THE AMERICAN MINERALOGIST

VOL. II JANUARY, 1917 No. 1

PROOF THAT PRICEITE IS A DISTINCT MINERAL SPECIES[1]

ESPER S. LARSEN
U. S. Geological Survey

THE friable, chalky "priceite" from Curry County, Oregon, and the compact, nodular "pandermite" from Asia Minor have the same composition, which is near that of colemanite, and they are stated in most books on mineralogy to be massive or cryptocrystalline, impure colemanite. Optical study, however, while establishing the identity of priceite and pandermite, shows that they differ from colemanite in crystal system and in optical properties; it also shows that both the type priceite and pandermite are remarkably homogeneous, so that the analyses should represent the true composition of the mineral. The name priceite has priority and should properly be applied to the mineral.

The important optical properties of colemanite and those determined for priceite from Curry County, Oregon, and from Asia Minor, as given in Table 1 on the following page, show clearly the difference between the two minerals.

Not all fine grained, compact hydrous calcium borate is priceite; a number of such specimens from California localities labelled "priceite" or "pandermite" have been examined microscopically and all proved to be howlite. The two minerals can be very quickly and certainly distinguished by measuring the optical properties under the microscope, but I know of no other method save a careful chemical analysis.

This is one of the many cases in mineralogy in which a reasonably careful optical study of a mineral would have established its place in mineralogy when first discovered. In others the opposite is true: many so-called minerals would never have been

[1] Published with the permission of the Director of the U. S. Geological Survey.

named had they been given even a superficial, but intelligent, optical study. It is the conviction of the author that the optical properties of minerals—possibly excepting the rock-forming minerals—have been too greatly neglected, and when they have been measured it has too often been on material that is not represented by an accurate chemical analysis. What the

TABLE 1. COMPARISON OF THE PROPERTIES OF COLEMANITE AND PRICEITE

Properties	Colemanite	Priceite	
		Oregon	Asia Minor
Composition	$2CaO.3B_2O_3.5H_2O$	$5CaO.6B_2O_3.9H_2O$	$5CaO.6B_2O_3.9H_2O$
Crystal system	Monoclinic	Triclinic	Triclinic
Habit	Prismatic	Very minute rhombic plates with an angle of 58°±1°	Small rhombic plates
Cleavage	(010)per.(001)dist.		
Optical character	+	−	−
Axial angle (2V)	55°52′	Rather small	32°±2°
Dispersion	weak		$\rho < v$ rather strong
α	1.586	1.572±.003	1.573±.003
β	1.592	1.591±.003	1.591±.003
γ	1.614	1.594±.003	1.593±.003
Optical orientation	Y = b, Z ∧ c = 83	X inclined to normal to plates. Crystals lying on flat face show Y′ ∧ bisectrix of acute angle of rhombs = 14°±2°	X inclined to normal to plates. Turned on edge plates show Z′ ∧ elongation = 25° ± 2°
Specific gravity	2.42	2.26–2.48	

science of mineralogy most needs is a careful study of particular minerals including, as well as the chemical properties, crystallography, and physical properties, which have heretofore been regarded as adequate, a discussion of the geological occurrence and relations, paragenesis, and optical properties. A careful statement as to the purity or uniformity of the material, determined optically, is rarely made, yet is of the utmost im-

portance. Many apparently homogeneous bodies are mixtures and a large number of the minerals in nature show zonal growths at least as great as those of the plagioclase feldspars in rocks. A number of illustrations of the way in which optical study can solve disputed questions in mineralogy will be described in future notes.

OPTICAL EVIDENCE THAT "HYDROGIOBERTITE" IS A MIXTURE[1]

ESPER S. LARSEN

Three specimens labeled "hydrogiobertite," examined microscopically, have proved to be mixtures almost submicroscopic in fineness of crystallization, and as no careful microscopic examination of the original "hydrogiobertite" appears to have been made it is highly probable that it was also a mixture and that the mineral hydrogiobertite does not exist.

The so-called hydrogiobertite from Phillips Springs, California, analyzed by Dr. R. C. Wells,[2] of the U. S. Geological Survey, is made up of successive layers of very minute fibers with some quartz and other impurities. It is made up chiefly of two fibrous minerals but may have some amorphous material. One set of fibers has nearly parallel extinction with positive elongation, a lowest index of refraction α of $1.52 \pm .01$, and a birefringence that is not strong; it may be hydromagnesite. The other has a much lower index of refraction and a much higher birefringence. The two minerals are in part in separate layers, in part intimately intermixed.

A second specimen from Phillips Springs was similar but contained more hydromagnesite (?) and probably some amorphous material.

A specimen from Monte Somma, Italy, kindly furnished the author by Colonel Washington A. Roebling, was also finely crystalline and was made up chiefly of hydromagnesite with some mineral with higher index of refraction and lower birefringence.

There is thus good reason to believe that "hydrogiobertite" has no claim to recognition as a mineral species.

[1] Published with the permission of the Director of the U. S. Geological Survey.

[2] *Am. J. Sci.*, [4] **30**, 189, 1910