

Memorial to Marlies Teichmüller

1914–2000

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With the passing of Marlies Teichmüller on September 12, 2000, the scientific world lost one of its most distinguished scientists and one of the pioneers in coal petrology. Her career spanned 60 years.

Marlies grew up as Marie-Luise Köster in Herne (Westphalia), Germany, where she took an interest in people, nature, and culture. It was only natural that she later pursued studies in the natural sciences. In 1937, after completing her undergraduate degree with a major in geology at Humbolt University of Berlin, Marlies came to the United States and began her doctoral thesis under the guidance of pioneering coal petrologist R. Thiessen at the U.S. Bureau of Mines in Pittsburgh. Her doctoral thesis (1941), which was completed under her mentor-professor E. Stach at the Humbolt University of Berlin, compared the transmitted-light method of Thiessen and the reflected-light method of Stach. This was a major contribution to modern coal methodologies.



Before Marlies left for the United States in 1937, she met her husband-to-be, Rolf Teichmüller, a well-known structural geologist and expert on the regional geology of western Europe. Professor Stach insisted that she complete her thesis before getting married. However, he reluctantly gave in to Marlies' wish to be married before that time. After World War II, the Teichmüllers co-authored many papers, including some pioneering work on the relationship among coalification, regional geology, and coal petrology.

Marlies Teichmüller's 190 papers touch on most aspects of organic petrology, and include many contributions with Rolf on the application of organic petrology to coal geology. In 1946, Marlies began her study of the thick brown-coal deposit near Cologne, Germany. One of her other professors at the Humbolt University of Berlin was the well-known paleobotanist, W. Gothan, and it is probable that he introduced her to this deposit while she was a student. Gothan had studied the wood from this deposit and had published his results in 1909. Marlies' three papers on this brown-coal deposit, including one co-authored with P.W. Thomson, are classics.

While Marlies continued her studies of brown coal, she and Rolf published a series of papers on the use of reflectance for determining regional coalification. They also used coal balls (permineralized peat) to determine the compaction ratio of Carboniferous peat (coal) in the Ruhr District. Marlies also used coal balls to determine that some inertinite, which she called "primary inertinite," was produced during the peat stage. Her work expanded into the anthracitic coals of Germany, where she was able to relate reflectance to chemistry. In 1953 she was one of the founding members of the International Committee for Coal Petrology (ICCP), which is responsible for the international standardization of coal nomenclature and coal analytical techniques.

In 1963 and 1967 Marlies came to the United States to participate in field trips to the Everglades and the Okefenokee Swamp. Professor William Spackman of Pennsylvania State University, who was conducting research on modern analogues of coal-forming environments, led the

trips. He wrote that Marlies called these experiences “A dream come true!” In 1964 she participated in the Coal Science Conference organized by Peter Given at Pennsylvania State University. In 1967 and 1973 she participated in the American Chemical Society’s Gordon Conferences on Coal Science held in New Hampshire, which helped her integrate chemical and optical data of coal.

Marlies was a pioneer in the application of fluorescence microscopy to coal petrography and petrology. In the 1970s she discovered the new macerals fluorinite, exudatinitite, and bituminite and also that petroleumlike substances in coal can form when heated under the microscope. A major result of her work with fluorescence was to determine the relationship between fluorescing liptinite and vitrinite and the oil window. This was a major contribution to petroleum exploration.

Virtually all aspects of coal petrology and coal geology attracted Marlies’ interest. She was one of the early workers to apply transmission electron microscopy (TEM) to coal studies. Marlies also published on the relationship between illite crystallinity and reflectance, and used graptolite periderm reflectance for maturity assessment when vitrinite was not present. Her interest in coal petrology also led her to apply it to archaeology.

The series of papers (1982a, 1982b, 1987, 1989, 1998) summarizing the state of the science of coal petrology and coal geology are major contributions in their own right. I remember editing her 1989 paper, which she said no one would read because it was too long. I was pleasantly surprised when she said that it became her most popular paper.

I first met Marlies Teichmüller in 1983 at the airport en route to the ICCP meeting in Oviedo, Spain. A small part of the ICCP group had gathered there, and she suggested in a friendly way that I put my heavy luggage on her pushcart. In Oviedo, Marlies and I visited a famous medieval church on the flanks of the mountain overlooking the city. Later we had an ice cream cone (a favorite dessert of Marlies!). Much to my surprise, Marlies knew many of the Spanish names of the ice cream flavors.

In 1985, I visited Marlies at her office in Krefeld, Germany, which she had long shared with her husband, Rolf Teichmüller (1904–1983). She was pleased that the administration of the Geologische Landesamt Nordrhein-Westfalen in Krefeld allowed her to keep her office following her retirement in 1984. Marlies showed me her vast reprint collection, which contained reprints she and Rolf had received from all over the world. She also showed me her botanical garden outside the building, where she had carefully nurtured arborescent and shrubby plants that were botanically the same or similar to those in Teichmüller-Thomson reconstructions of the Cologne Miocene brown-coal mires.

In 1986, I invited Marlies to deliver the keynote address at the Symposium on Peat and Coal at the 29th International Geological Congress in Washington, D.C. (1989). She delivered her keynote lecture in a large, standing-room-only venue. Her last slide showed five possible future directions of organic petrology, including further applications of transmission electron microscopy, organic chemistry of individual macerals, and peatification and coalification experiments, which she suggested be done in cooperation with botanists and chemists.

During her two last visits to the United States (1989, 1992), I was her host in the Washington, D.C. area. Marlies still had that natural curiosity about culture and people. We visited the Smithsonian Museum of Natural History and the Washington Cathedral. We were also very lucky to see a caravan of Amish horse and buggies on our way back from the combined meeting of The Society of Organic Petrology (TSOP) and the ICCP at Pennsylvania State University.

In retirement Marlies continued to fill an important role in the ICCP—an organization that she was devoted to. She last attended an ICCP meeting in 1996 in Heelen, Netherlands, where the organization began. She was a special guest as a founding member. The last great work of

Marlies Teichmüller's career was being senior author of Chapters 2, 3, 4, and 8 of *Organic Petrology* (1998), a publication accomplished under her leadership and that of Geoffrey Taylor.

Marlies received many honors and awards including the Gilbert H. Cady Award of the Coal Division of the Geological Society of America. She was the only coal scientist outside of North America to receive the Cady Award.

Marlies Teichmüller will not just be remembered as a great scientist—the likes of whom we rarely see—but also as a thoughtful, generous, and caring lady. I remember how in 1988 she cooked me a turkey dinner, including cranberry sauce that she had obtained from a faraway place in Europe. She would go to great lengths to accommodate a request, such as in 1994 when I asked her on short notice to arrange a visit to Essen to meet the famous German tonstein expert, K. Burger. Marlies arranged for a visit to his home and, additionally, for all of us to have dinner at a fine restaurant overlooking the Rhine River.

In one of her last letters to me (March 28, 1999), typed on the same typewriter she had when writing her doctoral thesis some 60 years earlier, and with which she communicated to scientists all over the world, she reminisced: “I very often think of the many discussions we had about scientific problems and of my visit in Reston [Virginia] and your visit in Krefeld with the good scientific relations we had over many years. It was a good time.”

Coal science has lost one of its greatest organic petrologists, whose devotion and career are models of excellence. I have lost a dear friend as well.

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