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MINERALOGY.—*Notes on white chlorites.*[1] Earl V. Shannon and Edgar T. Wherry, U. S. National Museum.

Although the name chlorite comes from the Greek word for green, various other colors are represented among this group of minerals, including violet-red in kaemmererite, and white in leuchtenbergite and other sub-species or varieties. The mineral colerainite, described in 1918 by Poitevin and Graham,[2] is in our opinion a white chlorite, since its composition, crystal form, optical properties, and physical properties are all similar in many respects to those of typical members of the clinochlore group. It seemed of interest to ascertain whether the material reported as colerainite from Brinton's Quarry, Chester County, Pennsylvania, by Mr. Samuel G. Gordon[3] could also be so classified, and Mr. Gordon kindly sent the Museum samples for examination and analysis. Sample 1 is composed of 3 to 5 mm. barrel shaped crystals, bounded by greatly rounded first and second order pyramids and prisms, with large basal planes. These are not solid, but have a dull white crust with loosely packed flaky material with pearly luster within. Under the microscope the material is fairly homogeneous, although some dull, opaque patches are present mingled with the transparent flakes. Specimen 2 is from a new locality discovered by Mr. Gordon, namely a small abandoned feldspar quarry about 2 miles southwest of Nottingham, Chester County, Pa. This is in more micaceous-looking and apparently less altered crystals of similar shape and size. Under the microscope its homogeneity is satisfactory. Similar material occurs also in feldspar quarries near Sylmar, Pa., but it is too altered for analysis; its crystallography is described below.

[1] Presented at the meeting of the Mineralogical Society of America, Dec. 29, 1921. Published by permission of the Secretary of the Smithsonian Institution. Received December 31, 1921.

[2] Canada Dept. Mines, Museum Bull. **27**: 66–73. 1918.

[3] Amer. Min. **5**: 195. 1920.

Another white chlorite of related composition is sheridanite, described from northern Wyoming by J. E. Wolff in 1912.[4] This differs considerably in properties, however, being a translucent greenish gray schistose rock. A specimen of schistose rock from Miles City, Montana, has recently been sent in to the U. S. Geological Survey for identification, and Dr. E. S. Larsen has found it to agree optically with sheridanite. This has also been analyzed, and found to have the same composition as the original sheridanite, so is here reported as a new occurrence of this mineral. In the analyses extreme care was taken to separate the aluminium from the magnesium, the aluminium hydroxide being reprecipitated several times. The results of the new analyses, with older ones for comparison, are presented in table 1.

TABLE 1.—ANALYSES OF WHITE CHLORITES. THE ASTERISKS INDICATE NEW ANALYSES AND OPTICAL DATA. THE NUMBERS IN PARENTHESES AFTER ANALYTICAL DATA ARE RATIOS

	1*	2*	3	4*	5	6
SiO_2........	28.10(2)	36.70(6)	28.81(2)	27.78(2)	26.98(3)	24.40(2)
Al_2O_3........	26.20(1)	10.38(1)	26.43(1)	24.30(1)	16.10(1)	22.77(1)
Fe_2O_3........	1.66	1.22	0.24	1.43	0.22	0.45
FeO........	none	trace	0.40	0.35	none	none
CaO........	trace	0.86	none	trace	0.12	0.10
MnO........	trace	trace	none	none	0.20	0.09
MGO........	30.36(3)	36.44(9)	31.21(3)	32.71(3)	36.56(6)	32.70(4)
K_2O........	...	...	0.35	...	0.28	0.30
Na_2O........	...	...	0.14	...		
H_2O-	0.56	1.06	0.09	0.06	19.91(7)	19.63(5)
H_2O+	14.00(3)	13.80(7)	12.62(3)	13.01(3)		
Totals.......	100.88	100.46	100.29	99.64	100.37	100.44
Opt. data....	*	*	...	*	*	...
α	1.562	1.555	1.580	1.576	1.570	...
β	1.562	1.560	1.581	1.576	1.570	1.570
γ	1.576	1.560	1.589	1.589	1.575	...
Sign	+	−	+	+	+	+
2E	0°	30°	35°	small	0°	0°

1. White chlorite from Brinton's Quarry, Pa. Analysis by Shannon; optical data determined on an exceptionally clean cut crystal and kindly furnished by Mr. Gordon.
2. White chlorite from Nottingham, Pa. Analysis by Shannon; optical data by Wherry.
3. Sheridanite, northern Wyoming. Analysis by Wolff, optical data by H. E. Merwin.
4. New occurrence of sheridanite (Wyoming?). Analysis by Shannon; optical data by Larsen.
5. Colerainite matrix, Quebec. Analysis by Connor quoted by Poitevin and Graham, loc. cit. Optical data by Wherry on specimen kindly furnished by Prof. T. L. Walker.
6. Colerainite crystals, Quebec. Analysis by Connor; optical data by Poitevin and Graham.

[4] Amer. Jour. Sci. IV, **34**: 475–476. 1912.

As to occurrence and origin, the Pennsylvania specimens are reported by Mr. Gordon to have been formed by the action on albite-pegmatite of magnesium-bearing waters derived from the weathering of serpentine and jefferisite.[5] The original colerainite had a similar origin.[6] The sheridanite occurs in granitic rocks, and may have also arisen through alteration of feldspar, but details of its occurrence are not known.

Both Pennsylvania minerals are rather different from colerainite in composition, but the first one agrees closely with sheridanite in this respect, although entirely different from it in physical properties. It is not possible at present to interpret the analyses of any of these in terms of end-minerals, so it seems best to class them all simply as white chlorites.

A crystallographic confirmation of the identity of these minerals seemed desirable, but the Brinton's Quarry and Nottingham material proved to be too dull on the surface to give definite results. Optical examination of the so-called secondary albite from Sylmar, Pa.[7] showed, however, that it is of similar character although too extensively altered to kaolinite to be suitable for analysis. It occurs in rosettes of subparallel crystal plates on compact albite rock, averaging 5 by 1 mm. in size, with perfect basal cleavage on which the luster is bronzy. These were found to give hazy light nodes as a number of places in each zone of faces, yielding the results shown in table 2.

TABLE 2.—ANGLES OF WHITE CHLORITE FROM SYLMAR, PA.

Crystallization perihexagonal; c = 3.3890 ± .0050

No.	Letter	Symbols Gdt.	Symbols Brav.	Mono	Description	Observed φ	Observed ρ	Calculated φ	Calculated ρ
1	*c*	0	0001	001	Dominant form	..	0°	...	0°00′
2	*b*	∞0	$10\bar{1}0$	010, 110	Narrow to fairly broad	0°	89–90°	0°00′	90°00′
3	*m*	10	$10\bar{1}1$	112, 011	Narrow but distinct	0°	66–67°	0°00′	66°07′
4	*t*	4/3 0	$40\bar{4}3$	043	Narrow but distinct	0°	70–71°	0°00′	71″38′
5	*o*	20	$20\bar{2}1$	$\bar{1}11$	Narrow to fairly broad	0°	77–78°	0°00′	77°32′
6	*v*	1	$11\bar{2}1$	132, $\bar{1}01$	Rather large	30°	75–76°	30°00′	75°40′
7	*s*	½	$11\bar{2}2$	$\bar{1}34$	Narrow and poor	30°	63–64°	30°00′	62°56′

The identification of the material as a white chlorite is thus complete.

[5] Proc. Acad. Nat. Sci. Phila. **1921**[1]: 169–192. 1921.

[6] Trans. Royal Soc. Canada III, **12**: 37–39. 1918.

[7] Amer. Min. **3**: 47. 1918.