KANSAS GEOLOGICAL SURVEY

OPEN-FILE REPORT 39-3

MINERALOGY IN 1939

By

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The science of mineralogy continued to expand in many directions in 1939. No doubt the war will result in a curtailment of research (except in the field of war minerals) in the countries affected, but such results were not yet apparent late in 1939. During the year, contributions to science continued to appear from countries which no longer exist. For example, a comprehensive account of an unusually large group of minerals occurring in the Kladno Coal Basin of Bohemia was given in a report of the Czechoslovakian Republic.

An increasing appreciation of the value of specific gravity in determinative mineralogy led to several contributions during the year in this field. Quick and accurate specific gravity determinations are not only of value in identification of minerals, but can be used also in determining the approximate chemical composition of minerals occurring in isomorphous series. A torsion microbalance, by means of which accurate gravity determinations can be made in a very short time, was made available to mineralogical laboratories during 1939, and its operation was described in the technical literature. For the determination of the density of very minute solids, scientists in a research laboratory developed an improved technique in the use of the micropycnometer.

Centuries ago, the study of the composition of minerals led to the birth of the science of chemistry. Investigation of the chemical composition of minerals has continued through the years, and was an active field of investigation during 1939. A Japanese laboratory reported finding the rare metal beryllium in the cerium mineral allanite. Several score of papers appeared describing the formation of artificial minerals. Some of these minerals were formed accidentally during metallurgical processes, but others were made for the express purpose of determining the chemical and physical conditions necessary for their formation. The latter research furnishes valuable information as to the origin of these minerals as they occur in nature.

A specialized branch of chemical mineralogy deals with the determination of the age of rocks through chemical analyses of the radioactive minerals present in those rocks. Age determinations were made during 1939 for rocks from several places, including the Kola penninsula in Russia, northwest Canada, Connecticut, New Hampshire, Ontario, and New Mexico.

The trend in crystallography from measurements of the external forms of crystals to determinations of internal atomic structures continued to be apparent in 1939. Although much work is still done on measurement of interfacial angles of crystals, and on the determination from these data of the length and angle relationships between the crystallographic axes, a great amount of investigation was carried on in the relatively new science in which the internal structure of crystals is determined by the use of X-rays. A British abstract journal listed sixty-six papers during the year which were devoted to this phase of the science.

Some unusual discoveries of diamonds were made during 1939. A stone weighing 726.6 carats was found in a placer deposit in Minas Geraes, Brazil. It has been named the President Vargas. Of perhaps equal interest, but of opposite extreme in the dimensions of the crystals found, was the discovery and identification of over fifty exceedingly minute black diamond grains in an iron meteorite from Canyon Diablo, Arizona. Although diamonds were first discovered in meteorites in 1888, the total number of known occurrences is exceedingly small.

Mineralogists have long appreciated that the hardness of minerals varied in different crystallographic directions, and diamond cutters have known that diamonds were no exception. A report was made in 1939 bringing the variations in hardness of diamonds to the attention of mineralogists. It was found by these investigators that the diamond is hardest parallel to the octahedral faces and softest parallel to the six faces of the cube.

Appearing late in 1938, too late to be included in the report on the progress of mineralogy for that year, was a description of the mineralogy of three sulphate deposits near Calama in northern Chile. Seventy-six minerals were identified and studied. Eighteen of these, of which seven are new species, have not yet been found elsewhere. Oxidation and secondary enrichment of primary cooper minerals, under the existing conditions of extreme aridity, have been mainly responsible for this remarkable suite of minerals.

Mining operations in a pegmatite in Sweden resulted in the discovery of large masses, weighing several hundred kilograms, of pollucite, a caesium-containing mineral which resembles quartz in appearance. Before the discovery of the value of caesium in radio tubes pollucite was very scarce, and large specimens absolutely

unknown. Active search for this mineral was started several years ago, and resulted in the discovery of large masses in pegmatites, first in Maine, and now in Sweden.

Several contributions were made in the field of sedimentary mineralogy during 1939, including the publication of a manual of sedimentary petrography. Cores of deep sea sediments were obtained, and the minerals present identified. New knowledge concerning the mode of formation of the clay minerals was obtained through synthesis of these minerals from feldspar by carbon dioxide charged water under high pressure and temperature.

Meteorites continue to excite interest. Eighty-four papers (the same number as in 1938) concerned with meteorites were listed by an abstract journal during 1939. One such paper described a witnessed fall of an australite in western Australia. Although these meteorites are abundant in Australia, this is only the second witnessed fall to be described in the literature. A meteoritic stone weighing over a ton and a half, and with a maximum dimension of 4 feet, 5 inches, was discovered in central Australia in 1937, but its description was not published until 1939. This is an exceptionally large stone.

A fair index of mineralogic research during any year is the number of new minerals which are discovered and described. During 1939 about eighteen such new occurrences were made a matter of record. These discoveries ranged in latitude from Greenland to South Africa, and every continent except Australia was represented.