Marquette and Vermilion districts, Michigan + Minnesota: [specimens] 42617-42627. No. 371 1902

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U. S. GEOLOGICAL SURVEY

FIELD SECTION BOOK

9-891

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen.* Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section and the dip and strike when observable, the latter always being expressed from the north; for instance 4025, 250 *N.*, 300 *W.*, *Strike*, *N.* 78° *E.*, *Dip* 50° *S.* Then follow with a full description of the ledge. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small-sized specimens, trimmed to a uniform size of 2 x 2½ x ¾ inches will be allowed, but in all other cases *large-sized specimens*, trimmed to a size of 3 x 4 x 1 inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. Specimens should not be placed together without protection in the collecting bag, as the fresh surfaces, important in determining the character of rocks, are thus destroyed. They should be damaged by no temporary mark, but the numbers should be at once marked in at least two places upon the inclosing paper or cloth bags. Specimens may be permanently marked in camp by painting the numbers upon them in white upon a black background, using Silver White and Ivory Black oil tubes for color, with turpentine as a diluent.

4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc.

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

Notebook No. 371

42617-42627

and Vermilion
Marquette District,
Michigan & Minnesota
C. R. Van Hise.
1902

August 12th, 1902.

With Seaman and Leith examined the conglomerate at the base of the Ajibik southwest of Teal lake. Following along the face of the Kitchie schist ridge patches of conglomerate were observed at a number of places plastered on to the southward facing escarpment. In this conglomerate quartzite pebbles of considerable variety were abundant; indeed they were probably the most abundant of any pebbles there occurring. The quartzite pebbles were of various colors, almost white, pink, red and brown. Some of them showed distinct veining, and others were cherty, closely resembling the quartzite pebbles there were seen vein quartz pebbles. The vein quartz was not granulated, although it showed the initial stages of breaking into small polygonal blocks. With close examination there was no difficulty in distinguishing the vein quartz pebbles from the quartzite pebbles. Chert and jasper pebbles characteristic of the Negaunee formation are conspicuous because of their absence. Therefore there is no probability that the conglomerate represents the base of the Goodrich instead of the Ajibik.

At one place a considerable ridge of typical Ajibik quartzite is

separated only by a narrow ravine from the Kitchie escarpment on the face of which are large patches of coarse conglomerate in which quartzite pebbles
42617 are abundant. 42617 and 42618 represent
42618 this quartzite. Boulders as long as hammer handles were observed.

In the afternoon visited the quartzite exposures east of Teal lake and saw the apparent feathering out of the Mesnard and Kona formations against the Ajibik quartzite. Also saw conglomerate at the base of the supposed Ajibik at a number of places. Whether the lower formations are deflected by folding and thus the feathering out partly apparent will appear in subsequent mapping.

August 13th, 1902.

With Seaman, Leith, and Van Horn examined the quartzite exposures northeast of the southeast end of Goos Lake and thence southwestward toward Palmer. Professor Seaman showed a conglomerate at the base of the Ajibik containing abundant fragments of quartzite. As near Teal lake there was a little difficulty in discriminating between quartzite and
42619 vein quartz. 42619 represents both. Professor Seaman showed that the Ajibik quartzite apparently laps well southward across the underlying formations which he supposed to be Mesnard instead of Ajibik. This will be worked out by Leith.

August 14th, 1902.

Knob 75 paces south of the west quarter post of 35 - 49 - 27.

Seaman showed us hill above old German exploring camp on east slope o: which is a complex alternation of rocks of different kinds. Here are seen three bands of gray feldsitic looking schist supposed to be mashed porphyry between which and outside of which are belts of schistose green stone which contain conglomeratic l looking bands alternating with non-conglomeratic layers, the whole presenting a strongly sedimentary appearance. Many of the bands of green material are slightly ferruginous. In this green material are belts of ferruginous chert varying from little lentiles through bands of 1, 2, or 3 inches wide, up to one band 3 or 4 feet wide. The bands a few inches wide are in a number of places separated by green schist layers from a fraction of an inch to two or three inches in thickness. The broader band can be traced for some distance, and probably extends across the hill as it is found on both sides. In places the material is coarsely quartzose, and vein like in appearance, but for the most part the chert material is finely banded and resembles that of the iron formation of the Lake Superior country. The pebbles in the conglomerate

appear to be at least for the main part similar to the green slaty schist of the area. In places the green schist takes on a gray cherty appearance. If the ferruginous chert is supposed to be original sediment, there is no reason to regard the green slate and schist immediately associated as other than a clastic sediment, although the material may have been deposited in the water in large part by volcanic action.

In places the green rock changes into a dark gray slate having as its chief constituent quartz much of it cherty, and also containing pyrite or marcasite and a deep brown crust as if there were iron carbonate in the gray background. In short, the material is very similar to some of the carbonated slates associated with the iron formation, especially the Canadian extension of the Vermilion series. This is represented by specimen 42620. Banded cherty iron formation stuff 42621; banded cherty non-ferruginous phase 42622; some of the coarser fragmental sediment 42623.

42620
42621
42622
42623

Went over on to the south side of the ridge south of the Holyoke mine, and saw a belt of jaspery material associated with clear cut sediments poorly exposed on the north escarpment of the hill. There can be no doubt as to the essentially sedimentary character of this series. Certain bands of good iron ore may be observed, and others in which the presence of carbonate is clearly shown by the alterations. 42624-5-6 represent phases of the rock from this locality. 42626 here looks decidedly sedimentary, but Professor Seaman calls attention to the fact that it is not widely different from certain rocks associated with the Archean fragmentals which have been called acid schists.

42624-5
42626

August 14, 1902.
Mitchell Mine.

42627

From test pit just south of the road. Peculiar radiating and concentric structures in the ores.

Aug. 20-22.

On a trip to the Mesabi and Vermilion ranges Cole told me the Zenith and Savoy pitched to the east the same as the Chandler and Pioneer. The jasper belt narrows between the two groups of mines and this again gives a an eastward pitch. The trough at the Zenith and Savoy is overturned to the south thus ∪ . The ore was first found on the south side of the trough, but when the dip was determined Cole thought the ore was also on the south side. We went after it and found it. Therefore put a big shaft in the footwall to the north.