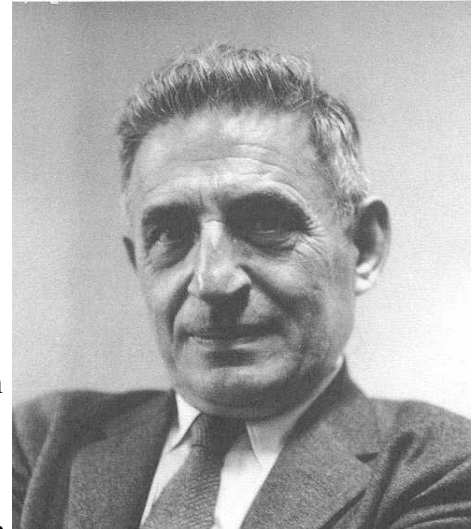


Oscar Zariski

Algebraic geometry is a field of mathematics that dates to the ancient Babylonians and Greeks, which studies the solution of systems of polynomial equations. During the 19th and the early part of the 20th century, the so-called Italian School of Algebraic Geometry made important progress on these matters. Russian-born American mathematician **Oscar Zariski** (April 24, 1899 – July 4, 1986) was considered an “adopted” member of the Italian school. During the 1930s Italian algebraic geometers persisted in their emphasis on “classical,” mainly projective techniques. However, their American counterparts, including Zariski, were more attracted to modern topological and algebraic languages and tools, as found in B.L. Van der Waerden’s classic *Moderne Algebra*. While preparing his mathematical classic *Algebraic Surfaces* (1935), Zariski became “disgusted” with the methods of the Italian algebraic geometers and their lack of rigor. His book, which summarized the work of the Italian school, marked the beginning of his efforts to rebuild algebraic geometry by its fusion with modern commutative algebra, particularly the work of Emmy Noether and Wolfgang Krull. During his long career, Zariski obtained ground-breaking results in algebra and algebraic geometry, living to see another transformation of algebraic geometry in the late 1950s and 1960s, which left Zariski somewhat behind, but, nevertheless, the revolution pleased him, because it was partly led by his students.



Our subject was born Ascher Zaritsky in Kobrin, Belarus, then a part of the Russian Empire. His father, a Talmudic scholar, died when Zaritsky was two, and his mother was left to support seven children. She was so successful in running a store that her family became one of the wealthiest in Kobrin. When WWI fighting reached the Belarus region, Zaritsky and his brother fled to Chernigov in the Ukraine,

where his mathematical ability was revealed at the Gymnasium. Because Kobrin was under German occupation during WWI, he was unable to see his mother again until 1918. In 1918-20, Zaritsky attended the University of Kiev while battles raged in the streets between the Czar's soldiers and the Red army. After the Communists took Kiev, they abolished examinations but Zaritsky secretly took them at the homes of his professors. By the time he returned to Kobrin, the peace treaty between Russia and newly independent Poland put Kobrin in Poland. He had to choose between Russian and Polish citizenship. He chose the latter, because he wished to study mathematics in Western Europe and, it was easier for a Polish citizen to get a passport to Italy.

Zaritsky first went to the University of Pisa but found its mathematics department inferior to what he was used to in Kiev, so he moved on to the University of Rome. There he came under the influence of Guido Castelnuovo, Federigo Enriques, and Francesco Severi, leaders of the Italian school of algebraic geometry. Zaritsky completed his doctorate in 1924 with a thesis on solving equations by radicals, supervised by Castelnuovo. That same year he married Yole Cagli, an Italian literature student. Because of his Jewish heritage and Communist sympathies, he could not join the University faculty. Enriques suggested that Ascher Zaritsky change his name to the more Italian-sounding Oscar Zariski, and this was the name under which his first paper was published. When Mussolini and his fascists took control of the country, their hatred of Jews made it necessary for Zariski to leave.

Solomon Lefschetz of Princeton University, who helped many European mathematicians escape the persecutions of the Nazis and the fascists, arranged for Zariski to be appointed to a position at Johns Hopkins University. He had to be separated from his wife and child for a year while he earned enough to bring them to America. At Hopkins, his teaching load was eighteen credits, and the administration was not sympathetic to his desire to do mathematical research. Yet, while at Hopkins, he carried out his project of applying modern algebra to the foundations of algebraic geometry. This work earned him a

Guggenheim fellowship for 1939-40. His plans to use it to visit England were spoiled by the outbreak of WWII. The war also cut off all communication with his mother and other relatives in Poland. As much as he wished to leave Hopkins, and despite the fact that his reputation as a mathematician was firmly established, academic positions during the war were in short supply. At the invitation of the State Department he visited São Paulo in 1945, where he worked with his friend and only student André Weil. While in Brazil, he learned that the Nazis had killed most of his relatives, including his mother.

When Zariski returned to the U.S., he resigned from Hopkins to take a position at the University of Illinois. The next year he was offered a permanent position at Harvard University, where he spent the rest of his career, making Harvard a world center for algebraic geometry. With Pierre Samuel he wrote the two-volume work *Commutative Algebra*, which is still a standard textbook. Zariski was an excellent teacher who served as a powerful model to the many outstanding students he influenced. Among these was David Bryant Mumford, who recalled:

“Oscar Zariski bewitched me. When he spoke the words ‘algebraic variety,’ there was a certain resonance in his voice that said distinctly that he was looking into a secret garden. I immediately wanted to be able to do this too. It led me to 25 years of struggling to make this world tangible and visible.”

What is most important about the work of Zariski is that in attempting to rework the foundations of algebraic geometry, he first turned to topological questions and then began to lay the commutative algebraic foundations of the subject. Many of the ideas he pioneered were innovations in topology as well as algebraic geometry and have been developed independently in the two fields ever since. As mathematics grows and matures there are many strings hanging out just waiting for someone to come along and braid them.

Zariski was a major contributor to the American Mathematical Society, serving as its vice-president between 1960 and 1961, and its president from 1969 to 1970. Zariski retired in 1969 and in the 1970s suffered from Alzheimer's disease, making his last few years very difficult ones. In 1981, the American Mathematical Society awarded Zariski the Steele Prize. That same year, Zariski was awarded the Wolf Prize, established in 1976 by inventor, diplomat and philanthropist, Dr. Ricardo Wolf, "to promote science and art for the benefit of mankind. When informed of the honor, Zariski is said to have exclaimed, "Too late!"

Quotation of the Day: "In [*Algebraic Surfaces*] I tried my best to present the underlying ideas of the ingenious geometric methods and proofs with which the Italian geometers were handling these deeper aspects [of birational algebraic geometry] of the whole theory of surfaces ... I began to feel distinctly unhappy about the rigor of the original proofs (without losing in the least my admiration for the imaginative geometric spirit that permeated these proofs); I became convinced that the whole structure must be done over again by purely algebraic methods." – Oscar Zariski