

## NOTES ON THE MINERALOGY AND LITHOLOGY OF THE DISTRICT OF COLUMBIA.

By **GEORGE P. MERRILL.**

Since the publication by the author of two previous papers bearing on this subject,\* the work on the extension of the Washington City water-works has been commenced and rapidly pushed toward completion. This work includes the construction of a tunnel through the underlying rock in the northwestern portion of the city, extending from the distributing reservoir beyond Georgetown to the new reservoir now in process of construction near Howard University, a total distance of 21,400 feet. To facilitate the construction of this tunnel, shafts have been sunk to the proper depths at Howard University, Champlain avenue, Rock Creek, Foundry Branch, and at the western extremity near the present distributing reservoir northwest of Georgetown.

The materials taken from these shafts and the tunnel have been carefully examined, and while, with perhaps a single exception, no rocks have as yet appeared of a different kind from those known to occur on the surface, several minerals have been brought to light never before reported from this vicinity, and which, in the majority of cases, have not yet been found in other than very small and perhaps microscopic forms in the surface rock. It is the object of this paper to call attention to those minerals of special interest that, so far as the author is aware, have not been reported heretofore.†

**EPIDOTE.**—As a constituent of the rock epidosite this mineral occurs in very minute crystals in a vein of unknown width which crosses the New Cut road a few rods east of Foundry Branch. The rock is very fine grained and of a yellowish-green color, and is frequently associated with massive quartz, prochlorite, and menaccanite. A similar vein has been passed through by the tunnel at Champlain avenue. In curved columnar forms the epidote sometimes occurs embedded in the prochlorite. We have received from Professor Robinson a specimen of this form in which the crystals are some 10 centimeters long and 5 to 6 millimeter in breadth. They are broken several times transversely, and the fractures have become filled with prochlorite. The finest crystals yet seen were found by Mr. L. H. Merrill embedded in the quartz veins of amphibolite which had been thrown out from the tunnel at Rock Creek.

\* Preliminary notes on the Crystalline Schists of the District of Columbia, these Proceedings, vol. vi, 1883, pp. 159-161, and on Prochlorite from the District of Columbia, these Proceedings, vol. vii, 1884, p. 67.

† It may be well to state here that Professor Robinson, of Howard University, has kindly volunteered to collect for the Museum a full suit of specimens at intervals of every 50 feet throughout the entire length of the tunnel. We hope to make a thorough study of these after the completion of the work.



They are about a centimeter in diameter, in well defined six-sided prisms, and are of a dull greenish brown color. Owing to the toughness of the surrounding material the crystals so far obtained are badly fractured and without good terminations.

**APATITE**.—This mineral, which until recently had been found only in microscopic crystals, has lately been discovered by Mr. L. H. Merrill in masses of considerable size embedded in white quartz from a vein in the shaft at Rock Creek. The largest found were some 2 centimeters in diameter, of distinct hexagonal outline, and of a light yellowish-green color. The majority of the specimens are, however, distorted and of irregular form. On account of their being embedded in tough, massive quartz it is impossible to obtain perfect crystals, and all yet obtained are more or less shattered and broken.

**BLACK TOURMALINE**.—This mineral is a very common constituent of the District rocks, occurring usually as small acicular crystals penetrating the quartz of veins. It has been found also in radiating forms on amphibolite, in curved trigonal prisms 4 to 5 millimeters in diameter embedded in prochlorite, as a very fine granular aggregate in quartz veins, and more rarely in columnar crystals of considerable size in the quartzose portions of the amphibolite. It has also been found by Professor Robinson at the Howard University shaft penetrating calcite.

**MENACCANITE**.—Aside from the usual grains scattered throughout the rock this mineral has been taken from the Foundry Branch tunnel in thin plates interlaminated with quartz or more commonly prochlorite. The thickness of the plates varies up to 2 millimeters, usually being about half this amount. They are commonly curved and an inch or more in diameter. The associated minerals are prochlorite, epidote, and quartz.

**SPHENE**.—This was first found in imperfect and broken crystals of a yellowish-green color, quite clear, and semi-transparent. Owing to its high fusibility and its evident pronounced cleavages in two directions there was at first some doubt as to its exact nature. Particles of the clear portions were therefore picked out and submitted to Professor Clarke for analysis, with the results given below:

Ignition .....	.54
SiO <sub>2</sub> .....	30.10
TiO <sub>2</sub> .....	40.82
CaO .....	28.08
Mg. O .....	40
Mn. O .....	Trace.
	<hr/>
	99.94
	<hr/>
Specific gravity .....	3,452

Later more and better specimens were found in which the characteristic wedge-shape crystalline form is unmistakable. The largest specimen obtained is about 2 centimeters in greatest diameter and occurs,



as do most of the others, embedded in prochlorite. They are all very brittle and none have been removed entire from the matrix. The pronounced cleavage property above alluded to I am now inclined to think to be caused by repeated twinning, as recently described by Dr. G. H. Williams.\*

**STILBITE.**—This mineral is of common occurrence forming a thin coating on the joint surfaces of both the hornblendic and micaceous rocks of the District. No really good material was found, however, until the work on the tunnel was commenced. The most common form is that of thin radiating blades coating the surface of the rock. Mr. True, of the National Museum, has, however, found it in small rectangular prisms implanted upright on thin layers of calcite. These forms are usually but a few millimeters in length and of a faint yellowish color. The largest specimens yet obtained were taken by myself from a narrow vein of calcite in the amphibolite, about 1,250 feet west from the eastern end of the tunnel by Howard University. These are some 15 millimeters in diameter and about the same length.

**LAUMONTITE.**—This, in connection with stilbite and prochlorite, is now one of the most common minerals of the District, although, until identified by myself from material gathered from the water-works tunnel, its presence has not before been recognized. The common form is that of a mass of imperfect crystals associated with calcite in narrow veins in the mica or hornblende rock. I have also found it in four-sided prisms with the ordinary oblique terminations, in small geodic cavities in the calcite veins. The best crystals are about 1 centimeter long by 4 millimeters broad and of a white or reddish color.

**HEULANDITE.**—This occurs in minute right rhomboidal prisms from 1 to 2 millimeters in diameter coating the surfaces of natural joints or in small cavities in the prochlorite. So far as examined the crystals present no unusual forms, and are of a grayish or yellowish-gray color with the characteristic pearly luster.

**PROCHLORITE.**—Attention was first called to the occurrence of this mineral in the District by myself in April, 1884.† Since that time considerable quantities of the material have been taken from the water-works tunnel, a few rods west of the shaft at Foundry Branch. It occurs most abundantly associated with the vein of epidote rock above alluded to. Specimens have also been taken from the tunnel near Rock Creek, Champlain avenue, and Howard University, showing it to be generally distributed throughout the rocks of the District. I have also found it on the surface in narrow veins in the amphibolite near the mouth of Foundry Branch, where it empties into the Potomac River.

JULY 20, 1885.

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\*Am. Jour. of Sci., June, 1885, p. 486.

† These Proceedings, vol. vii, 1884, p. 67.



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