EXHIBIT

GOUVERNEUR, N. Y.

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GEOLOGY OF THE GOUVERNEUR QUADRANGLE

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ALBANY

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GEOLOGY OF THE GOUVERNEUR QUADRANGLE

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INTRODUCTION

This report has been prepared, by instruction of the State Geologist, to meet a quite insistent local demand. There is a considerable production of limestone, feldspar, talc, pyrites and zinc blende within the quadrangle limits; a number of people are keenly interested in the mineral development, are actively engaged in prospecting, and greatly desire a more accurate and serviceable areal map of the district than has heretofore been available. Both Mr Newland and myself are under obligation to several of these gentlemen for courtesies of many kinds, freely extended on many occasions.

The Gouverneur district was the starting point from which Professor C. H. Smyth prosecuted his important work on the Precambrian geology of the western Adirondacks, work which did much to establish the fundamental basis of our present knowledge. By all rights of service and of priority in the region he should have prepared this report, and the writer undertook the task with the greatest reluctance and only when it became evident that the work could not be delayed, and that Professor Smyth was not in a position to do it at this time. The areal mapping which is the basis of this report does little more than to reproduce Smyth's earlier results upon a more accurate map of larger scale. The indebtedness of the present work to his can not be made too emphatic.

Doctor Buddington was engaged in mapping the Lake Bonaparte quadrangle, next south of Gouverneur, during the 1916 season. We studied our joint boundary together, to our mutual advantage and pleasure.

prism and pyramid. Massive quartz, white or vitreous, occurs very widely in veins that intersect all of the rocks and are most common around the borders of the porphyritic granite. The quartz has the characters of magmatic quartz; it appears in practically pure bodies and in combination with feldspar as pegmatites of varied composition. The occurrence of quartz in the Grenville limestone where it produces banded and ribbed structures is described in the earlier part of this report. The limestone on the borders of Sylvia lake especially abounds in quartz which stands out as white hummocks and reefs above the surface.

Chert and jasper are occasionally in evidence around the zinc deposits of the Edwards district. A considerable body of chert occurs on the limestone ridge that is mined by the Northern Ore Company, just north of Edwards.

Serpentine. This mineral abounds in the Edwards limestone belt as nodules and bunches enclosed by the carbonates. Most of the serpentine, as shown by Smyth,[1] is pseudomorphic after diopside, whereas talc, the other important secondary mineral in the limestone, is derived from tremolite. A peculiar whitish serpentine, seemingly of low iron content, is found in a quarry in the limestone area near Peabody bridge, north of Gouverneur. According to local accounts, the mineral was thought to be talc and some of it was ground and sold for the same purposes for which talc is employed. It is noticeably harder than talc and has rather an oily luster.

Sphalerite. Occurrences are noted in the lead veins of Rossie and Macomb as an accompaniment of galena, pyrite and chalcopyrite. In the Edwards district it is associated with pyrite and occurs in replacement bodies in the Grenville limestones. These are described elsewhere under their own title.

Talc. One of the important economic minerals of the Gouverneur district is talc. It is reserved for special description.

Titanite. Fair-sized recognizable crystals of titanite are found in some of the limestone-granite contacts, as near the Gouverneur marble quarries south of the village and in the vicinity of No. 2½ talc mine, Taleville. It is associated with diopside, tremolite, wernerite and tourmaline.

Tourmaline. This is quite common in white, brown and black crystals, as a sporadic ingredient of the limestones where it has been

[1] Genesis of the Zinc Ores of the Edwards District, St Lawrence County, N. Y. N. Y. State Mus. Bul. 201, 1918, p. 17–18.

formed by contact action with the porphyritic granite. Perhaps the best known occurrence of this type, from which have come most of the museum specimens that bear the locality name Gouverneur, is on the Reese farm, 2 miles southwest of Richville, on the Rock Island School road. It is described in some detail by Cushing on page 20. Good crystals of brown color are also to be had from the Rylestone marble quarry, southwest of Gouverneur. The black variety is a common accompaniment of the pegmatite bodies, all over the district, so widely scattered that specific mention of the localities seems unnecessary. As a constituent of the Grenville gneisses it occurs in various colors and locally may form 50 per cent of the entire rock mass. (See page 24.)

Tremolite. This member of the amphibole group is abundantly developed along the borders of some limestone areas, particularly the Edwards-Sylvia lake belt where great bodies of nearly pure tremolite in the form of crystalline aggregates appear along the contact and for some distance toward the interior of the belt. It is usually white in color and developed in long blades or needles without crystal terminations. The crystals are so interlaced that they make a very tough rock, although in the mass the latter appears to be of schistose structure. Bands of the tremolite may be traced for long distances parallel with the strike of the limestone. All of the talc mines are situated along these bands, with the tremolite forming one or both walls of the deposit.

The pink or purplish form of tremolite, called hexagonite, is a handsome mineral which occurs in the walls of the mines at Taleville, particularly on the southwestern end, and in the mines near Sylvia lake. Large masses of it are still available in the rock dumps of the old United States Talc Company's mine.

Vesuvianite. The only locality so far recorded for this mineral within the map limits, is 1 mile south of Gouverneur, probably one of the marble quarries. The locality is mentioned by Whitlock.[1]

Wad. This mineral is found in association with bog limonite in some of the Edwards and Gouverneur occurrences.

Wernerite. Sporadic occurrences of wernerite as a contact mineral are reported in the Grenville limestones. It is observed at Taleville and in the Gouverneur marble quarries.

[1] New York Mineral Localities. N. Y. State Mus. Bul. 70, 1903, p. 28

new deposits formed of any importance, and those already existing were little modified during the interval.

Consequently the occurrence of Potsdam has little or no bearing upon the existence of mineral deposits in the underlying Precambrian. There is the same likelihood of finding them under the sandstone as in the exposed formations, other things being equal.

List of Minerals and Mineral Localities

Preliminary to the description of the deposits of economic importance, brief mention will be made of the various minerals which have been noted as native to the district and of their local occurrence. The list of mineral species for the district embraces a large number that have no special value industrially, as in fact the useful minerals generally constitute only a small proportion of those actually known. The vicinity of Gouverneur has provided a great array of minerals in the way of crystallized and uncommon physical forms, and not a little that has served as type material for purposes of scientific description or illustration, so that an enumeration of the individual species with information of their occurrence may prove serviceable to the student and collector.

In the compilation of the mineral occurrences information has been drawn to some extent from published sources, notably Dana's Manual which is valuable principally for the data about the early discoveries, from the reports of the First Geological Survey of New York State and particularly those by Emmons and Beck, and from Whitlock's New York Mineral Localities.[1] The last-named work is the most complete in its references to the mineral occurrences of the district that has appeared up to the present time. The information thus made available has been supplemented by observations in the district by the writer in the course of a field experience that extends through a period of many years.

Although attention is restricted generally to those occurrences within the limits of the map, a few localities of particular interest that are found in the bordering areas will be included, for which Gouverneur would naturally be used as a base by any one intending to visit such places.

Actinolite. This variety of amphibole occurs in characteristic development of thin bladed and fibrous crystals in the walls of the talc mines in the town of Edwards. It has the same methods of occurrence as tremolite, the common parent mineral of the talc, and

[1] N. Y. State Mus. Bul. 70, 1903.

differs in appearance only in its greenish color which is traceable to the small content of iron in ferrous form. The crystals occur in felted or matted intergrowths, as actinolite schist. The country rock is limestone, but porphyritic granite appears nearby.

Albite. Soda feldspar is present in some of the pegmatite bodies, as one of the essential constituents. It is associated usually with microcline and may be intergrown with it as perthite. One of the localities where both varieties are found in large crystals or masses is at the quarry now being worked for pottery spar on the road between Richville station and East De Kalb, 3 miles northeast of the former place.

Amphibole. The members of this mineral family are mentioned under their specific names, as far as they are recognized. (*See* actinolite and tremolite.) Various aluminous amphiboles are represented, of which the exact composition and type has not been determined. One of the common forms is of greenish color in prismatic shapes, to be classed probably with the variety pargasite. It is found in the limestones, often associated with tremolite and diopside. Localities are the Calvin Mitchel farm in East De Kalb, the zinc mines at Edwards and the vicinity of Talcville. Darker green or black amphibole is an important ingredient of the gneisses; one of the gneissic rocks developed on the borders of the Edwards limestone belt consists largely of this mineral and is described in the first part of the report under the name "amphibolite." It is believed to be derived from gabbro, in which case the amphibole is probably derived from an aluminous pyroxene. Black or green amphibole is also an accompaniment of some of the Grenville schists.

Apatite. Crystals of apatite, greenish or reddish in color, small to fairly large in size, occur in the crystalline limestones, notably in the marble quarries north and south of Gouverneur. The quarries just southwest of the town have supplied examples of the usual six-sided prisms, terminated by the unit pyramid, 4 to 6 inches long. Beck[1] records a crystal nearly a foot long and weighing 18 pounds from the Robinson farm, town of Hammond, which is outside the limits of the map. This locality is perhaps the same as that listed by Whitlock as near DeLong's mills.

Asbestos. Fibrous tremolite, or brittle asbestos, is not uncommon in the walls of the talc mines, one or both of which may be constituted of tremolite schist. It is also to be seen in other limestone areas, as a development of the normal tremolite. The flexible

[1] Mineralogy of New York, 1842, p. 282.

1892