

André Weil: Memories of a Long Friendship

Henri Cartan

Editor's Note: André Weil died in August 1998. This is one of a short series of articles about Weil or his mathematics. The first articles in the series appeared in the April 1999 issue.

I met André Weil for the first time when I entered the École Normale in November 1923. He was then “carré”,¹ having entered one year earlier at the age of sixteen (the director of the École, Gustave Lanson, reproached him then for wearing short pants). In the entering class with André Weil figured notably Jean Delsarte, who was to become dean of the Faculté des Sciences at Nancy and was to create there one of the best mathematics centers in France, and who was also to play an important role at the core of the Bourbaki group. There was also Yves Rocard, who after the war was to create and develop the physics department at the École Normale. Delsarte and Rocard were among those with whom André Weil associated. I knew that Weil was considered as a rather exceptional being, but I did not know that during his first year he had read Riemann and finished all his examinations. Finishing the École one year before me in 1925, he was too young to do his military service and obtained a grant to spend a year in Rome, where Vito Volterra was his advisor. He spent the following year in Germany, with a Rockefeller grant that Volterra had obtained for him, and became friends with the great mathe-

maticians of the time, despite his being younger than they.

Upon his return to Paris, he wrote his thesis in algebraic geometry; in his *Souvenirs d'Apprentissage*² he tells how he found someone to write the report for this thesis, whose subject was then foreign to the interests of French mathematicians. He defended it in 1928. For my part I had prepared a thesis on normal families under the direction of Paul Montel; I defended it in December 1928. At the time I had been teaching mathematics in the Lycée de Caen since the month of October 1928. In this period positions in university teaching were few in number, and appointments were made at any time of the year. Thus it was that a position of “chargé de cours” was announced for the month of April 1929 at the Faculté des Sciences in Strasbourg, and Weil and I each had the idea of being a candidate. We were thus in competition; I had a priori an advantage, not because of personal merit, but because Georges Valiron, professor at Strasbourg, was interested more in functions of one complex variable than in the works of André Weil.

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¹In the language of the École Normale, a “carré” is a second-year student.

²A. Weil, *Souvenirs d'Apprentissage*, Birkhäuser, Basel, 1991; English translation by Jennifer Gage, *The Apprenticeship of a Mathematician*, Birkhäuser, Basel, 1992.



Formal photo of André Weil at the Institute for Advanced Study, about 1986.

That is what happened. Weil did not mind, and thought then of going off to India (he had learned Sanskrit starting at the time of his *taupe* class³; and Sylvain Levi was encouraging him to accept a post there). In fact, it was in 1930 that he left for Aligarh, where he undertook the responsibility of reforming from top to bottom the teaching of mathematics. Rough task, which he brought to life for me in his letters.

When he returned to France in 1932, it was to accept a position as chargé de cours in Marseille. As for me, after a break for two years at the Faculté des Sciences in Lille, I had returned to Strasbourg at the end of 1931; I had pleasant memories of some weeks that I had spent there in 1929, and I encouraged Weil to come join me there. It is what he did upon his return in 1933, and as a result I stopped being the youngest member of the faculty. Here we were, both teaching in the large building in the university quadrangle behind the statue of Pasteur. But that lasted only two months, because at the beginning of January I was admitted to the hospital on the Boulevard Clemenceau with typhoid fever, whose complications kept me from teaching until the end of the school year. But I will not forget the comforting visits that he made to me in the hospital.

I resumed my teaching at the beginning of 1934. I was in charge of the course Differential and Integral Calculus, and I posed many questions to myself about the way to present certain chapters of

³A preparatory class for the entrance examinations at the École Polytechnique and the scientific section of the École Normale.

the course, not finding in the classical treatise of Goursat an exposition that satisfied me. As we met often, Weil and I, at the mathematics department, I questioned him and asked for his opinions. One fine day he said to me, “Now that’s enough: let’s meet with some other people to discuss these questions. Let’s finalize the answers, and then we will not have to speak of them again.” Thus was born the Bourbaki group, which of course did not yet bear this name. Weil decided that eight or nine of us, all Normaliens in the entering classes of 1922 to 1926, would meet every two weeks in Paris to build the plan of a “Treatise on Analysis”. I have the good fortune to own the accounts of these meetings carefully kept by Delsarte. In effect, we were all

Normaliens, with the exception of Szolem Mandelbrojt, a little older than we, and well assimilated since his arrival in France. The role played by Weil in the Bourbaki enterprise was continually decisive. It is he who decided that everyone should be capable of editing any subject and that anonymity should be respected. It is he who imposed retirement from the group at age fifty in order that new generations could feel responsible in their turn. And that lasted until the war.

In the meantime, Weil was married in October 1937, and his friends were able to see how this union had transformed his life. He himself wrote that his life had effectively ended at “the death on May 24, 1986, of my wife and companion, Eveline”.

During these last years before the war, I sometimes had occasion to make the train trip with André Weil between Paris and Strasbourg. And, of course, we discussed mathematics. In general, it is I who made him part of my preoccupations of the moment and often he claimed that I was on the wrong track. He explained to me one day that he acted that way in order to challenge me to go more deeply into the problems. A little earlier, toward 1930, it is he who had oriented me toward the study of analytic functions of *several* variables by pointing out to me the work of Carathéodory on circled domains. One cannot overestimate what I owe to André Weil.

Came the summer of 1939. In his *Souvenirs d’Apprentissage* Weil explains the reasons that had led him to decide that in case of war he would leave France. He was, like all the former Normaliens

through the entering class of 1922, a reserve officer. I have recently found the letters that he wrote to me in the course of the year 1939. He had left with his wife for a trip in North Europe: Cambridge in England, Oslo, Copenhagen, Sweden, and up to Lapland. His first letter from Finland is dated September 12; he and his wife were invited to stay with their friends the Ahlfors in the suburbs of Helsinki. He signed his name "Ahlfors" because of French censorship. Letters at that time took two weeks to be delivered. He asked insistently for news of "all our friends who have been mobilized." In the month of October he wrote to me at Beaumont, a close suburb of Clermont-Ferrand, where the Université de Strasbourg had withdrawn. In this period his wife returned to France. On November 21 he wrote to me at length; he still signed his name "Ahlfors", for Finland was at war with the Soviet Union, and Finnish censorship had begun in earnest. He was preoccupied with the works of Bourbaki and elaborated at length on this subject.

Then there was silence. He had been arrested at the end of November. One knows about his odyssey through Haparanda in northern Finland, then Norway and on to Sweden, Norway again, Scotland and London, to land finally at Le Havre, where he was immediately taken to military prison before being transferred to the prison at Rouen, toward mid-February 1940. From the end of January I had been kept up to date by two letters from his sister, Simone. Weil wrote me on February 22 a long handwritten letter (he no longer had his typewriter). Between February 29 and May 2, he wrote me fifteen letters, most of them several pages long. It is also at the time of his stay at the Rouen prison that he wrote for Bourbaki a long report on the theory of integration. It is, I believe, the only mathematical text of André Weil that is handwritten; it is today in the archives of the Académie des Sciences (Paris).

His trial took place May 3; my father went to Rouen to testify in his favor. Following his sentencing, Weil left prison to be inducted into the army as a private. But France was soon invaded,

and the Weil family (his parents and his sister, Simone) took refuge in Vichy, then in Toulouse, although he himself began a long journey through England and North Africa to end October 9, 1940, in Marseille, where he was demobilized and found his parents again. All this time, I had served as intermediary between Weil and his family. On Octo-



Bourbaki congress at Pelvoux, June/July 1951. Left to right: Jean Dieudonné, Jacques Dixmier, André Weil, Laurent Schwartz, and Roger Godement.



Bourbaki congress at Murol (sometimes spelled Murols) just south of Clermont-Ferrand, August 1954. Left to right: Roger Godement, Jean Dieudonné, André Weil, Saunders Mac Lane, and Jean-Pierre Serre.

Photographs this page courtesy of Henri Cartan.

ber 10 he arrived at the station in Clermont-Ferrand, where I awaited him.

Weil reunited only later with his wife, Eveline, who remained in the occupied zone. They left together for the United States with Alain, Eveline's son. At the end of 1944 we could again correspond; he left the United States for Brazil, having been named to a professorship at the Universidade de São Paulo. I saw André again in July 1945 when he was sent on a mission to take part in the first Bourbaki Congress after the war. We saw each other in that way each summer until 1955, Weil retiring from Bourbaki when he reached the age of fifty.

In January 1948 I was invited by Weil to the University of Chicago, where he had been teaching since 1947; it was Marshall Stone, in charge of reorganizing the mathematics department, who had appointed Weil there. It was my first trip to the United States, and I had much to learn, not merely the language. Weil was then a great help.

A tradition was established between us: each year, toward the end of the month of May, the same evening that he arrived in France, Weil called me on the telephone to tell me: "Je suis là" ("I am here"). We would meet, and he would come spend the entire afternoon at my home. We would go out to take some air in the gardens of the Cité Universitaire, which was quite close, and we did not lack subjects for conversation. Returning to my home, we would rejoin our spouses; then we would dine together, and the evening would go on until the Weils returned to their apartment on the Rue Auguste Comte. After the death of Eveline in 1986, André continued the tradition of his visits. It is in 1987, I believe, that a little at loose ends by his solitude during the French summer, he came to spend



Photograph courtesy of Sylvie Weil.

André and Eveline Weil with their cat Catsou, Princeton, October 1960.



Courtesy of Sylvie Weil and reprinted from the work *Apprenticeship of a Mathematician* with permission from Birkhäuser.

André Weil and his sister Simone, Paris, 1911.

two weeks at Die, in the Drôme, where my family was vacationing in our summer house. He loved then to walk and to become acquainted with this beautiful countryside, which was new to him. The following years, he continued to come to spend an afternoon at my home in Paris, but he no longer wished to walk; he complained about his sight, his hearing, and his legs. The last time he came was in 1996; he seemed at the end of his strength, but he had kept all of his intellectual acuity. He no longer came to Paris, and the rare news of him that I could obtain was given to me by Armand Borel or by his daughters, Sylvie and Nicolette.

It is not possible to evoke the memory of André Weil without that of his sister, Simone, the dedicated philosopher. Certainly they were very different from each other and did not have the same aspirations. But their thoughts came together sometimes, and they felt deep down a great affection for each other. André told of his despair when a telegram informed him in New York that his sister had just died of exhaustion at Asherford in England on August 24, 1943. He later occupied himself actively in the publication of the *Oeuvres Complètes* of Simone Weil. Each of them in turn has contributed to the enrichment of the heritage of mankind.