

Memorial to Hans Gottfried Kugler

1893–1986

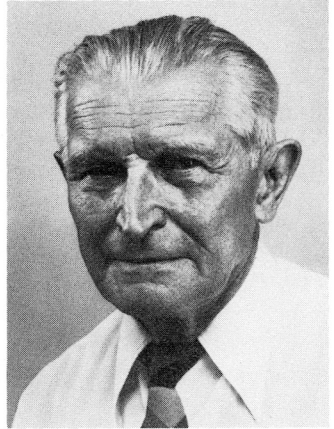
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Hans Kugler died at his home in Basel on December 6, 1986. He had remained in reasonably good health almost to the end, although his sight was failing. At the age of 93 he was still coming to the museum every morning to do a few hours' work.

The death of his wife Aline in 1972 was a great blow to him, but he was extremely fortunate in a number of ways. He had his daughter and family living not far away, he had the Natural History Museum where he could continue his work, and he had a very large circle of friends from his days in the petroleum world. He kept in constant touch with them by letter, while a steady stream of them visited Basel to be with him.

Hans was born in Baden, in the Canton of Aargau, but the family soon moved to St. Gallen where his father was a teacher. When Hans was eight they moved again, this time back to their home city of Basel; for the rest of his life, Basel was very much his home city, too. Right from the start, Hans was lucky in having good teachers who fostered his inborn interest in natural history and geology and encouraged his expeditions into the Jura hills to collect from the richly fossiliferous limestones. With a cabinet full of fossils, it is not surprising that he soon came in contact with members of the Natural History Museum which was located close to his grammar school. He spent much of his free time at the museum, so you can see that his connection with that institution was a long one, almost 80 years in fact!



After completing his undergraduate studies, he left school and crossed the square to the Geological-Mineralogical Institute where he studied under Professors Schmidt, Buxtorf, and Preiswerk.

At this time, Dr. August Tobler returned from the East Indies, bringing with him not only his geological material but also a big collection of ethnographic treasures. Tobler had packed them into his river boat, which was shipped complete to the Völkerkunde Museum, next door to the Natural History Museum. Hans Kugler was soon working for Tobler as a drafting assistant to earn pocket money. This led to field excursions together in the summer of 1913 and to a meeting with Dr. Fortunat Zyndel in Graubünden. Zyndel was employed by Central Mining and Investment Corporation as an exploration geologist in their concessions on the island of Trinidad in the West Indies. This contact led to a short contract for Tobler to go to Trinidad to map the southeast part of the island. He set out with his Malayan field surveyor, Abdul Kuder Mas Bakal, and with them went Hans Kugler as a field assistant. Life in the bush was primitive in those days; Hans noted in his field book their struggles with malaria and beri-beri. However, he took it all in stride and was equal to the challenge, as he was to all those that came later in his long and active life. (Fuller accounts of Hans Kugler's professional and family life and a complete bibliography can be found in: Jung, P., and Saunders, J. B., eds., *Hans Kugler; 1893–1986*: Birkhäuser, Basel, 1987.)

This first spell of six months in Trinidad marked the beginning of Hans' long association with the Caribbean and northern South America. This association has not yet ended: his colleagues are completing joint stratigraphic work that Hans had continued since his return to Basel.

From 1914 to 1959, when Hans returned to live in Basel, there was only one break. The war of 1914–1918 stopped any travel back to the Americas, but during this time Hans obtained his doctorate at the University of Basel with a thesis on Tobler's Sumatran rocks.

In 1920, Hans went back to Trinidad as geologist for the Apex Oil Company. He mapped the Apex anticline and was instrumental in the development of an extremely profitable field for this small English company. In 1921, his fiancée, Aline Werdenberg, joined him. They were married in Port-of-Spain immediately on her disembarkation from the ship that brought her from Europe.

Hans stayed with Apex until 1925 when he joined the Trinidad Petroleum Development Company. After only a few months of successful mapping in the Palo Seco concession, he moved once more, a situation not unusual in those days of small companies who were always on the lookout for good people. A meeting with Mr. Beaumont of Central Mining and Investment Corporation led to Hans joining them to work with their subsidiary company, North Venezuelan Petroleum. His first assignment, lasting the next few years, was to head an exploration team in Falcón. Their careful surface mapping, with resultant understanding of the subsurface structure, led to the development of the Cumarebo Field, which was later operated by Standard Oil. Less successful were the oil occurrences at El Tucuyo, which proved to be uneconomic.

From 1925 to 1952, Hans was concerned with operations in both Venezuela and Trinidad and lived with his wife and daughter first in one country and then in the other. This unsettled way of life is very apparent in his daughter Christine's account of their life with its many upheavals (see Jung and Saunders, 1987, cited previously).

He is certainly best known for his work in Trinidad, where he acted as consultant for the Central Mining subsidiary, Trinidad Leaseholds Limited (TLL). It was in no small measure due to his influence that the name of this small company became well known in ways not commensurate with its size. Many young men came straight from college to Pointe-à-Pierre and to the field camps in Forest Reserve, Barrackpore, and Guayaguayare to work as geologists and petroleum engineers. I was one of them, arriving from England on a tanker in 1951 as the result of a request for a field geologist/palaeontologist that was passed from Hans to Dr. Ovey at the British Museum and from him to my professor, S. E. Hollingworth. I continued working in and from Trinidad for a good many years before rejoining Hans at the Natural History Museum in Basel. Many others, though, spent a shorter time in Trinidad and then moved on to other oil areas of the world or to academic institutions where they have gained prominence. From the early days, Hans gathered around him a group of senior men who provided the equivalent of a teaching staff, but a teaching staff who practiced their profession day by day. Hans himself I consider the greatest teacher I have known, not as a lecturer (he disliked public speaking), and not even as a writer (though he has made significant contributions to the geological literature). His teaching came from his personal example. His enthusiasm was contagious, and his influence, both ethical and professional, was amazing.

Some of his contributions in Trinidad to the development of oil exploration and to the geologic sciences are worth reviewing.

In the early days, large-scale topographic maps did not exist, so Hans caused the development of what came to be known as the "spot map." The field geologist brought his compass and pacing data into the drafting office, while the field surveyor brought in his more sophisticated measurements. These were all plotted at scales ranging from 1:25,000 to 1:2,500, depending on the density of information. The geologist's observation numbers also came from his field book, along with his lithologic and structural notes. Beside the observation number would be a further number in a box; this was the "laboratory number" which was added if a sample had been taken for analysis in the geological laboratory. Some data came from outcrops, but these were rare in tropical rain forest areas. Usually, they came from auger holes drilled to an average 20–30 feet, to penetrate below the zone of weathering. Thousands of these were laboriously constructed in central and south Trinidad and were supplemented by test pits dug to examine the nature of important contacts.

The compilation of all the spot map information resulted in a definitive 1:100,000 geologic map together with a sheet of sections that included the results of many hundreds of oil wells. This was published by Hans Kugler in 1961, with the support of the Petroleum Association of Trinidad, and is still in demand today.

Hans was primarily a stratigrapher, so one of his main concerns was improving dating methods. To begin with, he had hoped to be able to use mollusks, or even micromollusks, that might be found in well samples, if that were possible. However, these fossils proved to be too restricted in their occurrence, so he turned to foraminifera. His interest in this group had already been fostered in his earliest days by Tobler. Hans employed Alfred Senn in Falcón, and they had considerable success, although the problems of reworked faunas nearly destroyed the credibility of the tool at the start. In Trinidad, Hans first had the foraminifera studied by Percy Jarvis, the local bank manager and a keen amateur microscopist: later, in 1929, he started the geological laboratory at Pointe-à-Pierre. It might be mentioned that Hans went to see Dr. Cushman in Massachusetts in the 1940s to try to persuade him to give his attention to planktonic foraminifera, but Cushman felt himself to be too committed already. Therefore, the necessary studies were carried out in Pointe-à-Pierre. In fact, over the years the laboratory there was to produce some excellent biostratigraphers who did important work for the science as a whole and gained international recognition for themselves, particularly in the field of planktonic foraminiferal zonations. Among these one could name Hans Renz, Charles Stainforth, Paul Brönnimann, Hans Bolli, and Walter Blow. The laboratory is still active, and I know that Hans was proud of it as a testimony to his foresight and his encouragement.

Hans Kugler was one of the best known and respected oil geologists in the Caribbean region; this is apparent from the contributions he was asked to make to the work of others over the years. His influence was great and his advice much sought after. In 1956, when Trinidad Leaseholds Limited was taken over by Texaco, Hans remained as consultant in Trinidad and soon achieved a great rapport with August Long, the chairman of the board of that company. When Hans returned to Basel in 1959, he remained as a consultant for Texaco and continued to return periodically to Trinidad to do appraisal work for them. His worth was also fully appreciated by Eric Williams, the Prime Minister of Trinidad at that time, and by the Minister of Energy, who tried to persuade him to become Government Geologist rather than return to Switzerland.

However, Aline and Hans wished to be back in their home country with their family, which had grown in size with the addition of several grandchildren. Also, Hans wanted to rejoin the Natural History Museum in Basel with which he had kept close contact through the years. On his return he took up his second career—that of a “museum man.” There is a tradition here of unpaid workers, what one might call “voluntary scientific museum collaborators.” Into this category Hans Kugler immediately moved, occupying the “Tobler Room” that had been made ready for him. Indeed, from the end of 1968 to 1973, he even acted as unpaid head of the Geological Department; during this time he used his experience from industry to introduce some needed reforms to the department. In consultation with his family, he set up the Kugler-Werdenberg Fund, whose aim it is to support the acquisition of paleontological and zoological collections from the Caribbean, northern South America, and the Pacific, and to provide assistance for the purchase of relevant literature and the publication of scientific results.

The circle of Hans' professional acquaintances was great, and many became close personal friends. However, to retain friends over distance and through time requires considerable discipline of mind; that is, it requires the writing of letters. Looking back through Hans' field books, which also acted as his diaries, I am staggered by the number of letters he mentions. I would estimate that he wrote an average of at least one letter a day for the 40 years that he was overseas. As might be expected, therefore, the number of geologists visiting Trinidad was great. As H. D. Hedberg wrote (Hedberg, H. D., 1968, Citation for honorary membership of the American Association of Petroleum Geologists: *American Association of Petroleum Geologists Bulletin*, v. 52, p. 1339–1340), his home

in Pointe-à-Pierre became a sort of mecca for many a traveler. Here again, his younger colleagues benefited from many evenings of stimulating conversation with scientists who were "household names" in geology. The food and wine were equally good, thanks to the expertise of Mrs. Kugler. When Hans and Aline returned to Basel, their friends changed their itineraries to head in this direction, and many a fine gathering has been held here since. On the occasion of Hans' eightieth birthday, a celebration was organized at the Basel Museum for the presentation of a commemorative volume (Jung, P., ed., 1974, *Contribution to the geology and paleobiology of the Caribbean and adjacent areas: Naturforschenden Gesellschaft in Basal, Verhandlungen*, v. 84, no. 1, 520 p.). Among those attending were 14 who had been in Trinidad with him, many of them with their wives and families.

Hans Kugler's contributions to the geological literature include his work on the geology, and particularly the stratigraphy, of Trinidad. His map has already been mentioned, but in addition there was his chapter on Trinidad in the *International Stratigraphic Lexicon* (1956) and his work that is still in progress and will be completed by his colleagues.

In a broader context is his study of sedimentary volcanism, a term which he introduced himself and a subject that he considered in a series of papers published over the years from 1933 to 1978. Trinidad was a classic place to study mud volcanism, shale diapirism, and sand and clay dikes, but he was also able to extend his investigations to other areas. For example, he visited the Baku area of the USSR at the time of the *International Geological Conference* held in 1938.

In 1953, Hans published his work on the Jurassic to Recent sedimentary environments in Trinidad. This became a benchmark paper for the region because its interpretation of the important part played by slumping and the mass redistribution of sediments enabled us to re-evaluate some of the stratigraphic peculiarities that had hampered our understanding of the Tertiary formations of Trinidad.

As an active geologist, it was natural that Hans Kugler should be involved in the affairs of many professional societies during his long life. Of particular interest was his service as first vice-president of the Geological Society of America for 1955, the first (to my knowledge) non-American scientist to hold this office. In addition, he was a foreign correspondent of the Venezuelan Academy of Sciences and an honorary member of the American Association of Petroleum Geologists, the Geographisch-ethnologisches Gesellschaft Basel, the Naturforschenden Gesellschaft Basel, and the Geological Society of Trinidad and Tobago. He was also a Fellow of the Institute of Petroleum and a Life Member of the Paleontological Research Institution.

Though geology was Hans' first love, not far behind came his interest in all branches of natural history. Throughout his life he worked hard for conservation. He was a cherished member of the Field Naturalists' Club of Trinidad and an Honorary Game Warden for Trinidad and Tobago until his return to Europe. Though careful to preserve animal and plant life, he also realized the importance of good taxonomic work, particularly for tropical amphibia, reptiles, and small mammals. This required collecting, which he did with great care, sending his material to specialists in Europe and North America for study and publication. The 60 taxa named after him are an indication of the unselfish help that he gave to taxonomists over the years.

To his family in Switzerland and to his friends everywhere, Hans Kugler will never cease to be present as long as they live.

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