

MEMORIAL OF PAUL HEINRICH VON GROTH*

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It is with deep regret that we record the death of Professor Paul Heinrich von Groth in Munich, Germany, on December 2, 1927. With the passing of Professor Groth the Mineralogical Society of America has lost one of its most distinguished honorary life fellows, the science of mineralogy one of its greatest leaders,

PAUL HEINRICH VON GROTH
1843-1927

and the world of science a courageous pioneer, an ardent investigator, an energetic and efficient author and editor, and an inspiring teacher.

Paul Heinrich von Groth was born June 23, 1843, at Magdeburg, Germany. His father was a portrait painter. The training for his life's work Professor Groth obtained at the school of mines in Freiberg, at the college of engineering in Dresden, and at the University of Berlin, at which institutions he spent the years 1862 to 1870. The degree of doctor of philosophy was conferred upon him by the University of Berlin in 1868, his inaugural dissertation being entitled "*Beiträge zur Kenntnis der überchlorsauren und übermangansauren Salze.*" In 1870 he qualified for a teaching position, the subject of the Habilitations-

* Paper read at the eighth annual meeting of *The Mineralogical Society of America*, Cleveland, Ohio, December 29, 1927.

schrift being "*Über den Zusammenhang der Kristallform und der chemischen Constitution.*"

From 1870 to 1872 Professor Groth was a member of the teaching staffs of the Technische Hochschule in Charlottenburg and of the University of Berlin. When the University of Strassburg was being reorganized, shortly after the close of the Franco-Prussian war, Groth was called to the chair of mineralogy, for he had already acquired a splendid reputation as an investigator of great promise, especially in the field of chemical crystallography to the development of which he subsequently contributed so extensively.

Groth held the professorship at Strassburg from 1872 to 1883. During this period he not only supervised the construction of a new laboratory, which set a very high standard for that time, and completely reorganized the mineral collections, but he also carried on extensive researches and published a long list of papers. Moreover, it was while at Strassburg, that Groth began his notable career as an author and editor, for during that period he wrote two textbooks and a guide to the mineral collections, and founded the *Zeitschrift fuer Kristallographie und Mineralogie*.

Thus, in 1874 the first edition of his *Tabellarische Übersicht der Mineralien* was published, which later appeared in four German editions and in 1904 was translated into French. Two years later, in 1876, his *Physikalische Kristallographie und Einleitung in die Kenntnis der wichtigen Substanzen* appeared. This soon became the standard text in the field of physical crystallography, and later passed through four German editions. In 1910 this important textbook was made more directly available to English-reading students, when portions of it were translated into English by Jackson. The third book to be written by Groth while at Strassburg was the excellent guide to the mineral collections of the University, published in 1878.

As already indicated, the *Zeitschrift fuer Kristallographie und Mineralogie* was founded by Groth. It was first issued in 1877. As sole editor Groth published 52 volumes of the *Zeitschrift* and three more as joint editor with Professor E. Kaiser, making a total of 55 volumes during the years 1877 to 1920. As is well known, since 1921 the *Zeitschrift* has been under the editorship of Professor P. Niggli of the University of Zürich.

Upon the occasion of Groth's eightieth birthday, in 1923, the 58th volume was issued as a *Groth Festschrift*, and contained 32 papers by his friends and former students.

The number of the *Zeitschrift* which was issued in November 1927, only a few weeks before Professor Groth's death, contains as its leading article a splendid account by Professor Groth of the founding and development of the *Zeitschrift* during the first fifty years of its existence, 1877-1927. In this paper Professor Groth refers to the long list of eminent scientists from all over the world who have contributed to the *Zeitschrift* and it is of great interest to note that many of them had been his students either at Strassburg or Munich.

In 1883 Professor Groth was called to the University of Munich as the successor to Professor Wolfgang Franz von Kobell. His tremendous energy was at once transferred to that institution, and he soon reorganized the instruction in mineralogy and installed in new quarters the extensive royal Bavarian mineral collections of which he was made custodian. Under Groth's leadership the Mineralogisches Institut of the University of Munich became one of the chief centers for crystallographic and mineralogical study, advanced students being attracted from all over the world, particularly from the United States.

During his professorship at Munich Professor Groth stimulated and supervised many investigations dealing with various phases of crystallography and mineralogy. He also continued to write text and reference books and 13 additional volumes were placed to his credit of which only the following will be mentioned: *Grundriss der Edelstein-Kunde* (1887), the monumental work on *Chemische Kristallographie* in six volumes (1904 to 1919), *Elemente der physikalischen und chemischen Kristallographie* (1921), and *Die Entwicklungsgeschichte der mineralogischen Wissenschaften* (1926). The last book was published after his retirement from active teaching and when he had all but lost his eyesight.

Professor Groth's contributions to the mineralogical sciences were widely and most favorably recognized for he was elected to honorary membership in many learned societies. Since he had had many students from the United States and Canada it, indeed, was fitting that he should have been elected an honorary life fellow of the Mineralogical Society of America in 1926. Promi-

nent universities also gladly testified to Professor Groth's pre-eminent position among the world's leading scientists of his period, the Universities of Cambridge and Geneva having conferred upon him the honorary degree of doctor of science and the University of Prague that of doctor of philosophy.

Professor Groth's activities were so varied and many of his contributions so fundamental and far reaching that they exercised a profound influence not only upon the development of mineralogy but also upon certain phases of chemistry and physics. Accordingly many of his views on morphotrophy and isomorphism, and on chemical crystallography in general have become firmly embodied in chemical literature. Furthermore, the remarkable advances in our knowledge of crystal structure as the result of the development of X-ray analysis, dating from 1912, are in large measure due to Groth's long and enthusiastic advocacy of the point system theory of crystal structure.

Until the very last Professor Groth was keenly interested in American mineralogy. In 1893 he came to the United States and served as a member of the jury of awards for the division of Mines and Minerals of the World's Exposition held in Chicago that year. While in this country he visited some of our leading universities, museums, and mining and mineral localities.

In March 1926 I was privileged to visit Professor Groth twice in his home in Munich. Although he was then in his 83rd year and nearly blind, he displayed the same enthusiasm for his beloved science and still retained the alertness of mind that had attracted so many students to him and inspired them to achievement. At that time he eagerly inquired about his friends and former students in this country and Canada. He also expressed great pleasure in the progress made by the Mineralogical Society of America, for he followed its development with deep satisfaction.

During the 60 years of Groth's activity crystallography has passed by various stages of development from the list of the more or less descriptive sciences to that of the exact sciences permitting of precise measurements. To this advance Professor Groth and his many students contributed in no small measure.