

ART. XLIX.—*On a Rose-colored Lime- and- Alumina-bearing Variety of Talc*; by WM. H. HOBBS, Madison, Wis.

THE crystalline dolomite of the vicinity of Canaan, Conn., is well known as a locality for white pyroxene and white and pale green tremolite. Some of this tremolite has recently been shown to be pseudomorphic to the white pyroxene.* Small amounts of quartz and colorless mica, and isolated crystals of pyrite, are present in the rock at many localities, and veins of calcite are occasionally met. Except near the boundaries of the horizon, where the rock passes by gradations toward a gneiss or schist, these are the only common minerals. Phlogopite I have found in clear brown scales a millimeter or more in diameter on the road running south from Rattlesnake Hill. The numerous openings which are made in the dolomite for supplying the lime-kilns of the vicinity, furnish opportunities for the discovery of any less common constituents that may be included in the rock. Mr. J. S. Adam, former analyst of the Barnum and Richardson Company of Lime Rock, has in his mineral collection at Canaan, several minerals of this character which have not been carefully studied. I am under obligations to him for the material which is here described. It was met with in the Adam Quarry which is located a mile south-east of the village of Canaan. The specimens given me are enclosed in the white crystalline dolomite whose grains average two millimeters in diameter.† Scattered through the dolomite

* Wm. H. Hobbs, Notes on some Pseudomorphs from the Taconic Region, Am. Geol., x, 44 (1892).

† I am permitted by Mr. Adam to publish analyses by him of the dolomite of the vicinity, which show it to contain calcium and magnesium carbonates in the proportions of normal dolomite:

| | Canaan Lime Company's Quarry. | | Calculated for |
|----------------------------------|-------------------------------|------------------|---|
| | Granular. | Cleavage Pieces. | CaCO ₃ . MgCO ₃ . |
| CaCO ₃ | 52.62 | 54.40 | 54.35 |
| MgCO ₃ | 46.25 | 45.12 | 45.65 |
| Fe ₂ O ₃ } | 0.24 | 0.25 | |
| Al ₂ O ₃ } | | | |
| Insoluble residue - | 0.17 | 0.08 | |
| | <hr/> 99.28 | <hr/> 99.85 | <hr/> 100.00 |

are simple pentagonal dodecahedrons of pyrite about a millimeter in diameter, which are colored brown from superficial alteration to limonite. On lines evidently corresponding to fracture planes in the rock, is developed a talcose mineral. Other fracture lines are occupied by vein dolomite, one cleavage surface extending several centimeters. In one of the specimens the talcose mineral has a deep rose color, somewhat deeper than that of the margarite from Chester, Mass. In the other specimen the color is white or nearly so, but Mr. Adam informed me that when found it had the same rose hue as the first mentioned specimen. The rose color has faded through exposure to the light, resembling in this respect rose quartz.

The scales of this talcose mineral lie with entire lack of any regular orientation, completely filling the fissure. Scales one-half a centimeter across can be obtained having roughly hexagonal outlines, but which are too poor for accurate measurement. They are very flexible but entirely inelastic. They have the softness and unctuous feel of ordinary talc. After treatment with dilute hydrochloric acid to remove any possible trace of calcite, nearly a gram of the material gave a specific gravity of 2.86 by determination with the pyknometer. In the closed tube the powdered mineral yields considerable water. Ignited before the blowpipe it resembles talc in exfoliating, whitening and glowing intensely. It is, however, much more fusible, falling below 5 in v. Kobell's scale. It is also more readily decomposable than common talc. When digested for only a short time in hydrochloric acid, the solution yields a considerable amount of alumina and calcium.

Between crossed nicols in convergent light, scales of the mineral show a negative bisectrix perpendicular to the plane of cleavage. The optical angle, which is very small, lies in the plane perpendicular to one of the bounding planes, and also perpendicular to a side of the hexagon of the percussion figure. It therefore corresponds to a mica of the first class. $2E$ was measured in sodium light as $15\frac{1}{2}^\circ$.

I am indebted to my friend, Mr. Louis Kahlenberg of the University of Wisconsin, for a chemical analysis of this mineral. His results are given below in the first column. In the last column is given the theoretical composition of ordinary talc:

| | | | Calculated for $H_2Mg_3Si_4O_{12}$ |
|--------------------------------------|--------------|---------|------------------------------------|
| SiO ₂ ----- | 61.48 | } 64.52 | 63.52 |
| Al ₂ O ₃ ----- | 3.04 | | |
| MgO ----- | 25.54 | } 30.50 | 31.72 |
| CaO ----- | 4.19 | | |
| FeO ----- | 0.77 | | |
| MnO ----- | trace | | |
| H ₂ O ----- | 5.54 | | 4.76 |
| | <hr/> 100.56 | | <hr/> 100.00 |

The mineral contains no nickel.

The analysis corresponds to a normal talc in which the magnesia is in part replaced by lime and the silica by alumina. The trace of manganese accounts for the rose color of the mineral which is lost on exposure to sunlight. The large amount of lime present is doubtless the cause of the unusual fusibility and decomposability by acids. Small amounts of lime in talc are not altogether unusual, though I have been unable to learn of but three analyses of the mineral, which have yielded more than one per cent of lime. These are given by Hintze in the list of sixty-seven analyses of talc printed in his *Handbuch der Mineralogie*.^{*} The three occurrences referred to are Plaben, Bohemia (CaO, 1.09 per cent); Bergen Hill, New Jersey (CaO, 1.41 per cent); and Campo Longo (?), Tessin (CaO, 3.70 per cent.) The presence of alumina in talc would not seem to be so unusual, since the same list includes four occurrences of talc characterized by as large an amount of alumina as the Canaan mineral. They are, Plaben, Bohemia (Al₂O₃, 3.27 per cent); Gasteinthal, Salzburg (Al₂O₃, 5.37 per cent); Mainland, Shetland Isles (Al₂O₃, 4.14 per cent); and Fahlun, Sweden (Al₂O₃, 4.69 per cent). No occurrence is mentioned by Hintze which like the Canaan mineral contains considerable amounts of both alumina and lime.

As regards the color of the mineral, it seems to be altogether exceptional. Nearly all the text-books mention a rose talc from Cooptown in Harford County, Maryland, but I am informed by Dr. G. H. Williams that the authority for this is a statement made by Tyson as long ago as 1837, the mineral being not talc but kaemmererite or rhodochrome. Hintze mentions in his *Handbuch*† beside the Cooptown locality, two others where rose-colored talc occurs, viz: in granite at Fischbach near Hirschberg, Silesia,‡ and with magnesite in clay slate at

^{*} Leipzig, 1892, pp. 824-6.

† Loc. cit., pp. 819-821.

‡ Traube, *Min. Schles.*, 1888, 224.

Wald in Styria.* The original reference to the first has not been accessible to me, and the second contains no mention of the mineral's properties.

The Canaan mineral is thus shown to belong to the talc family by its chemical composition as well as by most of its physical and optical properties. That it is a somewhat distinct variety is shown by its high percentages of lime and alumina, by its low fusibility and easy decomposability by acid, and by its exceptional rose color.

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