

100th Birthday of Henri Cartan

On July 8, 2004, the outstanding French mathematician Henri Cartan turned one hundred years old. The French Mathematical Society held a seminar in honour of Henri Cartan on June 28. Its programme, some of the contributions, a biography, several photos and documents can be found on the web site <http://smf.emath.fr/VieSociete/Rencontres/JourneeCartan>. The 100th issue of *Gazette des Mathématiciens*, the news publication of Société Mathématique de France, carried some tributes to Cartan, two of which are reproduced in this issue of the Newsletter along with a resolution from the International Mathematical Union (IMU). At the closing ceremony of the 4th European congress of mathematicians, EMS-president Sir John Kingman sent his cordial congratulations to Prof. Cartan in the name of all the participants.



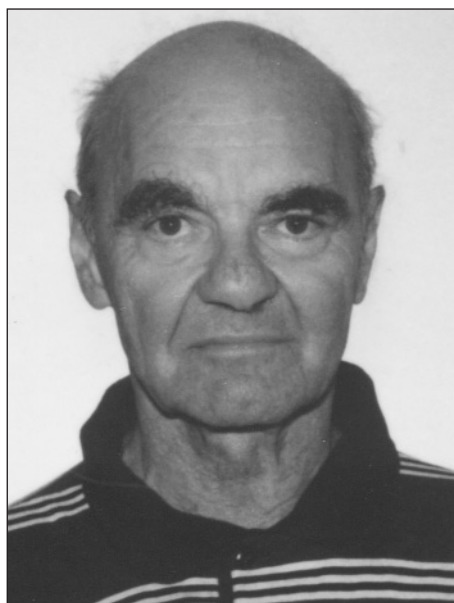
Three-quarters of a century with Henri Cartan

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In a special section in *Le Monde* of 3 March 2004 entitled "Matière grise: la bataille mondiale" (Grey Matter: the worldwide contest), one of the first observations by the biologist E.E. Baulieu reads: "French mathematicians are among the very best in the world". Above and beyond reservations concerning certain excesses perpetrated under the Bourbaki banner, it is my conviction (hopefully, one widely shared) that this high reputation is in large measure the heritage of that group of young men who, in the thirties of the last century, conceived the Bourbaki project to write a treatise that would develop mathematics from the ground up. In this group, I see, in the front rank, Henri Cartan flanked by his friends André Weil and Jean Dieudonné.

I have had the privilege to frequently cross the path of Henri Cartan. The first occasion (by his own account) was in Strasbourg in 1930; admittedly, I have forgotten this encounter – I was just two years old – but I have retained clear memories from succeeding years. Cartan was a colleague of my father's and a friend of the family, a friend who was admired, but somewhat feared for his caustic turn of mind and tongue; at the same time, his fragile health was a cause for



concern! I saw him again in 1939 in Clermont-Ferrand, where the University of Strasbourg had been moved following the outbreak of war, and later in La Bourboule, after the defeat of June 1940, of which he had been one of the few to voice premonitions. Then again in Strasbourg in 1945 after the abyss of war from which my own family was rising safe and sound, but not his. Next in Paris at the École Normale (rue d'Ulm), when he was the professor and I a student: the course for second year students, in which he taught us what a differentiable manifold was, and where, from the back of the lecture room, an unknown person (it was Alexander Grothendieck) ventured to dialog with him as an equal; the first Cartan Seminar on Topology (1948), for which, under his guidance, I presented "exposé no. 3" (thereafter entirely written up by him alone); and frequently in his family gathering, Boulevard Jourdan, on Sunday, where I was a little like

one more child. Then as research advisor, who did not *propose* a thesis topic, but who, one day, pointed out to me the article of Feldbau concerning homeomorphisms of spheres, which became the starting point of my thesis.

Even before this last period, I was sufficiently close to him to occasionally glean confidential remarks such as the following that I remember concerning René Thom, whom he 'discovered' before anyone else in spite of their quite different ways of thinking: "Thom is a boy brimming with ideas, but how hard it is to make him write them down!" Then, over a long period: his battles, mostly victorious, to, as he formulated it, "raise the level of the Sorbonne in Mathematics"; his vain efforts to have a chair created at the Collège de France for André Weil. His precocious commitment in favour of Franco-German reconciliation – in a period when that demanded lofty vision, a utopian vision whose realization is today one of our grounds for hope in the face of seemingly insoluble conflicts. His militance in the defence of Human Rights everywhere in the world, and for the construction of Europe as a federal state, an aim to which he attaches such high value.

Jean-Pierre Serre has written: "I believe that the Cartan style is the finest to be found in mathematics".

I would add that the Cartan style is the finest to be found in life in general. Thank you, Monsieur Cartan, for showing, by your example, that it is possible to become with age ever more humane.

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Personal souvenirs of Henri Cartan
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My first meeting with Henri Cartan took place in August 1940. I was a candidate at the Ecole Normale Supérieure and he was one of the examiners. Classmates, who had already taken the examination, told me that he was a “nice” examiner as opposed to some examiners at the Ecole Polytechnique who tried to destabilize the candidates. In fact, Henri Cartan wanted to make the candidates reveal as much as possible in order to find out which ones were the most promising. I noticed the same quality when, much later, we sat together in doctorates juries. The good questions he put to the candidates enabled him to predict from their answers which candidates would become first-rate mathematicians. He was never wrong.

I met Henri Cartan again in 1944-1945 at the Ecole Normale Supérieure, when I was preparing for the Agrégation de Mathématiques. At that time, the oral part of this competitive examination consisted in preparing (without documents) and giving lectures on classical subjects (like Euclidian Geometry, Analytic Geometry, Calculus) in front of the jury – just like in front of a high school class. We practiced lecturing in front of Henri Cartan. His criticisms were incisive and to the point and his suggestions were very valuable. Even at this elementary level, we learned a lot of deep Mathematics from him.

I had written to Bourbaki, pointing out mistakes in the exercises of the published volumes, so he took an interest in me and invited René Thom and myself as “guinea pigs” to a Bourbaki congress, which took place in July 1945 at the Ecole Normale Supérieure. This was one of the great experiences in my life.

From 1945 to 1947, I got a research fellowship at Princeton University and I returned with a research project on intersection multiplicities in Algebraic Geometry, mostly inspired by Claude Chevalley. When this work was completed in 1949, I presented it as a thesis to the Université de Paris. I asked Henri Cartan to be in the jury by giving me the subject of the so-called “seconde thèse” (in which the candidate studies and gives an outline



of a topic which has been the subject of recent research, but in a field distinct from the field of the thesis itself). Cartan chose the relations between homology and homotopy and spent a lot of time pointing out the articles to be read and making sure that I was mastering this topic that was new to me.

In the meantime, I became full-fledged member of Bourbaki. During the Congresses, I admired the acuteness of Cartan's comments and his mastery of most branches of Mathematics. If one of his proposals was not accepted immediately, he tried hard to convince other members during the recesses; either they were or the proposals got improved. When travelling by train to the Congresses, he also

made us share his enthusiasm for recent discoveries or trends, e.g. the notion of a functor and various topics from S. Eilenberg and his book “Homological algebra”.

In spite of the fact that our domains of research were quite distinct, our friendship and our common concerns intensified. Gradually, and especially when I became an environmental activist, he made me share his enthusiasm for the unification of Europe.

I also admired his ceaseless actions for persecuted mathematicians. During the May 1968 movement, we were both open to some demands of the students, e.g. the inclusion of personal studies in the curriculum. In 1970, we both successfully requested to be transferred to the new Université de Paris-Sud (Orsay). There he worked very hard to embody statutes providing a good balance between teaching and research.

Other mathematicians, more competent than me, will surely describe his results on functions of several complex variables, sheaves, algebraic topology, homological algebra, etc. I just know that they are fundamental and that the “Séminaires Cartan”, the topics of which were chosen by him each year with a remarkable intuition of what would be important, awakened the vocations of many first-rate mathematicians.

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On the Occasion of the 100th Birthday of Henri Cartan

It is a great honour for the International Mathematical Union to associate itself with the hundredth birthday of Henri Cartan, on July 8, 2004.

The son of the great mathematician Elie Cartan, his contributions to mathematics have been fundamental, from several complex variables to algebraic topology and homological algebra. A member of the Bourbaki group, his participation in the rejuvenation of the French mathematical school was essential, in particular through his seminar held at the École Normale Supérieure. His roles as teacher and mentor were also exceptional, and were felt well beyond national boundaries.

During the critical years after the second world war, Cartan's enduring friendship with the German mathematician Heinrich Behnke, and his own personal generosity, contributed greatly to the rebirth of German mathematics. He was made an honorary member of the German Mathematical Society (DMV) in 1994.

His natural preoccupation with international cooperation led to his active involvement with the International Mathematical Union, of which he was President from 1967 to 1970. As such he chaired the Fields Medal Committee for the Nice International Congress of Mathematicians in 1970.

He has been actively involved in the defense of mathematicians who were jailed or discriminated against in their countries, and is an ardent defender of European unity.

Mathematicians worldwide unite with respect and admiration in warmly congratulating Henri Cartan, great mathematician and great man, on this happy occasion.

International Mathematical Union