

**RENÉ THOM:  
“MATHÉMATICIEN ET APPRENTI PHILOSOPHE”\***

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René F. Thom was born September 2, 1923, in Montbéliard in the eastern part of France, where he grew up. His parents were shopkeepers. He, his wife, and their children paid regular visits to the region. Memories of his hometown obsessed him in the last part of his life.

After successful years at primary and secondary schools in Montbéliard, Thom obtained the *baccalauréat* “*Mathématiques élémentaires*” in Besançon in 1940. His studies were disrupted by the war, so his parents sent him and his brother south. After a detour through Switzerland, he got his *baccalauréat* “*Philosophie*” in Lyons in 1941, something that possibly set the stage for the dual inspiration that later deeply marked Thom’s work.

He then won a scholarship to attend Lycée Saint-Louis, the only lycée in France that has Classes Préparatoires exclusively. He entered École Normale Supérieure in 1943 on his second attempt and became *agrégé de sciences mathématiques* in 1946. He then had the typical career of a successful *normalien*: after a few years as CNRS fellow in the extraordinarily stimulating atmosphere of Strasbourg, in 1951 he defended his Ph.D., entitled “Espaces fibrés en sphères et carrés de Steenrod”, under the supervision of Henri Cartan. Shortly after this achievement, he visited the Institute for Advanced Study in Princeton, where he met leading mathematicians of the time...and of the times to come. He quickly became *maître de conférences* (at that time associate professor) at the University of Grenoble for the year 1953–1954 and immediately returned to Strasbourg, where he became full professor in 1957 at the age of 34, shortly before he was awarded the Fields Medal (1958). All these years the mathematics department in Strasbourg was an extraordinary place, with Henri Cartan originally, but also Charles Ehresmann, Jean-Louis Koszul, Georges Reeb, Bernard Malgrange, and visitors such as Wu Wen-Tsün and Albrecht Dold. In 1963 Thom joined the Institut des Hautes Études Scientifiques (IHÉS) as permanent professor, the same year IHÉS moved to Bures-sur-Yvette. He stayed there all his career and became emeritus in 1988.

All his life Thom kept the light, enigmatic smile that made him accessible to many young people in spite of his formidable reputation and his inclination for sharp comments. His remarks during seminars were often surprises, and at times it was difficult to connect them on the spot with what had been said. Often one got a clue later and then recognized the depth and aptness of the remarks. In the early ’70s, at the “*séminaire de dynamique*” at IHÉS one could breathe an air different

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\*This was the way Thom himself annotated his picture on the IHÉS pictureboard.

from the one that was dominating French mathematics at the time. New ways of thinking and exchanging ideas were emerging, and this atmosphere influenced quite a number of young people who attended the lectures. I was one of them. It took me a year in Stony Brook and in Stanford at the invitation of Jim Simons and Robert Osserman and the encouragement of Shiing Shen Chern to fully realize that it was indeed possible and legitimate to be interested in genuinely geometric problems, as Thom was.

It was of course Thom's ambition to think of science as a whole and in particular the need he felt to develop a paradigm for morphogenesis that led him to catastrophe theory. This theory is based on the very intuitive and geometric approach he formed of singularity theory, something Heinz Hopf pointed out in his address when he presented Thom with the Fields Medal.

The variety of fields covered by Thom in the second part of his career, from biology to linguistics, social sciences, and philosophy, fascinated people who would not usually try and talk about a bona fide mathematician: Jean-Luc Godard shot a movie entitled *René*, a personal exploration of Thom's personality; the last paintings of Salvador Dali in 1983 form a series exploring catastrophe theory dedicated "à René"; some music composers have also been inspired by Thom's work, e.g., Pascal Dusapin, who composed *Loop*, an octet for cellos.

A not so well-known aspect of Thom's personality is that he was always very keen on trains. He even published in journals specializing in news on this inspiring means of transportation, which he began to appreciate early in his childhood years. Clearly he viewed the railroad as the prototype of networks, where everything is organized, including changes of direction—their bifurcations.

Although already emeritus, he kept coming to the institute almost every day for many years. This gave me, as new IHÉS director, ample opportunity to interact with him through many precious conversations. I owe to Thom a number of subtle insights on what really matters in the institute's operations. I could then appreciate his penetrating and perceptive look at many things, including the most practical ones. The preparation of his complete work, which would not have existed without the extraordinary dedication of Michèle Porte, made me acutely aware of the unfortunate and soon irreversible deterioration of his memory. His wife, Suzanne, had a lot to endure during his last years. I admire her greatly for her courage and dedication.

I would like to end this brief personal perspective on Thom, someone I view as one of the most original mathematical thinkers of the twentieth century, by recalling Thom's own reflections on his way of working: "*Une grande partie de mes affirmations relèvent de la pure spéculation; on pourra sans doute les traiter de rêveries. J'accepte la qualification, la rêverie n'est-elle pas la catastrophe virtuelle en laquelle s'initie la connaissance? Au moment où tant de savants calculent de par le monde, n'est-il pas souhaitable que d'aucuns, s'ils le peuvent, rêvent?*"<sup>1</sup>

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<sup>1</sup>"A great part of my discoveries arise out of pure speculation; one could undoubtedly think of them as manifestations of my dreaming. I'm happy with that, for isn't the act of dreaming a virtual catastrophe that gives birth to knowledge? At a time when so many scientists are busy computing, isn't it desirable for some of them—if they can do it—to dream?"