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THE LIFE AND WORK OF AMOS PEASLEE BROWN

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A FEW months ago a brief note announced to our readers the passing away of Professor Amos P. Brown, of the University of Pennsylvania. It is fitting that a page or two be devoted here to a sketch of his life and scientific career. He was born in Germantown, Philadelphia, on December 3, 1864, studied at the University of Pennsylvania, and received the degrees of Bachelor of Science in 1886 and Mining Engineer in 1887. During the following two years he was assistant on the Second Geological Survey of Pennsylvania, and in 1889 became instructor in mining and metallurgy at his alma mater. Pursuing postgraduate studies in chemistry and mineralogy, he received the degree of Doctor of Philosophy in 1893, his thesis being on the chemical constitution of pyrite and marcasite. In 1895 he became assistant professor of mineralogy and geology in the college department, a few years later professor in the auxiliary department of medicine, and in 1898 head professor of the department of mineralogy and geology, which position he held until forced to resign by ill health in the spring of 1917. A breakdown from overwork and worry in connection with the monumental research on the crystallography of the hemoglobins, together with liver and intestinal trouble which necessitated a couple of operations, forced him to take long vacations from his college work during the last few years of his life, but he never fully recuperated, and after gradually failing for some months he died on October 9, 1917.

It was the writer's good fortune to receive instruction in mineralogy and related subjects from Professor Brown over a period of six years, 1903-09, and a few personal recollections may be acceptable here. He spoke rather slowly, in a low tone of voice, and sometimes failed to impress the undergraduate students. In postgraduate work, however, where he could address a limited number of men deeply interested in the subject, he was a splendid teacher, for he was widely read in all fields of his chosen subject, as well as in various other branches of natural science, and possessed exceptional ability in sizing up the value of a contribution, extracting from it what was new and important,

and presenting it in an instructive, interesting, and inspiring way. I recall how lucidly he discussed isomorphism, the field in which he was later to make his greatest contribution to science, and pointed out what must be its significance in connection with molecular structure (which has since been found to be substantially correct by x-ray studies). He was very familiar with the geology of the region around Philadelphia, and felt strongly that such maps as had been published, while they might be correct in many details, were lacking in breadth of interpretation of the interrelations between the various formations.

Professor Brown's contributions to science were not numerous nor with one exception of great importance. His thesis for the doctor's degree, above mentioned, represented real pioneer work in the study of mineral constitution, altho the conclusions drawn are now known to have been unjustified, owing to misinterpretation of the influence of some of the constituents of the minerals and solutions. The text-book used in his classes, "Mineralogy Simplified," was almost entirely his own work, altho, being based originally on another book with the same title, its authorship was credited to "Erni and Brown." He started a compilation of the economic minerals of Pennsylvania, but being forced by ill health to give it up, it was completed by his assistant, Dr. Frederick Ehrenfeld; and as simultaneously the latter had to take over the presentation of most of Dr. Brown's lectures in the department, he was unable to prepare as complete or accurate a work as might have been desirable by the time the Topographic and Geologic Survey Commission of the State was ready to proceed with its publication.

The work for which Professor Brown will be longest remembered and admired was that on the crystallography of the hemoglobins, a huge quarto volume published by the Carnegie Institution, of which Dr. E. T. Reichert, of the medical department of the University of Pennsylvania, was a joint author, contributing the biological matter included. Crystallized hemoglobin derivatives were prepared from the blood of a number of different animals, and studied under the "petrographic" microscope, determinations being made of the interfacial angles, and from them the systems and axial ratios of the substances, as well as of optical properties in many cases. The measurement of thousands of angles in this way was in itself a formidable undertaking; but the greatest achievement was the interpretation of the observations. Professor Brown was able to recognize almost intuitively the presence of isomorphous relations between crystals showing no very apparent points of similarity, and demonstrated that the greater the degree of isomorphism the closer were the animals yielding the crystals related. His success in carrying out the microscopic measurements was all the more remarkable in that he was personally acquainted with but few modern petrographers, and gained his knowledge of the methods almost entirely

from the literature and from practice by himself. His ability to recognize obscure isomorphous relations was also an indication of how thoroly and discriminatingly he had made use of published information in this difficult field of study.

Always quiet, reserved, and shrinking from publicity, Professor Brown was not as widely known, nor his ability as fully appreciated, as should have been the case. But from the above brief account of his life and work it will be seen that his death is indeed a loss from the all too limited group of American mineralogists.

SOME MINERALS FROM THE STANLEY ANTIMONY MINE, IDAHO

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THE Stanley Mine is located in Gorge Gulch, about one fourth mile from Burke, in the Coeur d'Alene District, Idaho. The vein is unique in that its valuable constituents are antimony and gold, altho it is located in the center of an area characterized by the presence of lead-silver deposits. The vein is lens-like in its character, being exceedingly variable in width and metallic content. The filling of the vein is milky-white quartz, but this gives out in places, the full width of the vein being then pure stibnite. The inclosing rocks are greenish, sericitic slates of the Burke formation, a member of the Algonkian series of sediments known as the Belt Terrane. The mine first began shipments of gold-antimony ore to Granite City, Illinois, in 1906 and maintained a considerable production for some time. The ore was sorted by hand, on the dump, into three products—first-class or shipping ore, consisting of practically pure stibnite; second-class, consisting of scattered small grains of stibnite in quartz; and waste, or the stibnite-free quartz of the gangue. The "second-class" or milling ore was later hauled to the gold mill of the New Jersey Mine near Kellogg and milled. A large part of the gold content was extracted by simple amalgamation and the stibnite was concentrated on Wilfey tables. The mine was later closed but not apparently from lack of ore, as some ten tons of pure stibnite were left for many years in a pile on the dump. Early in 1915, under the stimulus of the then prevailing price of antimony, the mine was reopened and several carloads of hand-sorted stibnite were shipped. The writer while visiting the mine in September of that year was not allowed inside the workings, but had to be content with an inspection of the dumps and ore heaps. The specimens collected at that time form the basis for the following notes.