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Van Hise, Charles Richard, 1857-1918

[s.l.]: [s.n.], 1890

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 99.

Marquette Region, Mich.,
and Vicinity of Porcupine,
Ontario, Canada.

C. R. VanHise, 1890
18436-18502

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 page is also arranged so that, if desirable, a smaller scale can be used, two inches, one inch, or even 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, for instance 4025, 250 N. 300 W., *Strike, N. 6° E., Dip, 50° E.* Then follow with as full a description of the ledge as possible. 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, but chips of them must be taken. 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 $2 \times 2\frac{1}{2} \times \frac{3}{4}$ inches will be allowed, but in all other cases *large sized specimens*, trimmed to a size of $3 \times 4 \times 1$ inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. 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. It is desirable that specimens 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.

y r r R B

#99 Book

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The regularly laminated
green schist and the regularly
laminated ore have very
strongly the appearance
of bedding as seen on end,
although there appears to
be a slight discrepancy
between the direction of the
layers of the schist and
the iron-bearing strata.
Upon the north side the
luster-mottled rock is
massive.

When the iron-bearing
selt is followed to the east
end of the ledge only a sin-
gle layer of it is found,
and this is narrower
than the larger selt on the
west end of the ledge.
Continuing to the next ex-
posure east the layer is
still smaller and here it
has upon both sides of it
the green schist. Whatever
the original of this rock,

it is evident that it is not an ordinary bed interstratified with the regularly bedded schist. The relations are more those of a rock which is a cutting ~~an~~ eruptive or a vein.

Upon following this layer still farther to the east, there appears, after a break of only about 10 feet, a layer of green stone, the entire bed being cut off. Either here the ore-bearing stratum abruptly stops or else we have a fault. At this place just south of the layer of iron stained rock, a crystalline green stone, 1843b contains large fragments and smaller fragments of granite. The appearance is very strongly that of a conglomerate but considering the relations

which maintains at the
 Light House Point and
 the crystalline character
 of the rock, I have little
 doubt that it is case of
 granite caught in
 eruptives.

Upon going east from
 the exposure in which the
 broad belt of iron-bearing rocks
 occurred, no such belt is again
 found. If a fault ^{cuts} ~~cuts~~ it
 off, it must have a con-
 siderable throw. However,
 various seams of iron-bea-
 ring material, some of them
 as much as a foot wide,
 some of them a few inches
 thick, occur interlaminated
 with the typical green
 schists of the Point.
 One of these is continuous
 for some distance - 100 feet
 or more - while ~~the~~ others
 are so small as to disap-
 pear in a short distance.

Those in which the iron exists have become soft and hydrated, resembling the Eureka ore. Others are very like the larger fels above described, but none so nearly resemble the Eureka ferruginous chert of the iron-bearing series as the larger band. That these small lenses are veins formed along the laminations of the dyke there can hardly be a doubt, and it seems most probable. Some that the larger fels is also of the same origin.

18487 Fresh slaty green schist from quarry.

18488. Thrown large fresh diabase dyke.

18489 Represent different phases
18490 of the iron-bearing material
18491 of the small veins.
contain much iron carbonate

If the ferruginous slate of the Point is regarded as a sedimentary rock, belonging to the iron-bearing series and earlier than the green schists with which it is associated, the question arises how it happens that its structure and that of the green schists correspond? The green schists are known to be modified eruptives. The only way the iron-bearing belt can be considered as Huronian is to consider it earlier than the eruptives with which it is associated. It will not do to say that its structure is a secondary one, for the only reason for regarding it as a bedded formation at all is its resemblance to the iron-bearing belts of the Eureka Huronides.

The quarry and point were again observed to consist

mainly of green schists, but in these are granite veins and dykes which for the most part have in their intrusion followed the laminations of the green schists. The ferruginous cherts would, I suppose be regarded as eruptive by Wadsworth, and the explanation (granting that such a material is ever an eruptive) would satisfactorily explain the structural relations.

Photos. 1144-45. Views of Picnic Islands from Light House Point, Manquette, Mich. Presque Isle in the distance.

Photos. 1146-47. Views of dioritic schists at extremity of Light House Point, Manquette, Mich.

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Thursday September 4/1890.

In company with W. S. Bayley I went up the Hudson River shore and Atlantic to Summit, where Bayley in his work of previous years had described a conglomerate within the granite area. This place was along the railroad near to Summit.

We walked back along the road as far as Spruce, about three miles and toward Taylor Junction, about $1\frac{1}{2}$ miles, from which point the road was seen to run a long way through a swamp. The first distance was the one remembered by Bayley as showing the conglomerate. Nothing was found aside from a large boulder having a conglomeratic appearance about $1\frac{1}{2}$ miles east of Summit.

It was concluded (and with this conclusion Bayley concurred) that he has in former years mistaken this boulder for a ledge. Recent trenching developed the fact that it was a huge boulder, which fact might not have been suspected before this was done.

18450.

represents two phases of the conglomerate-like rock taken from boulder to compare with specimens collected by Bayley.

The Archean core was closely examined at this distance, and is a typical case of coarse and fine black and grey gneisses, cut through and through by red and pink granitic veins of various sizes. In some cases the granite

is greatly predominant. In others a considerable exposure is free from granite veins, while there are all gradations between the two extremes. This is one of the best localities illustrative of a zone or transition between a solid schist or gneiss area and one of solid granite.

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Goose Lake, Michigan
September 5, 1890.

We made a trip south to the railroad from about the point where the cross traverse of September 2nd began to run north.

We then followed the railroad in a southwest direction to the west end of the developed Cascade range. Thence we came east for some distance and made a section north from the railroad to conglomerate station.

The following specimens represent the succession on the first part of this journey:

1844/2

Thin grained conglomerate, apparently under the coarse conglomerate that is at the foot of the hill and coarse conglomerate on top.

18443. Reddish quartzite farther south.
- 18444 Sericite quartzite or slate, farther south.
- 18445 Greywacke, farther south.
- 18446 Ferruginous quartzite on Cascade flank of railroad.

The above section is a continuation south of section Monday September 18th from the E $\frac{1}{2}$ part of Sec. 22, T~~4~~7 N., R. 26 south to railroad.

At the last end of the Cascade Range the normal northern dips were found.

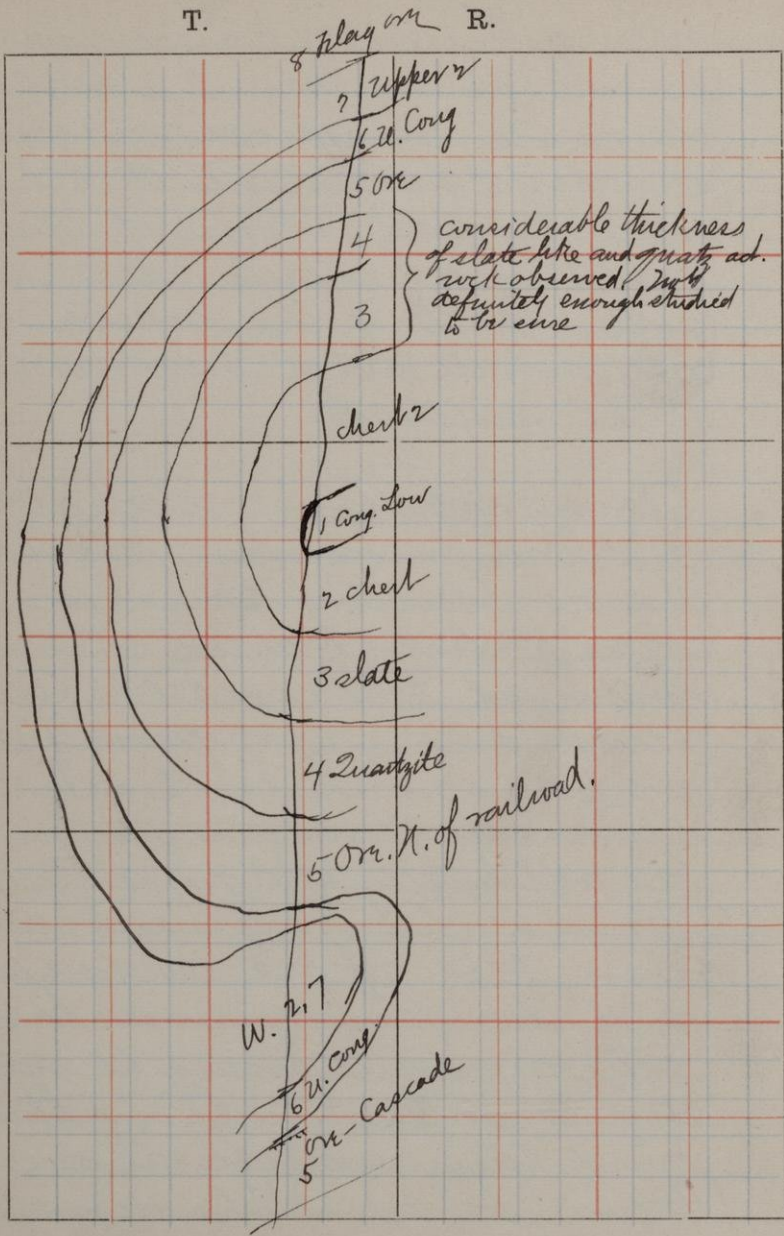
The ordinary ferruginous jasper of the ore formation was the rock found at the farthest point south we went, about $\frac{1}{4}$ mile south of the railroad. At the railroad

near a cluster of houses, was found the ore-bearing conglomerate in typical exposure carrying fragments of ore and jasper. Some of the jasper fragments are of large size. Next to the north is a quartzite ridge just north of the railroad.

18447. Going northeast along the railroad, and then north the ore-bearing series is again found and this is followed to the north by a great thickness of quartzite, which is everywhere strongly ferruginous and occasionally fragmental. None of the fragments are seen to be of ore or jasper, and the ferruginous character of the quartzite may be wholly due to interstitial infiltration and thus may be above or below the ore. The dip of the quartzite is upon its north

T.

R.



ern side to the south.

18448, This quartzite was followed to the north by slate conglomerate, and this followed by a considerable thickness of sericite-slates. 18449. After the slate, is found brecciated ferruginous chert, and then comes the conglomerate of Conglomerate Station.

The structure from all that has been seen, seems in the Goose Lake region to be roughly as follows:

It is very probable that the actual succession will be found to be considerably modified, but the ore belts and the overlying ore conglomerate give definite data for basement lines.

The almost universal northern dips and the fact of fine-grained conglomerate below the coarse conglomerate

along Conglomerate ridge
both indicate an overturned
fold, while the occasional
northern dips seen in the
same way, erosion having
caught these occasionally
so as to show reverse dips.

Port Arthur, Ontario, Sep. 19, 1890.

We drove from Port Arthur, north to the Mitchell mining locations known as 35 E, 70 E, 84 E, 47 E and 73 E.

In going north, for some distance we passed over the flat lying slate of the Animikie. There was then an interval without exposure, after which appeared much contorted green slates and schists in a vertical position.

Running east and west across the locations mentioned is a broad belt of iron bearing formations, showing all the characteristic phakes of this member including white schist, jasper, ferruginous slate, iron carbonate, graphitic slate etc. This iron-bearing belt is bounded upon the north by greenish schists, and massive greenstone, the former of which carries within itself narrow zones of the iron-bearing rocks. Upon the south

side of the location are graywackes and slates which appear to be fragmental. These are followed farther to the southward by green schists similar to those of the north. In one place a dyke was seen, cutting an iron-bearing formation!

The relations of the iron bearing to the adjoining rocks appear to be very similar to those at Vermilion Lake.

- 18451. Jaspery and magnetitic phase of the iron formation.
- 18452. Cherty phases of the same.
- 18453. Peculiar brecciated jasper and chert containing iron carbonate as shown by the weathering.
- 18454. Sideritic slate.
- 18455. Graphitic slate said by Mitchell to be silver-bearing.
- 18456. Massive greenstone north of ironbearing slate.
- 18457. Green schist carrying ferruginous materials; north of main iron formations.

- 1845-8. Clay slate apparently fragmental;
from southeast part of location.
- 1845-9. Green schist to the south of 1845-8
near the Current river.
18460. Specimens presented by Mitchell
as from the above location, and
said by him to bear gold in
considerable quantities.

September 21, 1890.

We drove northwest of Port Arthur on the Dawson road to locations 20, 21 etc. west of A in McIntyre township.

For some distance from Port Arthur, the road runs over the flat-lying Animikie. These rocks for the most part occupy rather flat ground. Before location 21 was reached, beside the road was seen the various phases of granite and gneiss usually referred to the Laurentian.

In A we left the road and made a trip north to 20, and thence for some distance west before returning to the road.

The rocks for the most part were granite or gneiss, but in a valley in the north part of 20 iron-bearing slates with carbonate of iron were found. At one place these were seen in contact with the granite, but

they were so much broken that it was difficult to make out the relation. No fragments of granite were seen in the slate.

Upon the other hand no stringers of granite were found cutting the slates. The main part of the locations 21-24 so far as seen (and they were traversed for at least a mile west of 8-Mile creek and from this point east to 6-Mile creek) were found to be flat-lying Animikie rocks being more or less altered iron carbonates, but occasionally jaspers and cherts and slates bearing iron oxide appear. Also in some places are found black slates.

For the most part they lie very flat, although occasionally they are seen to be somewhat tilted. Veins of quartz and calcite somewhat mineralized were found as a contact vein along the granite in location 20 and in a fault or fissure

vein in the Animikie slates.
 The vein minerals in the
 latter case carry very
 numerous fragments of the country rock.

18461. Three phases of sideritic
 18462. slate, chert and jasper from
 18463. the Animikie.
18464. Partly oxidized iron carbonate
 18465. from the same.
18466. Brecciated iron carbonate from
 side road to mining camp at
 place where it crosses 6-Mile
 creek.
18467. Vein stone containing numerous
 fragments of slate from walls
 from a fissure in the flat-
 lying Animikie.

September 23, 1890.

We went out from Port Arthur to camp on Mitchell's locations visited the first camp.
(35°E 70°E 84°E 47°E 73°E.)

18468.

Graphitic schist from same locality as 18455.

About $\frac{1}{2}$ ^{mile} west of camp outcrops of the iron formation have a strike of north 86° west and dip at an angle of 60° to the north.

The rock is a strongly ferruginous slate and is strongly magnetic, the needle varying 80° west. This point is 110 steps south and 20 steps east of the northwest corner of 47°E. The iron bearing belt extends from here some distance to the south, Mitchell says nearly $\frac{1}{4}$ of a mile.

September 24, 1890.

18469. Cherty iron carbonate from bluff 70 west 250 north of starting point. (beaver line)
Strike north 80° east dip 85° north. The strike is taken from a small exposure and may vary from the truth.

18470. Fine grained dyke rock 210 west of starting point.

Exposures of jasper continue to the extended north line of Mitchell locations at 275 steps west of corner between $35^{\circ}E$ $84^{\circ}E$ $70^{\circ}E$ and $47^{\circ}E$. Slate outcrops on line and south of line 300 east of the starting point. The strike of the slate here is almost due east and west.

18471. Slaty carbonate containing chert and jasper fragments. This
18472. is associated with 18472 banded chert and jasper. These specimens

are from a small ridge exposed by the cutting of a small creek just east of line running south from starting point at 100 south of the latter point. The ground to the south is low and swampy.

There was here no good opportunity to determine strike and dip but the first is nearly east and west, the latter apparently vertical.

18473.

Chert, jasper and iron carbonate. From a considerable exposure on ridge 275 steps north of starting point, on line.

Running east from 300 steps west of starting point the variation is for a short distance 5° to the west. At 150 west of starting point the variation is 5° east.

at 150 west and 25 north of starting point is found an outcrop of peculiar hard ferruginous rock, which looks as if it might be

18474.

coarsely crystalline siderite and chert!

18475.

Peculiar gray cherty slate 550 west and 110 north of starting point.

The same slate occurs at 375 north and 300 west of starting point.

Another similar rock is seen at 240 north 300 west of same place.

We now ran 300 west of starting point, then 500 north, then 400 west, then 100 south, then 750 west and returned to camp.

Lying to the north for all of this distance is the greenstone ridge or what is taken to be that. Our course was over a parallel ridge about $\frac{1}{4}$ of a mile to the south of this but there were no exposures whatever. It appears extremely probable that this ridge is the covered ironbearing slates which occur south of the green schists.

The course was over exceedingly rough country and a considerable

error may have been introduced.

18476. Greenstone 1030 west 180 north of starting point.

September 25, 1890.

Most of the day was used in cutting out a line to the west. At 2200 steps west of starting point I ran northwest for some distance, then turned east, and then south.

18477. Upon the last run I found 18477 a layer of magnetitic and actinolitic slate and also cherty phases. There is also local variations to a slight amount. This point is estimated to be 300 to 500 N. and 1800 to 1900 W of the starting point.

September 26, 1890.

Green schists occur a little north of west of point 1860 W. of starting point. Also along the cut-out line are various exposures of green schists between 850 W. and 1860 W. of starting point.

The same slate is found at 2060 W of starting point, here strike about N. 75° W.

At 2250 steps west of starting point occur peculiar knotted and gnarled schists which have strongly the appearance of a stretched conglomerate the pebbles of which are mostly of one kind. This rock has more of a fragmental appearance than any which has been before encountered. A part of the pebbles appear to be felsitic others resemble granite-porphyr.

18478.

Portion of one pebble.

18479.

Greenstone 2500 W. and 35 N. of

27.

starting point. This greenstone continues with numerous outcrops for about 500 steps to the west.

Then came a cedar swamp 200 steps wide containing a small stream and on the north side of the swamp appears 18480 conglomerate slate about 2500 W. and 980 N. of starting point.

The strike of this rock where first noted was about east and west; here it is about N. 75 E. In our course the slates first struck north of west, then west, and then finally south of west.

Continuing north for 1500 steps the top of an high bluff was reached which consists of green schists and conglomerates. Thus these have continued for at least a half mile north of the line.

Then turning east at a point 2225 west and 1500 N. of starting point was found a narrow layer

of cherty ferruginous slate in the green schists and conglomerates.

18481. The strike is here about east and west and the dip vertical.

I now ran west 750 steps, that is to 1750 W. 1500 N., then turned to the southeast.

A green schist belt is continuous along the north of the surveyed lands and at its northwest corner is near the line.

At 1400 W. of the starting point the top of the south slope and this green schist belt is 725 steps north of the blazed line. Green schists are also found south of this line. Between the two ranges of green schist is an area of low hills without exposure covered with poplar. At about 1500 W. of the west line of the surveyed property there begins to appear in this zone small exposures of slate and 1800 to 1900 W.

exposures of slate are practically continuous.

At one place in the belt is a narrow zone of actinolite-magnetite-slate and a short distance east of this point where there are no exposures there are decided variations of the needle for a considerable distance.

Across a ravine in which is a creek still farther to the west, that is about 2500 W. as shown by the previous notes, is a huge mass of greenstone.

Although observations were repeatedly made in the zone of low lying hills covered with poplar no considerable variations of the needle were noted but there were slight variations at one point.

The peculiar conglomerate-like rocks were noted north of the area

without exposure as well as south of it.

18482. Greenstone 1350 W and 50 S of starting point.

18483. Specimens obtained by Mitchell some distance north and west, $1\frac{1}{2}$ or 2 miles from starting point; found in green schist.

18484. Slate north of ironbearing formation of Mitchell locations. Merriam says it is identical with the Knife lake slates.

September 27, 1890.

We started at a large blazed pine near the northeast corner of the Mitchell location and ran a course south $22\frac{1}{2}^{\circ}$ E.

At 800 steps we ran upon green schists which contained layers of iron bearing slates. The green schists are on the north side of the Mitchell property and along this line extended.

At 1025 steps on course we found ourselves upon the regular iron bearing formation 18485.

From the last point we ran E 473 steps without exposures when we came upon the iron bearing slates. At the place where we started east we were probably about 300 or 400 E of the E line of surveyed land.

We next ran 100 S over repeated outcrops of the iron bearing slates and jasper. These iron bearing

slates are also to the south and east and west of latter point. (1025 S 22 E 100 S 475 E)

This last point was again used as a starting point.

At 350 S 485 E occur ironbearing slates. These continue to 400 S 795 E being over banded and contorted jasper all the way.

Jaspersy slates were noted also at 400 S 975 E at 400 S 1115 E.

At this point the jasper strikes directly across the East and west course and is followed by green schists striking in the same direction.

18486. Banded and jaspersy slates 18486 are again found at 400 S 1265 E and continue to 400 S 1795 E.

18487. Lean ironbearing slates in a rather narrow belt within the green schists at 650 S 2935 E.

From this point the nose of Thunder Cape bears 46° S of E and the W face of Pie Island is due south.

We now ran south.

Layers of lean iron material were found in the green schists for 500 or 600 steps that is 850 to 950 S 93° E of starting point.

We then passed over a long succession of green schists. Continuing to the south in the course which we believe to be near the west range line of MacGregor township we found an exposure of the ordinary green schist of the country which is faced on the top by a thin skin of conglomerate.

This occurs in patches and in what were depressions in the surface of the green schist. The thin layer of conglomerate contains pebbles of green schist white quartz and what appears to be granite. Specimens of the pebbles.

18488

After passing this point no farther exposures of the schists are seen

and Mitchell says we are now upon the Animikie series, certainly the topography is very different and exposures instead of being frequent are very rare. If this conglomerate belongs to the Animikie then the Animikie is later than the green schist series.

Kaministiquia, Ontario, Sep. 29, 1890.

In the forenoon we visited the location described by Bell as having iron ore and jasper both east and west of the Kaministiquia river about a mile below the station.

All the exposures mentioned were found and also one not mentioned between the railroad track and river. The rock on the right bank of the river is very much broken and shattered so much so as to give it and the associated schist the appearance of a conglomerate almost, although both Merriam and I think it Reibung's breccia.

18489. Breccia.

18490. Jasper.

18491. The material which is here most heavy ferruginous.

18492. Of over lying the green schist 18492

The breccia on the left bank of the river is less broken although much shattered, while about half of

a mile east of the river, that is one mile southeast of the station is a beautiful jasper containing bands of comparatively pure ore. This outcrop of jasper and ore is flanked to the north by gray schist which extends in a bold ridge to the east and in places is plainly a conglomerate of the type so common among these rocks.

The jasper conglomerate on the right bank of the river is overlain by one of schist which was at the time examined and thought to be a Reibung's breccia.

We started on a run with the crossing of the Dawson and railroad as a starting point.

At 1400 S 200 W. of bridge occurs bright red jasper containing layers of ore two inches across. The jasper again occurs 1400 S 780 E.

At 1600 S 1500 E we struck

greenstone conglomerate and
schist carrying granite veins.

We followed along the south
side of the above ridge to 1900 E
1400 S then ran south to 1900 E
2100 S then to 2100 S 2030 E and
found conglomerate resembling
the Deer Lake conglomerate of the
Marquette district except that it
carried chert fragments.

We now turned to the southwest
and ran over conglomerate for a
considerable time which carries
fragments of green schist chert
white quartz and granite some
of the latter being fifteen inches
in diameter. The conglomerate
also contains black material.

The chert and black material
were regarded as coming from
the jasper and ore formation.

This would indicate the
conglomerate is a latter formation.

We then found a lone knob of
chert which was ferruginous
and contained some jasper like

88
material the location of which
was estimated at 1000 E and
2100 to 2200 S.

Tuesday, September 30, 1890.

We rode along the railroad in a handcar 4 or 5 miles to the point where the railroad crosses the Matawin. We then left the road and went in a general southwest direction the objective point being Thunder lake.

After going about 2 miles we came upon conglomerate.

This conglomerate continued a long way on our course and in places the boulders were as much as a foot in diameter.

The conglomerate has very many pebbles of green schistose rock this being a predominate phase. Also pebbles and boulders of granite occur and those of red granite are very abundant.

Those of ore are less frequent.

This conglomerate is without doubt a continuation of that observed by us southeast of Kaminitiquia; in almost every

respect it is like the Ogishki
conglomerate.

October, 2, 1890.

18493 We found a knob of lean
magnetic ore in swamp 18493
175° E of the southwest corner
Counce 11-V

Bands of jasper and ore in
actinolitic slates occur just
west of the southeast corner of
12-V. The strike is here north
78° W. the dip is nearly vertical.

18494. Lean ore and chert. The
two interlaminated with layers
of green echist a short distance
to the west of the southeast
corner of 12-V. The strike is
north 70° W and dip vertical.
The chert and magnetic
echists continue for 20 or 30 steps.

After running west to
the creek in the south part of
12-V we ran northwest following
the ridge until the west range
line of Counce was reached.

For this distance we were upon the banded chert and magnetitic rock before seen.

We then ran for some distance over the country to the southwest as far as the small lakes. The only rocks seen were the conglomerates and numerous outcrops of greenstone.

Returning to the line at 18493 the creek and running north 18496 we found the lean actinolitic and magnetitic schist and chert. 18495-18496 at 1100 S of the northwest corner of 12-V.

At 815 S of this corner 18497 occurs 18497 lean magnetic slate.

With this was much of the green schists and numerous outcrops of greenstone knobs.

At 600 S of the northwest corner was found a small creek.

and at 400 S of this corner
 (12-V) is a belt of jasper and
 18498 ore 18498 and 18499 which
 18499 continues as a solid ledge to
 300 S of the corner. After this
 appear the magnetitic rock again
 which continues to 100 S of the
 corner when we went down
 on to a low swamp.

After going to the corner
 we turned back to the point at
 which the large ledge of jasper
 and ore were found. This was
 followed to 400 S 300 E of the
 Northwest corner of 12-V.

At 400 S 400 E is a
 creek and swamp.

At 400 S 600 E we came
 upon a huge ridge of greenstone
 which carries locally numerous
 18500. fragments of jasper 18500. The
 appearance was strongly that of
 fragments of this material
 caught in the eruptive rock.

Continued south and east to the range line between 11 and 12 and then ran south.

At 800 S of the northwest corner of 11-V was again found lean magnetitic ore in belts a foot or more across.

The sun disappeared and we made no farther attempt to run on the line but followed a course somewhat south of east along a ridge.

For the most part this appeared to be greenstone.

At about 500 steps from camp (estimated) we found a considerable exposure of 18501 chert and jasper. At the ridge upon which the camp is located (range line between 11 and 12-V a short distance west of the line) is a wide outcrop of magnetitic ore and jasper 18502 the magnetite

appearing to be the richest seen
at any point. This appears
to be the chief or sole rock
making the outcrop at this swamp.

Position of camp 1400 S of
northeast corner of 11-V.



