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Memorial of Paul Ramdohr
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Paul Ramdohr, Fellow of the Mineralogical Society of America and Roebling Medalist of 1961, died on March 8, 1985, in his home in Hohensachsen near Heidelberg, Germany, shortly after his 95th birthday. It was only during the summer of the preceding year that he had rapidly recovered from a first, light stroke. Thus he had remained scientifically active almost to the end of his days, and his last two papers are still in press. On March 13, 1985, his wife, daughter, the four sons, and innumerable friends and colleagues followed his coffin into the foothills of his beloved Odenwald, where he found his last rest "unter einem Lindenbaum."

Paul Ramdohr was born on January 1, 1890, at Überlingen, Lake Constance, as the son of a pharmacist. He studied at Heidelberg and Göttingen, from where he received his Ph.D. under O. Mügge in 1919. Directly afterward he became Assistant in Darmstadt. In 1921 he moved to the Mining Academy at Clausthal, where he received his Habilitation in 1922. He became Full Professor at Aachen in 1926, but, eight years later, was called to the prestigious Friedrich Wilhelm University at Berlin. There he experienced the war, the destruction of the Institute including the collection, and the difficult early postwar period. In 1950, after declining an offer to come to Australia, Ramdohr became Professor at Heidelberg, a post which he held until 1960. As an emeritus he immediately joined the Geophysical Laboratory at Washington, D.C., off and on until 1964; in 1962 he spent five months at the University of New South Wales in Australia. Until he was ninety he took trips, practically around the world. But his base remained Heidelberg, the Mineralogical Institute of the University and the Max Planck Institute for Nuclear Physics, where he held an office up to his death.

Paul Ramdohr was clearly one of the greatest German mineralogists, but his fame was also on an international level. Although he began to work on contact metamorphic rocks, on buchites formed at a basalt contact, and on ferruginous hornfelses from the Harz Mountains, his great and lasting, yet also early-starting contributions were in the field of ore microscopy. Together with Hans Schneiderhöhn he was one of the founding fathers of this method of investigation, that became an indispensible tool in ore mineralogy, economic geology, ore dressing, and metallurgy. It is not exaggerated to say that Ramdohr has carried his individual art of ore microscopy to a peak which—even with the modern methods of physical measurements of reflectivity, etc.—has not been surpassed. This was possibly by virtue of a combination of several outstanding personal capabilities: Two keen, extremely observant eyes that could recognize the slightest differences in color or brightness; a memory with the quality of a computer to store the observations made; unlike a computer, however, brilliant intelligence that allowed combination and coordination of these observations with data on occurrence and paragenesis, etc.; and, last but not least, never-ending patience and dedication for his work.

The almost overwhelming wealth of knowledge compiled, truly the mineralogical record for the ore minerals, was laid down for posterity in his book *The Ore Minerals and Their Intergrowths,* the last edition of which appeared only during 1980. It will undoubtedly remain the standard reference work on this subject for many years to come.

However, it would mean doing injustice to Paul Ramdohr to qualify him exclusively as an ore microscopist. For him the microscope has actually been only a tool to attack and solve major problems of ore genesis. Again, extremely careful and detailed observations in the mode of a detective were critical for his genetic conclusions. Thus, prior to any competent experimental work, he was first in unraveling the complicated phase relations of the system Fe-Ti-O. This happened as early as 1925 and was solely based on polished-section work with natural magnetite, ilmenite, and hematite, and he had prepared these sections himself! It was Ramdohr who first demonstrated conclusively the primary sedimentary nature of the Rammelberg ore in Germany. This was the key to the understanding of many other "stratiform" sulfide deposits in later years. Ramdohr's conclusion implied that these sulfide ores like their country rocks had been deformed and metamorphosed, and Ramdohr found and defined many characteristic features to prove this point. Thus, to the world's surprise, and only on the basis of hand specimens, he recognized in 1950 that the ores of the huge lead-zinc deposit of Broken Hill, Australia, occurring in granulite-facies rocks had obtained their present mineralogy and textures totally through metamorphic processes. In a similar way he presented the microscopic evidence that the world's largest gold deposit at the Witwatersrand, South Africa, was originally formed as placers, a fact that was undoubtedly of the greatest importance for mining and further exploration.

Additional topics to which Ramdohr made important contributions are radioactive haloes in minerals, the secondary origin of native nickel-iron alloys in ultrabasic rocks, and, especially during the last decades of his life, the opaque minerals of meteorites. In fact, at the age of 81 he traveled to Australia to have the big iron meteorite Mundrabilla II shipped to Heidelberg, where it was sectioned and studied. Large slices were dedicated to the world's most prominent museums. Not counting about a dozen new opaque phases that he found in meteorites, there are about ten now-well-known terrestrial minerals that were discovered and described by Ramdohr. Finally, Ramdohr's scientific career would not be adequately covered without mentioning his enthusiastic participation in the study of lunar rocks. He was, in fact, from its start one of the Principal Investigators of the Lunar Program leading a small research group at the Heidelberg Max Planck Institute.

From early on Ramdohr had close relationships with the United States. The stories which he had heard in his youthful days from his uncle, one of the pioneers of metal mining in the American West, may even have been a decisive factor for his own scientific development. During the summer of 1930 his dreams became reality: Together with Schneiderhöhn he traveled for six weeks through the United States in connection with a Summer School of Geology and Natural Resources organized by R. M. Field of Princeton University. For everybody who had once seen Ramdohr in the field it is easy to reconstruct mentally his activities with his huge sledge hammer named "Minna" in order to collect as many as possible of the best samples from such famous localities as Franklin, New Jersey; Butte, Montana; or the Coeur d'Alene District in Idaho. His postwar stay at the Geophysical Laboratory, where he cooperated with G. Kullerud, marked his longest overseas period.

In addition to the honors bestowed upon him by MSA, Ramdohr was an Honorary Member of about a dozen other scientific societies; he held five honorary Doctor's degrees, was member of six Academies, and had received seven additional medals. His long list of publications with some 250 titles has just been published in detail by *Fortschritte der Mineralogie,* volume 63.

Paul Ramdohr had, and still has, many pupils the world over. Not all of them did, in fact, obtain a degree with him. Some, like the present writer, were just "infected" by his scientific attitude and enthuasiasm in general, by his wide knowledge and interest in all fields of mineralogy and the earth sciences as a whole, by his critical judgment, and by his very personal way of solving geoscientific problems of genesis by studying the products in a most elaborate manner. If there is a legacy by Paul Ramdohr to the yet expanding community of mineralogists, economic geologists, and petrologists, it is this: Observation at all possible scales must have priority!