PREHNITE, ANOTHER MINERAL ADDED TO OKLAHOMA'S LIST

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Early this year, J. M. Stevens of Lawton brought to our office for identification a specimen of mineral he had obtained in the Meers area of the Wichita Mountains. It was identified by W. E. Ham, using petrographic means, as the mineral prehnite. A search of the literature on Oklahoma mineral occurrences reveals no mention of prehnite so it may be presumed that it had not previously been observed.

Mr. Stevens was unable to give us the exact location from which his material had come, but in April 1947 he took members of the Oklahoma Mineral and Gem Society to the locality, and in October, some of the members of that Society, in turn, directed J. O. Beach, L. V. Davis, and J. H. Warren, of the Geological Survey staff, to it. Subsequently, Beach and Warren revisited the area, and found other occurrences, indicating a fairly wide distribution in the Meers area. Pieces have been cut and polished by members of the Oklahoma Mineral and Gem Society, and by Warren; the material takes a good polish.

The following description of field relations was contributed by Mr. Beach: Prehnite veins ranging in thickness from about 1 to 8 inches have been observed in secs. 25 and 36, T. 4 N., R. 14 W., and in the east bank of a road cut just south of Meers post office in sec. 33, T. 4 N., R. 13 W. In the small part of the area that has been examined, more than a dozen such veins were observed. These veins cut the anorthosite and related rocks in the region, and at one place, two veins of prehnite which appear to be offset a few feet by a small fault, are cut along the line of displacement by a third prehnite vein. All the thin veins are of the hard, compact type of prehnite. Most of the specimens examined are of a light-"apple"-green color with thin streaks of light-colored prehnite, and contain minute cavities irregularly scattered through the mass.

Two exposures of a different type of material have been found, one near the center and the other in the northeast part of sec. 36, T. 4 N., R. 14 W. The exposure near the center of the section is almost chalky white, finely granular, and appears to be a mixture of granular-type prehnite and a fine, claylike material. This vein is about 16 feet thick, where exposed in a stream bank. Two thin veins of the hard, compact type of prehnite are contained in it. Whether this was originally a thick vein of compact prehnite that has been altered or a granular type of prehnite that has been partly altered or a mixture of granular prehnite and a fine aluminum silicate of different type has not been determined. The exposure in the northeast part of section 36 is somewhat larger than the one near the center. It appears to contain material mixed with other minerals.

According to Dana (1897) prehnite occurs chiefly in basic rocks, basalt, diabase, gabbro, and the like, as a secondary mineral in fissures and cavities. Its luster is vitreous; its color ranges from oil green to gray and white; and it is subtransparent to translucent. Hardness is 6-6.5; gravity, 2.80-2.95. In composition it is an acid orthosilicate with formula $H_2Ca_2Al_2(SiO_4)_3$, corresponding to: Silica 43.7, alumina 24.8, lime 27.1, and water 4.4 percent.

Prehnite has been used for years as a gem stone. Cut and polished it has a very pleasing appearance. There are no other known commercial uses, but the fact that typical analyses of the mineral secured from several sources indicated that where iron was present as an impurity it was in small amounts only, caused us to take further interest in the mineral. Aluminum silicates with low iron content are always intriguing to people in the ceramic industries. Therefore, when experiments with Mr. Stevens' specimen showed that heating to the point of vitrification would yield a white product, we were determined to find out more about the Wichita Mountain occurrences and their extent.

Though the hard, massive prehnite is of interest as a gem stone to hobbyists, especially those interested in cutting and polishing, and may have some economic application in making art objects, it is the finely granular material that we believe to be of greatest commercial interest. This soft, claylike material is nonplastic, and after drying and firing at 2000°F, the resulting product is semivitreous, nearly white in color, and should offer possibilities as raw material for the ceramic industry. Insufficient data are available to indicate the volume of this material, but the preliminary reconnaissance by Beach, Davis, and Warren suggests the probability that bodies of commercial size can be found.

Chemical analyses and utilization tests were carred out by A. L. Burwell in the laboratory of the Geological Survey. The analysis of the unaltered prehnite conforms closely with that found in New Jersey.

LITERATURE CITED

Dana, E. S. 1897. A text-book of mineralogy. With an extended treatise on crystallography and physical mineralogy. New York: John Wiley & Sons.

Palache, C. 1935. The minerals of Franklin and Sterling Hill, Sussex County, New Jersey. Washington: U. S. Government Printing Office.

TABLE I

Chemical analyses of prehnites from New Jersey and the Wichita Mountains

	New Jersey prehnites[a]		Wichita Mountain prehnites	
	No. 1	No. 2	Massive	Finely grannular
SiO_2	43.30	43.06	43.44	47.71
Al_2O_3	22.70	24.98	25.32	34.21
Fe_2O_3	.34	.31	.05[b]	.15
CaO	27.35	27.00	26.49	11.26
MgO	.30	.06	.05	.11
Na_2O	.93	.10	——[c]	——[c]
K_2O	.18	.10	——[c]	——[c]
H_2O				
at 105°C	5.09	4.43	.08	1.24
above 105°C			4.71	4.52
	100.19	100.04	100.14	99.20

[a]From Palache (1935).
[b]Less than figure shown.
[c]Not determined.