

# Mathematics in Poland after the War

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Poland was partitioned in 1795 by Russia, Austria, and Prussia. It became a country after the First World War in 1918. In 1945 it moved: its eastern part, including the city of Lwów, was annexed by the USSR; in the south and west it acquired territory from Germany, including Breslau (now Wrocław) and Dantzig (now Gdańsk). The parts in the south had been Polish a few centuries ago, were still inhabited by Polish-speaking peasants, and were referred to after the war as the “recovered territories”.

In 1946 I had returned to Harvard after military service and was crazy to see the destruction caused by the war in Europe and, if possible, help in the reconstruction. I had taken a little German and French. Graduation was approaching, and my best efforts produced no way to cross the ocean.

In college I had spent much time browsing in the mathematics library and even in the stacks, and I found *Fundamenta Mathematicae* and *Studia Mathematica* of special interest. There were magic names in them: Sierpiński, Steinhaus, Kuratowski, Ulam, Ostrowski, Szegő, Borsuk, Tarski, of course Banach, and a name that appeared in two forms, sometimes as Szpilrajn and sometimes as Szpilrajn-Marczewski, which I could not explain. Many papers seemed related, many were joint work, all quite short. I could not un-

derstand most of them, but I tried. My tastes were real variables and topology, and I didn't know much; I had studied Hilbert space, but hadn't taken linear algebra. (Despite the illogicality, this way of learning mathematics is not all bad.)

Nobody took my Wanderlust seriously, least of all my father, whose recent ancestors had escaped from pogroms in Eastern Europe and who considered Europe a waste of time, if not much worse. No support there. But on the eve of my graduation in spring 1947, I was awarded a traveling fellowship by Harvard. The most desperate place in Europe seemed to be Poland, and there were mathematicians in Poland. That is why I went to the Polish consulate in Washington, was interviewed by the cultural attaché there named Czesław Miłosz, and got a Polish visa.

The “student ship” was filled with Slavs of several sorts, mostly working people apparently going home. Bed was a bunk in a large dormitory; food came off a chow line in abundance. Gossip was abundant too. Where to stay, how to change money, dangers and opportunities galore.

I came ashore at Southampton after seeing the incredible green English countryside from the ship for the first time. There are some basic experiences in life: a German potato salad, a French cheese, the Parthenon, and the English green. The world would be much poorer without any one of these. The pound was convertible at \$5.50, and a decent seat at the theater or even the opera was a couple of shillings. A long bus ride cost tuppence. London was badly bombed. Now, two years after the end of the war, there was some

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rebuilding and cleaning up, but there was plenty of rubble left. The city was gray; no unnecessary lights because electricity was scarce. Serious rationing. It was the age of equality and fairness, very bracing to a young person like me who considered himself a socialist. I saw London—all of it—on foot and made friends with students and libraries. I attended the first music festival in Edinburgh, where I learned to drink tea.

On to Paris, where every corner had an illegal moneychanger who also sold feeble peccatures. The opera was flooded with light every night, even though electricity was hard to come by elsewhere, and seats were so expensive that you had to buy a cheap one behind a monstrous column and couldn't see the opera. Some food was rationed, but nobody paid any attention. I thought the scene was terrible and liked the British way much better. Quite a few years later I changed my mind, and gave up socialism. In Paris I saw Fréchet, an old man, coming out of the Institut Henri Poincaré, and I learned to drink wine.

I had now joined a college friend who had learned Czech and was going to spend the year in Czechoslovakia. We continued together to Prague, crossing Germany in a "sealed" carriage, but actually we bartered cigarettes for water through the window. You could get Leica cameras the same way. Prague was a wonderland. It had food, normalcy, civilized people, and it is a magnificent city. I tramped all over, heard splendid chamber music, met Edouard Čech, and learned to drink beer.

Two weeks later I got on a train at midnight and started north. When we crossed the border, my car was empty. On the other side, with daylight beginning, peasants came on at each village, and pretty soon my compartment was full. I was scared, afraid that somebody would steal my navy seabag with all my belongings in the rack above. Everybody was talking furiously, and after a while I was obliged to explain myself in rudimentary German. Pretty soon we were all friends.

I was met at the Warsaw station by the brother of a Polish college friend, who took me to his mother's flat. Since she belonged to the Sejm, the parliament, she had a nice little flat and hot water. I slept on a couch. The first morning she took me to Sierpiński's apartment. In this ruined city it was a restored habitation on an upper floor at the end of a long walkway that ran endlessly upwards through rubble. When you got there, it seemed spacious and nice. I had a cordial meeting with Sierpiński, and he sent me away with an armful of his reprints. Later I attended his weekly Sunday afternoon social occasions, where his wife's excellent baked products made the event memorable. Thirty Sunday-clad visitors

climbing through the rubble to this occasion make an odd memory.

Soon I was inscribed as a student at the university, and I moved to a little room in a dormitory with a French and a Canadian student. No more hot water. I attended lectures that I did not understand; talked with Kuratowski, who gave me a problem in topology to think about; got to know Borsuk, Mostowski, and Wanda Szmielew; and learned to live in this city of rubble. One day the exchange rate changed from 100 złotych to the dollar to 400. Then I could eat enough again, and I have never felt so rich. Roman Sikorski was finishing his thesis, and I edited his English. He was considerably older than I, but was delayed by the war. We remained friends until he died. I met hardly any Polish students my age, because all schools in Poland had been closed by the Germans, and young people were coming through the educational system older than normal. I learned that I could work in my sleeping bag down to about 55 degrees, but not below. The natives needed to be hardier than that. I got an intestinal sickness three times that was awful, and the third time someone called a doctor. I recovered.

There is something shameful about feeling nostalgia for such a terrible time. I am not nostalgic about the periods that most people remember: my childhood or my military service. But there was something beautiful about the ruined city. The church in the Plac Trzech Krzyży has been reconstructed now, but as a ruin it was lovely, on a smaller scale than the cathedral of Coventry. Lights coming out of a partly reconstructed shop in the dark, cold gloom of a November afternoon (it gets dark early up in the North) were warmer than other lights. People scurrying back to some kind of home with something that would do for supper seemed happy. There was hope for the future. Political differences had been suppressed by the enormity of the catastrophe. There was still a public spirit of joy in liberation. Poland was going to rebuild itself. The present was much, much better than the past, and the future was coming. People then did not know the future.

The past was atrocious. I heard hundreds of stories of brutality on the part of the Germans, and some about Russians too. The Poles had a long history of antipathy toward the Russians, but even the Russian connivance in the destruction of Warsaw was minor compared with the German occupation. Stanisław Saks died like many Poles in the following way. German soldiers barricaded two ends of a street and shot everybody between. There was, however, a possibility of escape from this recurrent problem. The Germans needed a great quantity of lice in order to produce a vaccine against typhoid and other

diseases. Poles were employed to wear a box of lice on the wrist, fed by the human host. The wrist itched frightfully. The pay was that a Pole with such a box might not be shot as Saks was. Banach wore a box. More than half the Polish mathematical profession perished during the war.

War makes atrocities, but this was different. The occupation was a continuous stream of inhuman acts. The stories I heard were not about statistics. They were not either about how hard life was, although it was terrible. They were about individual acts of sadism. In Kraków I heard about a Polish child playing in the street who was doused with gasoline and set on fire by German soldiers. In Kraków also I attended the war crimes trial for a day, and a group of German prison camp guards was on trial. Much was said about the institutional barbarity of the place, but what I remember is how one guard liked to shoot his pistol out his open window at prisoners for target practice. War is terrible, but many of the people in war are worse still. During the occupation German professors came to steal books from Polish libraries to take back to Germany, with their Polish colleagues looking on. Can anything be said in their defense?

After Christmas in Kraków I went with my friend from Prague to Vienna. We were directed on arrival to Colonel Williams, who oriented us in our status as guests of the army. He told us that we were the first civilians to obtain permits to visit the city after the war, aside from people who had a need to be there. In our interview of ten minutes we learned painfully that the Colonel was a rabid anti-Semite, posted evidently to the appropriate place. Vienna was in a sulk, on account of its hardships. Nevertheless, it was untouched physically by the war, public services were normal, there seemed to be enough food, and people were smartly dressed. To a visitor from Warsaw it seemed a very fortunate place. All this made a bad impression on me, and I have disliked the city ever since, particularly because I have friends who tell me what it was like in 1938. I alternated evenings between theater and opera, and that was all marvelous. At that moment, when Austria was reconstituting itself as a country, it was established by economists that the country was impossible; it could not survive economically. I debated with myself the question whether the world should support this place just to hear Mozart done right. In the course of time Austria has confounded the economists, Mozart is still done right, and I still dislike it (in spite of the fact that I have friends there whom I like and respect very much).

In the spring I went to Wrocław. The center of the city had been badly damaged, but I was assigned to an apartment with two Polish room-

mates in a nice block of flats built by the Germans just before the war. One of the roommates had been a partisan fighter during the war, when he was 16. Once they had intercepted a German radio message and had been able to bring down a helicopter with a German general on board. Staroszak told me that if he had to do it over again, he wouldn't. I heard later that he had become a judge. In Wrocław I met a lovely girl, whose father had been murdered by the Russians in the Wood of Katyn (she had no doubts about it), and she introduced me to vodka.

Szpilrajn had become Marczewski by this time. In Polish law you had to keep both names for a while if you wanted to change. I suppose that Szpilrajn was a Jewish name. Marczewski took me in hand and gave me good problems in analysis to work on. I solved two of them, and they made my first publications, and he was pleased. (So was I.) One day he came to my flat for some reason and was incensed by the filth and disorder. In his next lecture, to a big class, he chastised Polish students generally for being so uncouth in the presence of an impressionable foreigner. Next day I had a message that Steinhaus would like me to move to the upper story of his house, which I did. (The topologist Knaster lived on the ground floor, Steinhaus and his wife on the second, the maid and I on the third.) Everyone lived close together in this little intact community. Afternoons I walked along the Oder River with Steinhaus, just across a field from his house, and got to know him. It was spring, I worked very hard, it was a lovely time.

Steinhaus told me this story about the war. He had to live incognito in a village and had no access to any sort of news except a journal published by the Germans for their troops. This newspaper reported a steady stream of German triumphs. But it also published death notices inserted by families that had lost a son. It was the time of the Battle of Stalingrad, and everything depended on the outcome. Steinhaus pieced together bits of statistical information from the notices over a period of time and concluded that the German losses were huge. He was very proud of this achievement; like Wiener, he was at heart an applied mathematician.

Marczewski was a saint. He was inspiring, generous, and a wonderful person. I met him a last time in London—coming back from, I think, the Congress at Edinburgh—in a little Polish hotel in South Kensington that Steinhaus had introduced me to. He had a long and painful last illness, which he endured with humor and grace. He died in 1976.

I had a problem when I was in Wrocław. My visa had run out, and I was living without valid documents. I had left my passport in Warsaw for the visa to be extended, but received no news

about it. Mazur was a professor in Warsaw, and I had met him, but he came to the Institute only rarely; I don't know why. He was the liaison between the mathematics community and the party. He was appealed to, probably by Kuratowski. I was summoned to an interview with a nice man with a little beard in the appropriate ministry. Soon I got my extension and was able to leave the country. This seemed urgent, because it was the moment of the Berlin airlift, which was going on much too close to Wrocław. I took the good ship *Batory* home from Gdynia the day after my twenty-first birthday.

All this does not seem to be History of Analysis. But perhaps there is history here. Steinhaus told me the story, now well known, of how he "discovered" Banach, reading on a park bench. The *Scottish Book* from Lwów was still a fresh memory in Wrocław in 1948; Banach still an almost-living figure. The university at Lwów had been transplanted, to the extent possible, to Wrocław. I found there a humanistic view of mathematics that I have always admired. Polish mathematics, even when it is very serious, has an amateurish quality. Steinhaus himself, dedicated and hard-working, exuded the question: If it isn't fun, why should we do it? Banach was a man proud of his work, contemptuous of dilettantes, but his papers and his famous book are simple, lucid, careful, full of esthetic content as well as mathematical.

The seminar at Wrocław at that time was universal. Each weekly séance lasted several hours and had two or three talks. The subjects were various; for example, I remember Jerzy Łoś speaking about logic. But the talks were carefully prepared, and everybody expected to follow. If someone didn't, the speaker had to try again. This tradition may be why Polish mathematicians from different fields often collaborated. I have mentioned the fact that Polish papers were usually short. They solved a problem or presented an idea that was intended to be clear and interesting, not encyclopedic. I remember the simplicity, elegance, and power of Sierpiński's little papers in *Fundamenta Mathematicae*; it would be hard to find anything comparable in our journals. These pieces of evidence depict a mathematical culture different from ours. It was lots more fun. Must progress deprive us of that?

It is only a bit more than a century since the idea surfaced in Prussia of universities devoted to teaching and research in equal and interdependent parts. The idea spread quickly over Europe and then to the United States. Some of my teachers were among the first American-trained mathematicians, although even Saunders Mac Lane, who was one of them, did the trip to Göttingen. The speed with which professionalism has overwhelmed us is remarkable. I once

met a man who had been a colleague of Weierstrass in Berlin. It was not so long ago.

Ease of traveling and now e-mail have homogenized our profession. Our talent is ranked in a hierarchy, not locally but over the whole world. Mathematics is a business, a competitive one, whose product is theorems, priced too much by weight. Instead of having fun, we write and read promotion letters. Our teaching is evaluated on a 7-point scale in a popularity poll; the question whether we have given our students anything to think about is hardly raised.

Of course Poland wants to be like the rest of the world. Now Polish mathematicians go abroad to study, and their connections by way of e-mail are to other specialists wherever they may be, not to their colleagues. They produce theorems of the proper weight. Since Poland is now on the way to becoming a prosperous country at last, it can afford to neglect its universities to a pitiful degree. Polish professors have to take second jobs. There is no more Polish school in mathematics.

When I came home from Poland in June 1948, I was full of news about Eastern Europe and information and ideas from this extraordinary adventure. Naturally friends asked about it. I discovered quickly that I couldn't tell them anything. In 1948 Poland was too far away; its experiences were beyond the imagination of my friends.