lives by a process of mutual exchange, is per se a characteristic feature of today's Swiss Confederation. It is a liberal system that allows for a great deal of freedom and is not dictated from above. Just as Swiss democracy needs debate and dialogue, Swiss science too has to contend with repeated challenges. As part of an ongoing dialogue, the various players have to find the right path for science that benefits the nation and society as a whole. Occasionally that leads to minor disputes or even to bigger upsets, but overall it results in an impressive degree of stability. This route of negotiation, discussion and compromise has not only fostered innovation in the ETH Domain but has made Switzerland one of the world's most innovative countries. With the challenges we are facing – such as digitalisation and climate change – it is vital that we build solid foundations for our future work. This, too, calls for an intensive dialogue between government, the research institutes and the researchers themselves. The ETH Domain is at the service of Switzerland, helping it to build these solid foundations for our country's future success.

Commissioned by the ETH Board but given a free rein in terms of content, the historian Urs Hafner recounts and comments on the Board's history and development. For this I am very grateful to him. I wish you an interesting and stimulating read.

Zurich/Bern, June 2021



Michael O. Hengartner,
President of the ETH Board

A SPECIAL CASE

A SPECIAL CASE

Nearly everyone has heard of the Federal Institute of Technology Zurich, or ETH Zurich for short. But very few people have heard of the ETH Board. The contrast could hardly be greater: on the one hand, the world famous technical university that enjoys a leading reputation among researchers, and on the other its government-appointed management body, which is not responsible for ETH Zurich alone.

The ETH Board supervises the ETH Domain, which consists of six scientific and research institutions, all reporting to the federal government: in addition to ETH Zurich and its equally prominent sister institute, Ecole polytechnique fédérale de Lausanne (EPFL), these are the Paul Scherrer Institute (PSI), the Federal Institute for Forest, Snow and Landscape Research (WSL), the Federal Laboratories for Materials Testing and Research (Empa) and the Federal Institute of Aquatic Science and Technology (Eawag). These six institutions are spread across a dozen sites in thirteen cantons, from Geneva to Davos and from Lugano to Villigen in Aargau.

It is a point in the Board's favour that hardly anyone has heard of it. Its role is to ensure that the institutions it supervises flourish in their nationally important work of teaching, research, training, professional development and service provision. As long as this remains true, the Board has fulfilled its remit. In order to do so, it is constantly having to regularly review its positioning and that of its Domain, as the requirements relating to science and technology change over time. In the middle of the 19th century, when the Federal Polytechnic School – now known as ETH Zurich – was founded, our digitalised “knowledge society” was still a long way in the future.

Both the Board's mode of functioning and its very existence are surprising for a federalist country like Switzerland. Although there are a number of national coordinating bodies, the universities are all run by the cantons. The universities of applied science and the teacher training colleges are organised at cantonal and intercantonal level. Education, too, is the responsibility of the cantons. The two Federal Institutes of Technology are therefore exceptions, as are the research institutions. After all, it is a remarkable fact that the two Federal Institutes are managed partly by outside bodies, yet are independent of the Federal Administration, whereas the universities have a high degree of autonomy despite being more closely bound up with politics.

The ETH Board and its Domain therefore have a somewhat exceptional relationship with the Confoederatio Helvetica. Nor has the wellbeing of these generously funded institutions suffered as a result. In fact their very success seems to confirm the efficacy of their unique structure. At the same time, however, this increasingly complex set-up, embedded as it is in a multilayered national and international academic system, has repeatedly caused frictions,

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both minor and major, which eventually forced the Federal Council to step in. Dissension and renown, stability and subtly functioning precision mechanics – these all seem parts of the same whole.

Little wonder that the ETH Board is constantly seeking the perfect method of governance. It is a work in progress: managing all these factors is a balancing act involving many different participants whose interests sometimes collide: the professors of the Federal Institutes, their presidents and rectors, the directors of the research institutes, the state secretaries for education, the Federal Council, and – rarely but notably – the students. History has bequeathed a difficult task to the Board.

The 11-person ETH Board and its staff of around 50 are based in two offices: in Zurich, where the Board was set up in the Polytechnic School era, and in Bern, close to the Swiss parliament and the French-speaking part of Switzerland. In addition to its president and vice-president, the Board includes the presidents of the two Federal Institutes, a member who represents the four research institutes, and the delegate of the two University Assemblies. The other five members are drawn from industry and science, and have links with other research institutions. Six members of the current Board (i.e. more than half) are female. Politics is only peripherally represented, in the person of a former National Councillor.

The ETH Board is officially appointed by the Federal Council and is the strategic management and supervisory body of the ETH Domain. It ensures that the Domain achieves the objectives set by the federal government or the State Secretariat for Education, Research and Innovation (SERI) – objectives which the Board itself can help set. The Board appoints professors and makes recommendations to the Federal Council regarding the appointment of the presidents of the two Federal Institutes and their professors, as well as the directors of the research institutes. The respective presidents are not allowed to vote on matters pertaining to the Federal Institutes. This rule also applies to the member who represents the research institutes.

The ETH Board's most important task is to allocate funds. In accordance with a more or less fixed formula, which nevertheless provokes controversy on occasion, the six institutions receive about CHF 2.5 billion annually: around 50 percent goes to ETH Zurich, 25 percent to EPFL, about 13 percent to PSI as the largest of the four research institutes, and the remainder to the others. The Board also makes public pronouncements on matters to do with science policy, and provides information about research findings. However, it does all this sparingly. History has shown that it is not always sensible to attract too much attention.

**A SUCCESSFUL STOPGAP:
THE SCHOOL BOARD
(1854–1968)**

A SUCCESSFUL STOPGAP: THE SCHOOL BOARD (1854–1968)

The ETH Board was created in 1854 as the Swiss School Board of the newly founded Federal Polytechnic School in Zurich, a higher education institute which excited considerable controversy. The recently formed federal state wanted to set up a national university with a focus on medicine, theology and law. Alfred Escher, then an up-and-coming liberal (free-market) politician and entrepreneur, supported this vision. Scholars and major figures of the Enlightenment had been mulling over this plan since the late 18th century but had been unable to obtain a majority in parliament: not only the regional and religious differences but also those between the university cantons and the federal government were simply too great. A compromise was reached in the shape of a polytechnic school. Yet this stopgap turned out to be a stroke of luck for the young Swiss nation.

The liberal elites saw their own interests embodied in the technical school, as the latter supplied the engineers and scientists that the rapidly developing country needed. The philosophical and economic sciences also included in the Polytechnic School's curriculum were all that remained of the failed national university project. In 1905 Wilhelm Oechsli, a historian who taught at the Polytechnic School, wrote approvingly in a commemorative volume: "If Switzerland has now become a wonderland of engineering, and hosts the greatest works of engineering on its soil, this is in no small measure thanks to its technical college. As Swiss soldiers and officers once did, so today do Swiss engineers and businessmen fan out the world over, doing credit to the name of Switzerland even in the mountains of Abyssinia. (...) In short, there is hardly any field in which the Polytechnic School has not already exercised, and increasingly continues to exercise, its fructifying effect."

The Swiss School Board (the precursor of the ETH Board) was the supreme body of the Federal Polytechnic School. Parliament could not agree on the name of the governing body. A member of the National Council suggested calling it the "Swiss Education Board", because he "thought [it] undignified to use the same name as the school committee found in every little parish". The School Board was set up by the Federal Council, which had – and still has – ultimate authority over the new institute. It consisted of five members, with Johann Konrad Kern (a member of the Council of States for Thurgau and a federal judge) as president, and Alfred Escher as vice-president. The other three seats were filled by a member of the National Council from Geneva, a Bernese professor (of earth sciences), and a politician and doctor from Lucerne. French-speaking Switzerland and (liberal) Catholicism were thus also represented. Politically, the School Board was dominated by the liberal elite. Its federalist composition reflected that of the Federal Council.

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The School Board had wide-ranging responsibilities. It proposed professors to the Federal Council, which then appointed them. Furthermore, it appointed everyone who worked at the Polytechnic School, including the director and heads of department. Lastly, it specified how funding was to be allocated, drew up timetables, and organised examinations and the awarding of degrees. Its president had extensive powers. Kern was dubbed the “Louis Philippe of Thurgau” by the press, in allusion to the French Citizen King. It was his responsibility to supervise the entire institution and ensure that it was managed in compliance with the laws and regulations.

In his inaugural speech at the Polytechnic School in 1855, Johann Konrad Kern pointed out that the technical implementation of nearly all Switzerland’s railways was being undertaken by foreigners. That should never happen again: “May the first federal education establishment, under the protection of the Almighty, be a blessing to our beloved fatherland, and may future generations count this day, on which it is officially declared open, as one of the finest in the cultural history of our people!” The new institution was a patriotic affair.

Starting from nothing, the School Board and its president had to build an entire college of higher education from the ground up. Professorial appointments were advertised in Swiss, German, Belgian and French newspapers, and a physicist travelled to Paris to spend CHF 17,000 on equipment and instruments. A bookshop presented books to the new polytechnic, while the consul in Le Havre donated two chests of minerals to be used in geology teaching.

The appointment of the stateless revolutionary and architect Gottfried Semper, who was wanted by the German authorities, to a professorship sparked controversy. The Federal Council demanded that Semper, the Polytechnic School’s first star, should either prove his citizenship or become a Swiss citizen. He was unable to do the former and unwilling to do the latter. The School Board refused to back down and the architect was appointed; he designed the new Polytechnic School building. The Board also stood up for the many foreign students who attended the School, right from the start. They were not always welcomed with open arms by the Swiss population

Kern spent only four years as president of the School Board. He was succeeded by Johann Karl Kappeler, who – like Kern – was also a member of the Council of States, a federal judge and a citizen of Thurgau. He served as president of the Board until 1888. According to observers, his was “an almost monarchical regime”. Kappeler monitored the professors by attending their lectures. He was repeatedly confronted by rebellious students who felt infantilised and wanted the same academic freedoms they would have had at a university. They were not free to choose the subjects they studied. In the 1860s, the School Board complained that even in the new building the students would scratch their desks with knives, break door locks, dirty the corridors and “scrawl malicious insults” in the lavatories.

When the School Board forbade duels and duelling fraternities, the students physically threatened the director. The “ringleaders” were expelled. “The School Board also had to face up to its duty and its responsibility to the country that founded this institution”, said its report to the Federal Council. It “trusted and believed that this national institution was a place of diligence, orderliness and good manners to which Switzerland and other countries could confidently entrust their sons”. Women, too, were permitted to enrol right from the start, with the first woman graduate (a Russian) obtaining a degree in agriculture and forestry in 1877.

Towards the end of the 19th century the School Board was enlarged, from five to seven members. This followed protests from the ‘Gesellschaft ehemaliger Polytechniker’, an association of industrialists and engineers who had formerly studied at the Polytechnic School. They believed that the School needed to strengthen its relations with the business sector, to which considerably more weight was now given on the School Board. As a result, the requirement for a Catholic politician to be represented was dropped. Politics gradually faded into the background. Geneva industrialist Gustave Naville played a significant part in the reorientation; he served as a member of the School Board for many years, although he never became its president.

The Polytechnic School performed services for the Swiss state right from the start. These were organised by the School Board in what were known as the “annex institutions”. In 1880, the Building Materials Testing Institute (now Empa) began operations at the Polytechnic School. It carried out tests relating to railway and bridge construction. However, it was not permitted to conduct what would now be regarded as basic research. In the same year, the Polytechnic School established a forestry testing institute, which developed into the Swiss Central Institute for Forest Research – now WSL – in 1885. It studied woodlands and compared tree species with a view to improving forest management.

At the turn of the century, the Polytechnic School underwent a crisis – partly because of the School Board’s hostility to change. Although the technical disciplines were steadily becoming more scientific, the Polytechnic School was reluctant to transform itself into a university, which would have necessitated a change of name. Nor did the School Board chaired by Hermann Bleuler, an engineer and army colonel from Zurich, introduce academic freedom or the right to confer doctorates, since it favoured the traditional degree. However, the pressure (including from students) became too great, and in 1911 the Polytechnic School was given its new name: “Eidgenössische Technische Hochschule Zürich” or E.T.H.Z. Its official name in English is the “Swiss Federal Institute of Technology Zurich”, although its German name could also be translated as the “Swiss Federal Technical University Zurich”. The School Board was chaired by a chemistry professor from Schaffhausen called Robert Gnehm, who had links with Sandoz. ETH Zurich now had the right to confer doctorates. The crisis was over.

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The School Board piloted the ever-expanding ETH safely through the following decades. The 1930s were particularly significant. On the one hand, ETH's research orientation took shape under Gnehm. Up to that point, teaching had been more important. On the other, the presidency of Gnehm's successor, the Geneva engineer and technical scientist Arthur Rohn, weakened the links with the political world, and liberalism in particular. Instead, Rohn cultivated relationships with industry and the banks, not least in order to obtain the additional research funding that parliament was refusing to grant.

1936 saw the founding of ETH Zurich's third research institute: the Advisory Centre for Effluent Treatment and Water Protection, today known as Eawag. The Swiss Angling Association had previously approached the Federal Council to demand that measures be taken to combat water pollution. Meanwhile, the School Board continued to wrangle over the structure of the research institutes. In the 1950s, for example, there were plans to reorganise the institute now known as WSL. While the School Board obliged it to undertake its service tasks and coordinate with ETH Zurich's research, it successfully insisted on its freedom of research.

In 1957, in the midst of the Cold War, the western world had a shock: the Soviet Union demonstrated its technological and military superiority by launching the first ever satellite into orbit. The West was caught on the back foot. Technical sciences were now in particular demand. ETH Zurich benefited from this and continued to expand. 1960 and 1968 saw the founding of the Swiss Federal Institute for Reactor Research and the Swiss Institute for Nuclear Research, respectively, both of which were located in Villigen, canton of Aargau. These institutes held out the hope that Switzerland would one day have its own atomic energy for both civil and military use. In 1988 the two institutes were merged and became PSI, whose activities subsequently went far beyond atomic physics.

**A LAWLESS EMPIRE:
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(1969–1990)**

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After the 'Sputnik shock', the School Board suffered a political blow in 1969 when the Swiss people firmly rejected the new ETH Act in a referendum launched by the VSETH students' association, even though the law had been passed by parliament unopposed. In the spirit of '68, the students asserted that co-determination at grass roots level had not been properly addressed – an argument that appeared to convince many voters. Or was the electorate simply making the academics aware of its general indifference? At any rate, the policy-making scientific establishment had been cut down to size. Following the abandonment of the Act, a provisional arrangement with constantly changing transitional rules remained in place for over 20 years. The event that had occasioned the new law was not reversible: the founding of EPFL.

When the federal government boosted science and research in the 1960s, new institutions were established – including the Swiss Science Council, the two parliamentary Committees for Science, Education and Culture, and the Swiss Conference of Higher Education Institutions. Turning the University of Lausanne's Polytechnic School (the Ecole polytechnique de l'Université de Lausanne, or EPUL) into a federal institute – EPFL – in 1969 was a decisive step, since it was thus placed on an equal footing with ETH Zurich. The engineering school, offering instruction in chemistry, physics, mathematics, drawing and architecture, was originally founded by private individuals in 1853, two years before the Zurich Polytechnic School. However, by the turn of the century it still had only about 130 students.

There was no opposition to EPUL being transferred to federal control, since the Canton of Vaud was financially overstretched and the Confederation wished to strengthen the economy. The Swiss School Board was now responsible for two Federal Institutes. Moreover, the research institutes were being restructured despite the rejection of the ETH Act; the School Board reorganised Empa, for example, merging its twenty autocratically run departments into six units. In short, 1969 marked the actual inception of the ETH Domain, and with it the ETH Board, although this was admittedly still called the School Board. The new order did not become law until the 1991 Act.

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Meanwhile, the act dealing with the founding of ETH remained in force. A transitional arrangement defined the cooperation between the two Federal Institutes and granted co-determination rights to their members. Research was for the first time defined as a task of the Federal Institutes. Their rectors, who were elected by the professors, declined in importance. The School Board had to be enlarged and restructured. A new hierarchical level was introduced: the two vice-presidents of the School Board, who were also the presidents of the Federal Institutes. They therefore had seats on their own supervisory body – and still do today. This led to the vice-presidents not being allowed to be present from the start of the meetings, or having to refrain from voting on certain matters, because of the risk of partiality.

The School Board took on a new and challenging role: on the one hand it was still managing ETH Zurich, which was much the most important of its institutions, and on the other it assumed an increasing number of “strategic” functions for all the institutions. It was forced to devote more time and expertise to planning. As a result, it was even more liable to find itself caught in the middle between individual institutions and the federal government. However, the School Board’s organisational structure was already the subject of debate: when its president, Hans Pallmann, unexpectedly died in office in 1965 just as the Secretary retired, the Board found itself falling into disarray.

The Federal Council invited Karl Schmidt, a professor of German studies at ETH Zurich and later President of the Science Committee, to take over, but his rejoinder was to the effect that this failing system of an enlightened monarchy could no longer be managed by an individual. In 1966 the federal government appointed an experienced diplomat to preside over the Board in the person of Basel patrician Jakob Burckhardt, assisted by a delegate for the research institutes.

Burckhardt could thus be said to have been the first president of the ETH Board. The two vice-presidents – i.e. the presidents of the two Federal Institutes – also sat on the Board, together with a former member of the Council of States and a cantonal councillor. An EPFL professor, a delegate for matters regarding the annex institutions and the president of the VSETH were all “guest” members. Burckhardt remained president for twelve years, and almost all his successors served for around ten. Long as these terms of office were, most of their predecessors had been in office for around twenty years. The new management team was exacting and demanding. Furthermore, Burckhardt was confronted with students staging a sit-in at his office at ETH Zurich because they wanted to be admitted to the departmental conferences. For the 1968/69 academic year he arranged a series of events entitled “Educational requirements in the industrial world”. Little seemed certain and everything was up for discussion, with “reform” the watchword of the day.

At the School Board meeting in October 1970, Burckhardt somewhat wistfully greeted “the dawn of a new reign”. The number of members was increased and a significant proportion of the meetings were thrown open to representatives from both Federal Institutes. Although, as Burckhardt said, the School Board was no longer the Confederation’s sole formulator of science policy, he added

that “we alone must actively grapple with the complexities of life, teaching and research, and the wishes and ideas of the two schools and the institutes that we are here to guide”. The VSETH representatives shared this aim, but their demand to attend every meeting and have the right to inspect all documents was rebuffed.

In the early 1970s the oil crisis brought the launch of Switzerland’s education and science policy to an abrupt halt, as cost-saving suddenly became the order of the day. While the electorate voted in favour of the constitutional article relating to research in 1973, it nevertheless rejected the article on university teaching. This was a severe setback for the Confederation’s efforts to create a better coordinated national education system. In the same year the government ordered a recruitment freeze. This affected the ETH Domain badly, and in 1978 the revised Higher Education Promotion Act was defeated at the ballot box. The climate of opinion was still not as pro-science as the School Board had hoped.

In 1985 the new president of the School Board invited Maurice Cosandey, a structural engineer who had been the first President of EPFL, to a Swiss National Science Foundation press conference in Bern. Together with watch magnate Nicolas G. Hayek he presented the ‘General analysis with optimisation and concept study’ that Hayek Engineering AG had carried out in the ETH Domain. From the 1980s onwards, almost all public institutions employed management consultants to explore the potential for optimisation and cost-savings. The Federal Council also regarded this as appropriate for the Domain. The day after the conference, the tabloid ‘Blick’ – which took a keen interest in the study, like all the media – ran the following headline: “Hayek’s ETH bombshell stuns officials! Swiss research faces collapse – old professors to go!”

Hayek concluded that the Domain was no longer in touch with technological developments. He thought there was scope for rationalisation in both Federal Institutes as well as the research institutes, and found the Board’s management structure inadequate. As he pointed out, the Board had to undertake the tasks of both an executive board and a board of directors. According to Hayek, who was a businessman himself, the Board needed more entrepreneurial skills. However, he also concluded that the federal government should invest more in the Domain, where hundreds of new posts were needed. In other words, Hayek called for the recruitment freeze to be lifted.

The School Board, which was certainly keen to be regarded as a corporate body, was naturally very pleased to hear this. It immediately filled the positions that the Domain needed and sent the Federal Council the bill. In addition, as the historians David Gugerli, Patrick Kupper and Daniel Speich explain in their book “Die Zukunftsmaschine” [translated into English as *Transforming the Future: ETH Zurich and the Construction of Modern Switzerland 1855–2005*], the Board commissioned a whole series of detailed studies under the project title “Avanti”. These looked at optimising the ETH Domain with reference to

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over 40 parameters, such as better coordination between the Federal Institutes and improved information technology in the research institutes' administrative departments.

Heinrich Ursprung, a biology professor at ETH Zurich, presided over the School Board from 1987 to 1990. He had previously spent many years as president of ETH Zurich and therefore as vice-president of the School Board, before taking on the role of director of the new Science and Research Group at the Federal Department of Home Affairs. From 1991 his title was "State Secretary", so that he could conduct international negotiations. The Group eventually became what is now known as SERI.

At the beginning of the new decade internationalisation was on everyone's lips.

Ursprung was a shrewd, universally respected science manager. In conversation he recalled having ensured as President of the School Board that the individual board members spoke on predefined topics, had their say as often as possible, and considered the arguments put forward by the guest members of the Board: i.e. the staff representatives, assistants and students. In 1990 he delivered a lecture at the Institut National Genevois, entitled: "Quel avenir pour les universités de la recherche scientifique en Suisse face au défi international?" ["Whither the future of universities and scientific research in Switzerland confronted with international challenges?"] At the beginning of the new decade internationalisation was on everyone's lips. Universities, in particular, were looking to their international positioning. Then came a further demand from Ursprung's successor: that they should take the economy into account.

**DUAL AUTONOMY:
THE BOARD AND
THE INSTITUTIONS
(1991–2003)**

DUAL AUTONOMY: THE BOARD AND THE INSTITUTIONS (1991–2003)

In 1991 the Federal Assembly approved the new ETH Act. After 20 years of transitional arrangements, the ETH Domain finally stood on a sound legal foundation, as historian Sebastian Brändli describes in his history of the ETH Board. The School Board was now renamed the ETH Board. In the same year Roland Crottaz, the new President of the Board, wrote in the information bulletin “Wissenschaftspolitik” that the universities should systematically place greater focus on socioeconomic development. He said that the research and knowledge transfer process should be speeded up in a targeted way, and the time taken to obtain a doctorate shortened, particularly for engineering qualifications. The Board should assist the economy to position itself adroitly in relation to the international competition. He issued a reminder that the economic world was in a state of permanent rivalry and struggle.

This was the case elsewhere too. Crottaz had already stepped down by 1994, saying he was receiving too little support both from below and above. He had fallen out with the presidents of both Federal Institutes, but particularly ETH Zurich. The Board had discussed its organisation (and its organisational chart) at a meeting in January 1994. Six members had raised the rhetorical question: “Who is our boss?” Crottaz replied: “The President of the ETH Board”. That was the beginning of the end.

Following Crottaz’ resignation, “Weltwoche” magazine reported that the relations between the Board and ETH Zurich had reached rock bottom and nobody wanted to serve as president of the Board. In the “Journal de Genève”, Jean-François Bergier, a history professor at ETH Zurich (and from 1996 onwards head of the Federal Council’s ‘Independent Commission of Experts Switzerland, Second World War’, generally known as the ‘Bergier Commission’), criticised the authoritarian methods used by Crottaz, alleging that he had not respected the “academic freedom” of the Federal Institutes. He said that ETH Zurich had different traditions from EPFL. Bergier went on to state that the next president needed to take this into account, in accordance with the new ETH Act.

This law formally defined the Board as the management body of the Domain, including both Federal Institutes and the research institutes. They had all become public law institutions which managed their own affairs. The Board now had the right to appoint the professors itself. Budgetary autonomy was of central importance: it was delegated by the Federal Council to the Board and from the Board to the Management Boards and institute directors, who in turn

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delegated it to the departments. In the spirit of the times, the ETH Act had a markedly businesslike tone. Entrepreneurial freedom was placed on a par with efficiency improvements, while autonomy implied increased flexibility.

When Crottaz stood down, Vice-President Heidi Diggelmann, a biology professor at the University of Lausanne, replaced him on an interim basis – the first woman to preside over the Board. Meanwhile, Federal Councillor Ruth Dreifuss was on the lookout for a new management team. In 1995 she instated a duo who successfully headed the Domain for almost ten years: President Francis Waldvogel, a professor of medicine from Geneva, was responsible for strategy, and Vice-President Stephan Bieri for the operational business. An economist, manager and army colonel, Bieri was also known as “the Delegate”. Waldvogel officially worked for the Board one day a week, while Bieri’s post was full time. Despite their differences, the duo were a successful team. Waldvogel preferred a participatory style, while Bieri liked to lead from the top. It was said only half-jokingly that Waldvogel was president under Bieri.

Francis Waldvogel recalled in conversation that he had found the Board in an appalling state: his first task was to repair the relations between the two Federal Institutes and the research institutes, and straighten out the finances. It soon became clear to him that both ETH presidents had been under the thumb of his predecessor (Crottaz). He quickly made changes, allowing them to be present at the meetings right from the start. In his view, the Board’s task was to defend the Domain externally while creating a climate of constructive discussion internally. Bieri immersed himself in the essential smaller matters without which – as he himself said – the organisation would never have got back up to speed; this included drawing up the personnel law, the rules on recusal and the co-reporting system.

The Board opened an office in Bern to ensure easier access to members of parliament, particularly the Committees for Science, Education and Culture. Bieri says that he went up to people and spoke to them as a way of promoting the concerns of the Domain. A number of lobbyists working for the individual institutions of the Domain were also stationed in Bern, but they found themselves restricted in their activities. The Board cast a sharp eye over recruitment processes, with the aim of discouraging internal appointments in particular.

The university landscape of western Switzerland was completely transformed under Waldvogel and Bieri. They presided over the rise of the “Arc lémanique” by transferring the disciplines of physics, mathematics and chemistry from the University of Lausanne to EPFL, thus boosting the growth of the latter. Pharmacy was allocated to the University of Geneva. Waldvogel came to the conclusion that EPFL needed to move away from its traditional engineering subjects and embrace the natural sciences “in close future collaboration with biology, biochemistry, computer science and nanosciences”. To general astonishment, in the year 2000 he appointed the relatively unknown doctor of medicine Patrick Aebischer as head of EPFL. On taking up his post, the latter wasted little time in dismissing the three vice-presidents. Waldvogel recalls holding difficult conversations in which he endeavoured to smooth the ruffled feathers.

The Board opened an office in Bern to ensure easier access to members of parliament, particularly the Committees for Science, Education and Culture.

Under Aebischer, EPFL soon progressed from a regional institute to one of the world's leading universities. In little more than ten years, the number of students doubled and numerous tenure track professorships were created. Aebischer entered into spectacular, though sometimes controversial, deals with the private sector. The departments were transformed into faculties on the American model; the Faculty of Life Sciences was inaugurated in 2002. Many professors were shocked at the transformation. In 2010 the architecturally eye-catching Rolex Learning Center opened its doors. Aebischer presented the Board with *faits accomplis* before it had even had a chance to discuss them. ETH Zurich repeatedly felt ignored and hard done by, which led to tensions on the Board.

Lastly, Waldvogel and Bieri pushed ahead with "portfolio renewals" to reorient the research programmes of the research institutes. In 2001 PSI opened the Swiss Light Source (SLS), a major experimental centre. This facility, which has been upgraded several times, provides insights into the structure of material. Thousands of researchers come to Villigen each year to use the machine for their experiments. The research institutes were still not permitted to award their researchers the title of professor, which instead had to be obtained from a federal institute or university. This was intended to promote the institutes' 'scientification', according to Bieri.

In 1992 the Board collaborated with the Swiss National Science Foundation to launch a series of priority programmes (PPs) which eventually led to the National Centres of Competence in Research (NCCRs). It thus demonstrated its willingness to plan the research landscape using a top-down approach, even though a bottom-up selection system was employed. The Board wrote that the three PPs it selected served to strengthen Switzerland as a centre for research and employment, and boosted living standards. They covered power electronics, systems engineering and information technology, as well as optical science, applications, technologies and materials research.

Each programme was managed by a director who reported to the president of the Board. As it proudly noted in a leaflet, the Board made use of a new control system operated in collaboration with the consultants ATAG Ernst & Young. This meant that those responsible for policy could be supplied with information to help with their decision-making, without burdening the researchers with administration. When working on the PPs, the Board cooperated with the Science and Research Group, the Federal Office for Professional Education and Technology (now both part of SERI) and the Technology and Innovation Commission (now Innosuisse).

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In 1997 the Federal Administration adopted the principles of New Public Management (NPM). The Board announced in a strategy paper: "New Public Management is to be implemented and put into action." This type of management no longer requires laborious long-term planning: instead, it adapts to the situation. This shift is apparent in the concept of "governance", which has become popular since then. Academic funding is now allocated competitively. Researchers have to prove their excellence and demonstrate their productivity during evaluation processes. They offer expertise and advice to the administration while at the same time being subject to political interventions, since funding is bound by guidelines.

In 2003 the ETH Act was revised in accordance with NPM principles at the behest of Waldvogel and Bieri. Dual autonomy was now the order of the day, reinforced by outcome-oriented management: the six institutions and the Board managed their own affairs. The Domain received an overall budget that was cascaded downwards and linked to its performance mandate. Ultimately, the required performance had to be delivered, and this was verified by the relevant senior authority; *how* it was delivered was up to the institutions.

In addition, the Domain's links with the Federal Council were loosened further, and the ETH Board was given further powers, such as organising the research institutes, appointing members of the ETH Appeals Commission, and strategic property management. The representatives of the research institutes were granted full voting rights on the Board. The Federal Institutes were now permitted to draw up study guidelines. The new Act was approved almost unanimously. Stephan Bieri simply lamented that the representation of the individual institutions was unsatisfactory in that there was no clear separation between strategic and operational levels. Nor had it been possible to transfer ownership of the real estate to the Domain, which made investment processes more complicated.

The Board steered the Domain safely and kept the tensions between Lausanne and Zurich under control. Francis Waldvogel stepped down in 2004. One of his final projects was to make researchers more aware of their ethical and social responsibility. He had been brought in to deal with the crisis at the Board. His departure was to trigger an even greater one.

**CRISIS AND
CONSOLIDATION
(SINCE 2004)**

CRISIS AND CONSOLIDATION (SINCE 2004)

Optimism reigned at first. As the “Neue Zürcher Zeitung” newspaper reported in October 2004, Alexander J.B. Zehnder, the new president of the Board, put forward an “ambitious programme” with the following milestones: both Federal Institutes to rank among the world’s top ten universities, new competence centres for the institutions in and outside the ETH Domain, a capital base for the ETH Board, the Federal Institutes to select students, the Domain to be an innovation driver for the economy and society. Zehnder took the experience of EPFL under Aebischer as his role model. He left after just over three years. What happened?

In 2005 Zehnder, a biologist and engineer who had previously been head of Eawag, unexpectedly brought in the biologist Ernst Hafen, a professor at the University of Zurich, to be head of ETH Zurich – and thus a member of the ETH Board. Beth Krasna, a chemical engineer and manager, recalls that the Board (of which she was a member at the time) greeted this appointment with enthusiasm. People thought that Hafen, as an unbiased ‘safe pair of hands’, would finally put an end to the conflict between Lausanne and Zurich, yet he apparently set about it too hastily. Hafen proposed a radical reform of ETH Zurich to make it fit to encounter growing competition in the globalised research and education market, as he put it. Following the example of the elite US universities, he wanted to tighten up the management of the Federal Institutes, change the departmental structure and do away with the Rector’s Office.

Alexander J.B. Zehnder was meanwhile working on a no less radical reform of the ETH Domain. In 2006 the ETH Board once again discussed its corporate identity, which needed sharpening up and improving. As the Board minutes show, an agency put forward four scenarios, ranging from keeping the status quo with the different names of the six institutions (“full diversity”) through to a “holding company” with “homogeneous branding for all its members”. In Scenario IV, the Domain would be renamed the Swiss Institute of Technology (SIT) and the two Federal Institutes – i.e. ETH Zurich and EPFL – would be known

as SIT Campus Zurich and SIT Campus Lausanne; the research institutes would be called SIT Research Institutes. The global brand "ETH" would thus disappear, and with it what was regarded as the backward-looking "diversity" of the institutional names. Was the MIT (Massachusetts Institute of Technology) brand being taken as a role model?

In a consultative vote taken in March 2006, the Board came out unanimously in favour of Scenario IV, on the agency's recommendation. The few sceptics deferred to the majority. Zehnder said that in adopting the new branding the Board would show that it could compete with the best in the world. The director of PSI, who was appointed president of ETH a few months later, was of the opinion that since others were already moving in that direction it was important not to miss the boat. Charles Kleiber, the State Secretary for Education and Research who attended the meeting as a guest, endorsed this view, saying that a new name was also a means of changing mindsets: the time was ripe and courage was now needed.

Virtually all the professors urged Hafen to step down.

The plan was not implemented because of growing resistance to Hafen, culminating in a revolt that kept the Board occupied for months. Virtually all the professors urged Hafen, who had lost both his bearings and his support, to step down. This led to open conflict between ETH Zurich and the Board. Zehnder was forced to dismiss Hafen in 2006. In 2007, National Councillor Vreni Müller-Hemmi submitted a postulate calling on the Federal Council to review the ETH-Domain's management structures. Parliament debated abolishing it entirely. National Councillor Kathy Riklin, President of the Committee for Science, Education and Culture, described the Board as a flawed structure in the "NZZ am Sonntag" newspaper.

Dieter Imboden, President of the Swiss National Science Foundation, publicly called for Zehnder to resign, for which he was reprimanded by Federal Councillor Pascal Couchepin in the press. ETH Zurich submitted a complaint against the Board to Couchepin, saying that the allocation of funds breached the Board's rules of procedure and was not conducted transparently. The President of ETH Zurich played a leading role in this action. Couchepin rejected the complaint, but suggested that Zehnder should retire at the end of 2007.

Alexander J.B. Zehnder looks back on a challenging period in office, marked by the debt brake, the strong growth of EPFL, ETH Zurich's refusal to help out EPFL financially, and calls from the Swiss People's Party (SVP) to invest in the ETH Domain only if this was of benefit to the economy. He says he had to make the office in Bern focus more on lobbying in order to majority political backing. Then there were the upheavals in the Swiss education system, with the upgrading of the universities of applied sciences. In his opinion, the Board was no longer clear how far it was subject to the Federal Department of Home Affairs or to SERI, whose influence was growing, even as regards day-to-day business.

Zehnder says he was able to preserve the independence of the ETH Board. He also considers the development of the research institutes to be another of his successes: having already built the SLS, PSI also undertook to construct the free-electron laser, which will be useful to industry, while Eawag consolidated its position and WSL gained an international reputation. He adds that the Board increased research into sustainability and set up centres of excellence that attracted considerable attention worldwide. The plan to transfer part of Empa to western Switzerland, where it would be a better fit with industry and with EPFL, came to nothing. Zehnder said he would have liked to allocate more resources to Empa, but this did not prove possible.

Couchepin now had to find a new president of the Board who would be capable of restoring it to its former status. He entrusted this difficult task to a federal politician and lawyer rather than to a professor or manager. As in the 1966 crisis, it fell to a level-headed politician to pour oil on troubled waters. In 2008 Fritz Schiesser, a Council of States member from Glarus who had previously served as president of the Foundation Council of the Swiss National Science Foundation, took office. He went on to serve for 11 years.

Schiesser recalls that the scientists were very dubious about his appointment. At ETH Zurich, heads of departments and professors asked him whether he knew anything about science – his response being to ask them whether they knew anything about politics. He still reflects on his reaction with satisfaction. Schiesser says he never aspired to define academic strategy – he left that mainly to the two presidents and four directors.

Instead, he devoted himself to the political side and to fostering good relations with the federal authorities in Bern. He states that he never had any problems with SERI: he left it to deal with international matters so that he was free to cope with the Federal Institutes and research institutions. However, he claims that Parliament put pressure on him – often more than the Federal Council – as well as the Federal Administration. He states that the Federal Finance Administration in particular tried to bind and direct the ETH Domain more closely. According to Schiesser, the Board must be protected from this. He says he always insisted on the dual autonomy laid down in the ETH Act, particularly that of the Board as the Domain's representative.

There were still conflicts between EPFL and ETH Zurich over federal funding, but Schiesser was able to calm things down. Some people accuse him of taking too defensive a stance towards the EPFL presidents with their constant demands, as well as towards the institutions and the politicians. Beth Krasna believes

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that Schiesser gave the Board the assurance that its actions were legally correct, while also making the staff increasingly professional. In 2015 the Swiss Federal Audit Office found that the Board was not independent of the Federal Institutes, since the latter had seats on it. This criticism was prompted by a cost overrun by EPFL, which the Board failed to prevent. The rules on recusal for the two presidents of the Federal Institutes were consequently revised.

When Fritz Schiesser stepped down, Beth Krasna took over as interim president from May 2019 to January 2020. Michael O. Hengartner has been President of the ETH Board since 2020. A professor of biochemistry, he has substantial management experience; he was previously Rector of the University of Zurich and President of swissuniversities, the Rectors' Conference of Swiss Universities. He aims to create the right conditions for both Federal Institutes to maintain their position and still enjoy a global reputation in thirty years' time. Hengartner chairs a Board which now has greater powers of authority.

**NEVER-ENDING
TALKS**

NEVER-ENDING TALKS

The ETH Board is as complex as it is paradoxical. Its 11 members include some who could be said virtually to supervise themselves: the two presidents of the Federal Institutes (ETH Zurich and EPFL) and the director of one research institute who represents all four (PSI, WSL, Empa, Eawag).

These members of the ETH Board are of course forbidden to make decisions about their own institutions – particularly the two Federal Institutes – because this would cause a conflict of interests. Thus, the rules on recusal regularly need to be discussed and defined. There is however clear justification for these members' presence on the Board: without them, it could not guide the institutions appropriately. The members not only bring indispensable expertise to the Board, but also boost its legitimacy within the institutions. It could not function without them.

Like any governing body, the ETH Board has to work as a team. All the members need to trust one another if they are to cooperate effectively in the interests of the ETH Domain. In this respect the Board is faced with a further difficulty: the members who are heads of institutions naturally tend to pursue their own interests, and even come under pressure to do so from their institutions. The EPFL representative, for example, will attempt to obtain as much as possible for EPFL. He will be open to reproach if he fails to do so.

Yet as a member of the ETH Board he is also obliged to act in the interests of the Domain as a whole – otherwise the Board would become unable to transact its business. In any case, it would be paralysed if all three representatives of the institutes thought only of their own institutions. They do not in fact do so; otherwise the system would implode or the rest of the members would object and complain. During its history, the Board has dealt with at least two such crises (in 1994 and 2006).

Along with its success, its solid footing at federal level is one reason why the ETH system has hardly changed over the past 30 years. It is, as they say, robust. Yet it will not always stay the same. The Domain undergoes an external evaluation by a group of experts (some of them non-Swiss) every four years. One finding is that the three smallest research institutes are too small to continue as independent bodies. Many departments at ETH Zurich and EPFL are larger. The idea of mergers is therefore being bandied about. There is a tough struggle ahead, which will last years.

And what if the politicians decide that the two Federal Institutes should drop their less popular subjects and gear the curricula more precisely to the needs of the economy? If SERI wanted to integrate the Domain more closely into the Fed-

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The Board is as complex as it is paradoxical, being embedded in and permeated by Switzerland's finely balanced federal structure.

eral Administration and organise it using a top-down approach, the ETH Board would intervene on the institutes' behalf and refer to the Domain's autonomy, which also encompasses the institutions' autonomy. The Board would defend the institutions from the politicians' excessive demands and their desire to influence teaching and research content. It would be their protective shield.

The Board is as complex as it is paradoxical, being embedded in and permeated by Switzerland's finely balanced federal structure. The same is true of the Domain: although it is managed by the Board, the Board is also part of it. While the Domain is funded by the federal government and reports to it, it is not run by a ministry. No member of the government decides what research should be carried out, or how. That is decided by the Board or the Domain itself – through internal and external debates and disagreements.

The participants involved are constantly negotiating the bounds of their responsibilities. This is exhausting and time-consuming, but prevents the Domain from being kicked around by politicians or overbearing managers. If managers get too far above themselves, the system brings them back down to earth. Changes are made only rarely, after careful consideration and with broad-based agreement. They are the result of exhaustive deliberation.

The ETH Board has been regulating scientific endeavour since its origins in the mid-19th century. While teaching was initially its main focus, everything now revolves around innovation. Science and research are expected to obtain results that are useful to society in the widest possible sense, and not just economically or ecologically. In the best case, research contributes to shaping a society in which people live well and happily.

There is no guarantee that research will produce innovation. The Board can only try to create the optimum conditions. Successful research is always partly a matter of serendipity: the stroke of luck that leads to a chance discovery. Now more than ever, the Board is faced with the challenge of guiding the unguidable – in other words, guiding chance.

ANNEX

ANNEX

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SOURCES

INTERVIEWS

Fritz Schiesser, 18.06.2020, 13.11.2020

Francis Waldvogel, 25.06.2020

Alexander J.B. Zehnder, 07.07.2020

David Gugerli, 10.07.2020

Hugo Bretscher, 14.07.2020

Heinrich Ursprung, 04.08.2020

Stephan Bieri, 06.08.2020

Beth Krasna, 26.08.2020

ETH ZURICH UNIVERSITY ARCHIVES, ETH LIBRARY

Minutes of the School Board 1970, 1990–1994, 2006–2007

Brochures and newspaper articles

BIBLIOGRAPHY

Bergier, Jean-François: L'EPFZ est-elle un danger public?, in: Journal de Genève, 08.08.1994.

Bora, Alfons: Wissenschaft und Politik: Von Steuerung über Governance zu Regulierung, in: Sabine Maasen et al. (ed.): Handbuch Wissenschaftssoziologie, Wiesbaden 2012, pp. 341–353.

Brändli, Sebastian: Auf der Suche nach «Good Governance». Zur Geschichte von Schulrat und ETH-Rat in den Jahren 1969–2005, 2005 (online).

Brändli, Sebastian: "Die Schweiz vor unübersichtlichen Mammuthochschulen zu bewahren". Systembildung und Hochschulreformen in der Schweiz der 1960er Jahre, in: Martin Kitzinger, Wolfgang Eric Wagner, Julia Crispin (ed.): Universität – Reform. Ein Spannungsverhältnis von langer Dauer (12.–21. Jahrhundert), Basel 2018, pp. 291–342.

BIBLIOGRAPHY

Burri, Monika; Westermann, Andrea: ETHistory 1855–2005. Sightseeing durch 150 Jahre ETH Zürich, Baden 2005.

Criblez, Lucien: Die Bundesstaatsgründung 1848 und die Anfänge einer nationalen Bildungspolitik in: Lucien Criblez (ed.): Bildungsraum Schweiz. Historische Entwicklung und aktuelle Herausforderungen, Bern inter alia 2008, pp. 57–86.

Crottaz, Roland: Les besoins d'une politique technologique cohérente, in: Wissenschaftspolitik, Beiheft 50, 1991 (Wissenschaft und Forschung. Voraussetzung für Innovation in Wirtschaft, Kultur und Politik), pp. 63–70.

Eawag (pub.): Streiflichter auf die Eawag 1936–2011, Winterthur 2011 (online).

Empa (pub.): Viel mehr als Materialien. Eine kurze Geschichte der Empa, place of pub. not given 2020.

ETH-Bereich: Strategische Planung 2000–2003, Zurich 1997.

ETH-Rat: Prisma 96–99: Schwerpunktprogramme, Bern 1996–99.

Gugerli, David; Kupper, Patrick; Speich, Daniel: Die Zukunftsmaschine: Konjunktoren der ETH Zürich 1855–2005, Zurich 2005.

Hafner, Urs: Vom Wissenschaftsrat zum Innovationsrat. Die historische Entwicklung des Schweizerischen Wissenschaftsrats in der Aussensicht (SWIR-Schrift), Bern 2015 (online).

Herren, Marc: Die nationale Hochschul- und Forschungspolitik in den 1960er- und 1970er-Jahren, in: Lucien Criblez (ed.): Bildungsraum Schweiz. Historische Entwicklung und aktuelle Herausforderungen, Bern 2008, pp. 219–250.

Joye-Cagnard, Frédéric: La construction de la politique de la science en Suisse. Enjeux scientifiques, stratégiques et politiques (1944–1974), Neuchâtel 2010.

Kern, Johann Konrad: Rede des Präsidenten des schweizerischen Schulrathes, Herrn Dr. Kern, bei der Eröffnung der eidgen. Polytechnischen Schule in Zürich, in: Neue Zürcher Zeitung, 15.10.1855, supplement, pp. 1–12.

Oechsli, Wilhelm: Geschichte der Gründung des Eidgenössischen Polytechnikums mit einer Übersicht seiner Entwicklung 1855–1905. Zur Feier des fünfzigjährigen Bestehens der Anstalt, Frauenfeld 1905.

Pont, Michel: Chronique de l'EPFL 1978–2000. L'âge d'or de l'ingénierie, Lausanne 2010.

Schweizerischer Schulrath: Offizieller Bericht an das Schweizerische Departement des Innern über die Vorfälle am Eidgenössischen Polytechnikum, Zurich 1864.

Schweizerischer Schulrath: Offizieller Bericht über die neuesten Vorfälle am Polytechnikum, Zurich 1866.

Schweizerischer Schulrath: Bericht an den hohen Schweizerischen Bundesrath über die Fragen der Reorganisation der polytechnischen Schule, Zurich 1879.

Speich, Daniel: Die Geschicke der ETH bestimmen, in: ETHlife. Die tägliche WebZeitung der ETH, 2004 (online).

Stöckli, Andreas; Weber, Florian: Die Eidgenössischen Technischen Hochschulen (ETH-Bereich), in: Bernhard Ehrenzeller (ed.): Schweizerisches Bundesverwaltungsrecht (vol. IX: Bildungs-, Kultur und Sprachenrecht), Basel 2018, pp. 235–373.

Wullschleger, Erwin: Die Geschichte der EAFV. 100 Jahre Eidgenössische Anstalt für das Forstliche Versuchswesen (1885–1985), Teufen 1985.

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