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Marquette region, vicinity of Lake Angeline and Teal Lake, etc.. No. 124 1891

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1891

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Ishpeming

No 3

Traverses

U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

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.

17822-

Omitted

19847 to 19863 Plane Table notes

Omitted 19864 etc in vicinity entered

" 19909-6 Plane Table

" 19945-86 " "

19988-95 " "

19997-99 " "

21000-21136

#124

Marquette Region

vicinity of

Lake Angeline and

Teal Lake, etc

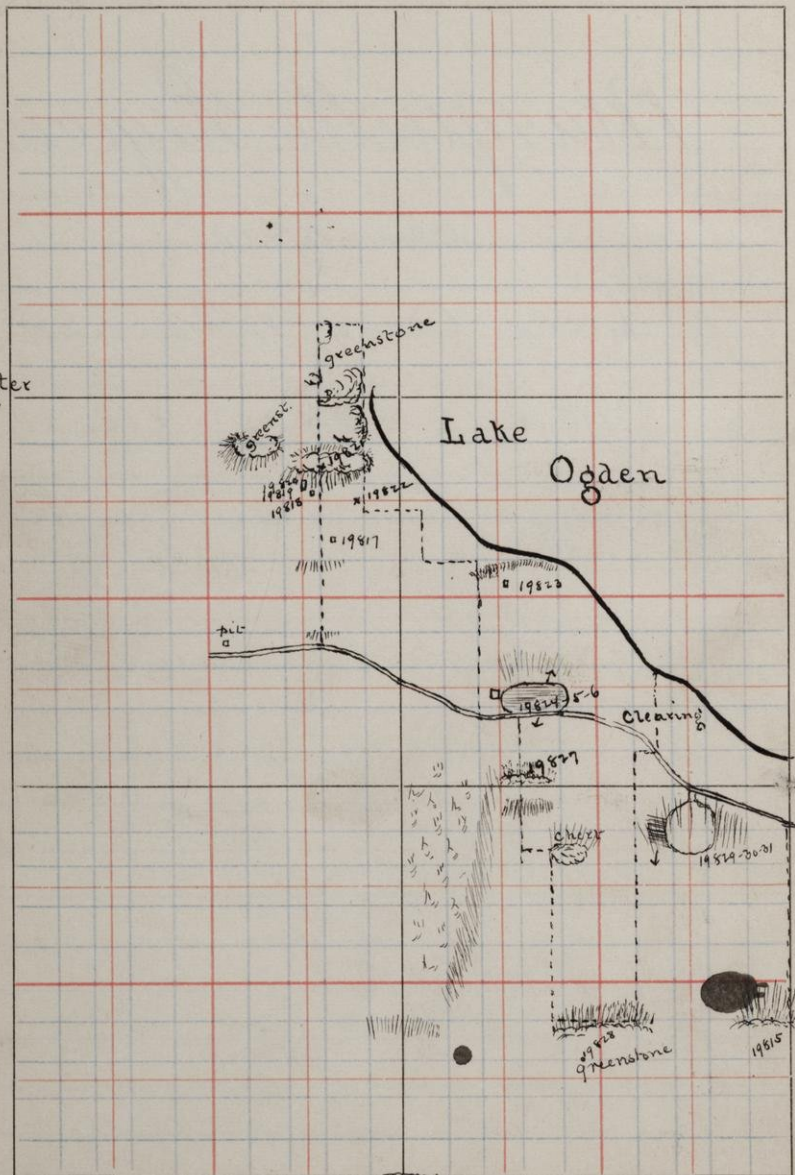
Aug. 1891

W. S. Bayley

T. 47

R. 27

Center
14



S 14

S.E.
Cov

At 860 N. and 490 W of S.E. Cor
 Sec. 14, is a flat running to
 the lake. In this several
 test pits have been sunk. For
 instance at 880 W and 515 N
 is a small exposure of cherty-
 material that has been stripped
 bare. Iron cherts and schistose
 greenstone or chlorite lies all
 around the base of the exposure
 since the relations of the various
 rocks to each other could not
 be determined any specimen
 of schistose chlorite was taken
 From here went East and S 10
 road at 590 N. and 400 W of S.E.
 Cor Sec. 14, then East on road 50
 paces, where it is covered a very
 large stripped ledge of iron rocks.
 The ledge is exposed for 35 paces
 N and 100 paces E. W. The
 main rock is a cherty iron, which
 lies in a great syncline, on
 the south side of which the layers
 dip 15° S and on the North side
 at 25° N. The strike is W. 10° N

19822

and the pitch of the axis is about 20° - 30° to the west.

The rocks are iron cherts with interbedded white cherts and layers of limonite?

Just east of this ledge is a smaller pit in which the same kind of rocks occur, and at the north is another.

19823 is from the pit to the north, at 770 N. 350 W of D.E. cor Sec 14

19824 Banded chert and jasper from the S. side of the top of the large stripped ledge

19825 White chert from a band some 6 ft N. of 19824.

19826 Obscure iron material from same ledge.

From this ledge went south striking a high precipitous ledge of iron cherts at 550 N. 510 W.

19827 Specimen from this ledge at 510 N. 340 W of D.E. cor Sec 14. Continued S. to 1570 S (430 N) and East to 320 N of corner, where is another small ledge of iron

chert forming a little ridge.

At this point 320 N, went south to 200 N. pt. line of sec.

✓ 19828 hill to large ledge of greenstone in ridge facing north, - a continuation to the west of the great hill crossed yesterday.

From here went East to 200 N of E line of section and went to lake after offsetting another 50 paces W E.

At 500 N and 140 N of S E corner of 14 find mouth of large pit whose south side is 430 N. On the stripped top of this pit on its west side the strike of the rocks is E 10° S. The pit is some 40 paces from E to W and 20 paces wide. The rocks are well banded cherts etc. dipping 25° - 55° W S.

- ✓ 19829 Chert and ore
- ✓ 19830 " " "
- ✓ 19831 Ore.

Aug 11/91

Located S.E. cor. Sec 14 and corrected up locations recorded. Then went East 250 paces and south

At 1790 W 250 N of S.E. cor Sec 13 is a deep perpendicular cut in iron chert, from which a very large amount of material has been taken, as numerous dump heaps are found piled in every direction through the woods.

✓ 19832 is a specimen of the well banded chert dipping S at 40° and striking E 20° S.

✓ 19833 At 1750 W and 250 N. is the main excavation. Here are well banded sandy chert dipping very low (15°) to the south

At this point run south

At 1750 W. 180 N of S.E. cor Sec 13. rises the abrupt face of the greenstone bluff whose extension to the west has been repeatedly crossed. Specimens from

✓ 19834 1800 W. 180 N of S.E. Sec. 13

Other ledges of greenstone are found further south on the same course, viz. 1750 N of E line Sec 13. This line of travel keeps in top of high ridges of greenstone, that drop suddenly to the East forming a valley through which streams and road pass.

19835 1750 N 150 N of S.E. Sec 13.

19836 1750 W, 1850 N of S.E. Sec 24

Other ledges not sampled were found at

1750 W 1980 N. S.E. cor Sec 24.

" 1950 N. " " " "

" 1830 N. " " " "

" 1720 N. " " " "

Struck road at 1580 N.

Returned then to Lake Ogden and ran south along a line 1500 N of E line of Sec. crossing plains until reached a point 1710 N of S.E. cor Sec 24, where found a low hillock, from which low rocks crop out at intervals from 1500 N to 1420 N

A large exposure of these is at

1420 W. 1710 N of SE. Dec 24.
 Here the rocks strike S. 220 W(?)
 and dip about 20° N.W.

✓ 19837 1500 W 1730 N of SE. Dec 24

✓ 19838 1420 W 1710 N. " " "

When struck little lake at
 1510 N went north 50 paces, then
 E 250 W within 1250 of E. line
 of Sec and from here north.

At 1250 W. 1620 N. of SE. Dec 24
 found ledges of the same iron
 rocks as above mentioned, form-
 ing another little hill. The
 rock is well exposed on the south
 side of the hill where it dips 40°
 W N and strikes W 10° N. The
 rock is well bedded and looks
 ✓ 19839 like the siderite rock.

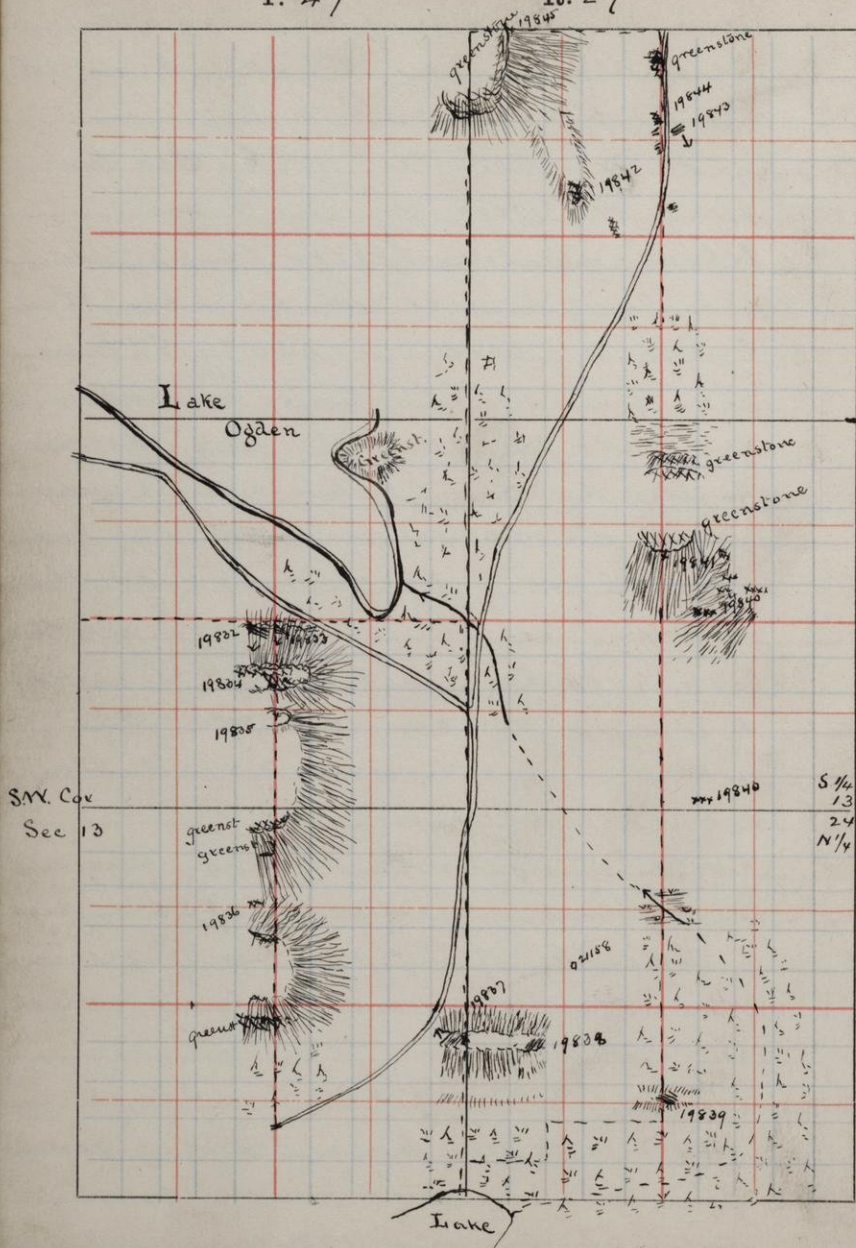
Continued north through Swamp
 and plain until at 250^{of S line 13} N. and
 a little E, found ledge of green-
 stone forming a high hill, which
 ascended

✓ 19840 260 N 1200 W of SE. Cir Dec 13.

The hill is one bare ledge of green-
 stone, from whose south face
 took specimen 19841

T. 47

R. 27



- 19841 1250 W. 320 N. J.S.E. Dec 13.
 at 800 N. crossed the road.
 150 paces west of this point
 is a little knob of greenstone
 forming a shoulder joining from
 the larger hill to the north. From
 this took specimen
- 19842 800 N. 1400 W. J.S.E. Cir Dec 13.
 at 870 N. on East side of the
 road at the top of the hill over
 which roadway passes is a small
 exposure of bedded rocks running
 about N.W. for 20 ft. Their strike
 is W. 32° N. and dip 50° SW. The
 rock resembles Rominger's arena
 ceous sandstones
- 19843 At 785 N. is another ledge of
 the same rocks and
 at 900 N. 1250 W. is a small
 ledge of greenstone
- 19844 Continued North to 1000 N.
 then went west 250 and South.
 At 1450 W. 1000 N. of S.E. Cir 13
 climb a high steep hill of green-
 stone from which took specimen
- 19845 Greenstone 1450 W. 1000 N. of S.E. Dec 13.
 On the South from leave the

hill, which has a high bare face
to the south and descended to the
plains and swamp, remaining
in there until finally reach the
road.

Upon returning to camp on road
running along south side of Lake
Daley, found a ledge of iron chert
that had been overlooked. Its
19846 location is 600 N, 825 W of S.E. cor
Sec. 14. The exposure is 50 ft long
with rocks dipping about 10° S.

19847 }
15 } See Plane Table Book.
19863 }

Aug 14/91

Went in on Lake Daley to
get western extension of iron
rocks outcropping on lake shore.
After correcting up on N. line
Sec 14 found had started at
1200 N and 1625 W of S.E. cor Sec
14.

Saw no iron rocks in new north,
but found ledges of greenstone

NW. Cor Sec 14



in plenty.

At 1295 N. 1625 W. of SE Sec 14

19864 took specimen

At 1320 N. 1625 W another ledge.

Others are indicated on the map opposite?

19865

5

19873

} Plane Table Notes

Aug 16

Went to SW cor Sec 33. T48 R. 27 and ran north, east and south crossing many times the contact of quartzite with Deer Lake Agglomerate, with intention of discovering if possible the relations between these rocks, of studying the conglomerates and learning the age of the agglomerate.

The details of swamp are in the left for the map, reference being made only to the rock exposures, in the notes.

At 265 paces N of the S.W. cor
 Sec 33 struck first rock, in
 a hill just north of a swamp.
 This one like all the other hills
 marking the southern limit
 of rocks overlooks a swamp
 and large open prairie that is
 drift covered. The south slope of
 the hill is very abrupt, being
 almost perpendicular when the
 rock capping it is a quartzite.

19874 This hill consists of a greenish
 gray rock that looks more like
 tuffa than anything else, i.e.
 like fine grained agglomerate.
 The specimen was taken from
 285 North.

No other rocks were seen on
 run north. At 1000 N of Cor-
 ner went East, finding ledge
 of Deer Lake agglomerate at
 1000 N 85 E of S.W. cor Sec 33.
 This ledge forms a western
 spur of a great hill rising to
 a considerable height in the
 center of the section. The rock
 has the usual characteristics

Photo. 1116. Near view of talcose conglomerate between Deer Lake agglomerate and quartzite. About 300 N., 400 W. of S.W. corner section. 33, T. 48 N., R. 28 W., Mich. Specimens 19877-83 and 19885-93. South side of cliff north of valley. Shows quartzite pebbles and fragments in talcose schist.

Photo. 1117. Another view of same cliff. Some irregular quartzite fragments are banded, as at left of handle of hammer. Fragments here are quite angular and are plentiful. They are not sharply defined against groundmass. The dark view-like mass to the right is a shadow.

Photo. 1118. Another view of same cliff. The pebbles are principally quartzite as before. Most are angular, but the large white one is fairly well rounded. Surrounding it the matrix is quite well marked schistose, with schistosity bending around pebbles. Looks like effect of pressure.

of this agglomerate, in places containing great fleeces of greenstone and at other places very small red weathering spots. The whole hill consists of this rock, whose schistosity is E & W.

- 19875 Agglomerate from 135 E of W $\frac{1}{4}$ past Sec 33.
At 400 E went south, taking
- 19876 specimen from top of a hill at 465 N. 1600 W of SE cor Sec 33.
At 315 N. 1600 W of this corner found a contact between the agglomerate and the quartzite. There is a little knob of
- 19877 a talcose looking rock cut by quartz veins and containing in its north side a great mass of quartzite that may be either fragmental or a great vein mass. On the south side of the talcose rock is an undoubted fragmental
- 19878 quartzite.
The contact between the quartzite and 19877 seems to be a con-

Photo. 1119. General view of side of cliff of Deer Lake agglomerate. On south side of road from Deer Lake to Gold Mines. Near center Sec. 33, T. 47 N., R. 28 W., Mich. Planes of schistosity nearly vertical in view.

Photo. 1120. Near view of portion of cliff shown in Photo. 1119. Schistosity vertical. Pebbles are elongated in this direction.

formable are except for certain minor irregularities that may be explained on the supposition that the talcose rock is a tuffa.

South of this knob and separated from it by a little gully is a knob of quartzite. When I ran East between these two knobs, Smith ran South across the quartzite to the swamp, then East 300 steps and North across another knob of quartzite, meeting me at 350 N 1300 W of S.E. Cor Dec 33.

19880 is quartzite taken by Smith from the quartzite knob at 250 N 1600 W of S.E. Cor Dec 33.

19881 is quartzite from South side of quartzite knob whose North side is 330 N. 1300 W of S.E. Cor Dec 33.

19882 is from North side of this knob.

19883 is quartzite from the North side of the knob on the South

side of the valley, at about
1450 N. 280 N of S.E. cor Sec 33

19884 Black talcose rock from top
of knob north of quartzite.
at 340 N. 1320 N of S.E. cor Sec 33.

The conglomerate whose ex-
treme western end is indi-
cated by specimens 19844-8-9,
none of which are, however, con-
glomeratic, becomes a well
marked feature of the ridge
on the north side of the valley
between the talcose rock and
the quartzite. This north
boundary of the valley is steep
and bare, and shows conglom-
erate running all the way
from 19844 to point where meet
Smith. While passing along
at the foot of this bluff, ex-
amined carefully all exposures.
In these the pebbles are every-
where very apparent. The ce-
menting rock is largely like
19844, i.e. it is a schistose
talc. matrix cementing large

pebbles of white, red and some
of banded quartzite. There can
be no doubt that the rock is
younger than the main mass
of quartzite, but whether it is
identical with the Deer Lake Con-
glomerate or not remains to
be determined. A little fur-
ther east than the point at
which the best pebbles are ex-
posed the matrix lies down as
the hill appears quartzitic and
the pebbles quartzite. It may
well be that the talcose rock
is merely a squeezed quartzite,
in which case the conglomerate
loses much of its significance.
The true conglomerate is sepa-
rated from the talcose rock by
a swamp, so that the relations
of the two up to this point have
not been definitely settled.

Some of the pebbles in the
talcose conglomerate are as
much as 18 inches in diameter,
others are very small. All are
rounded.

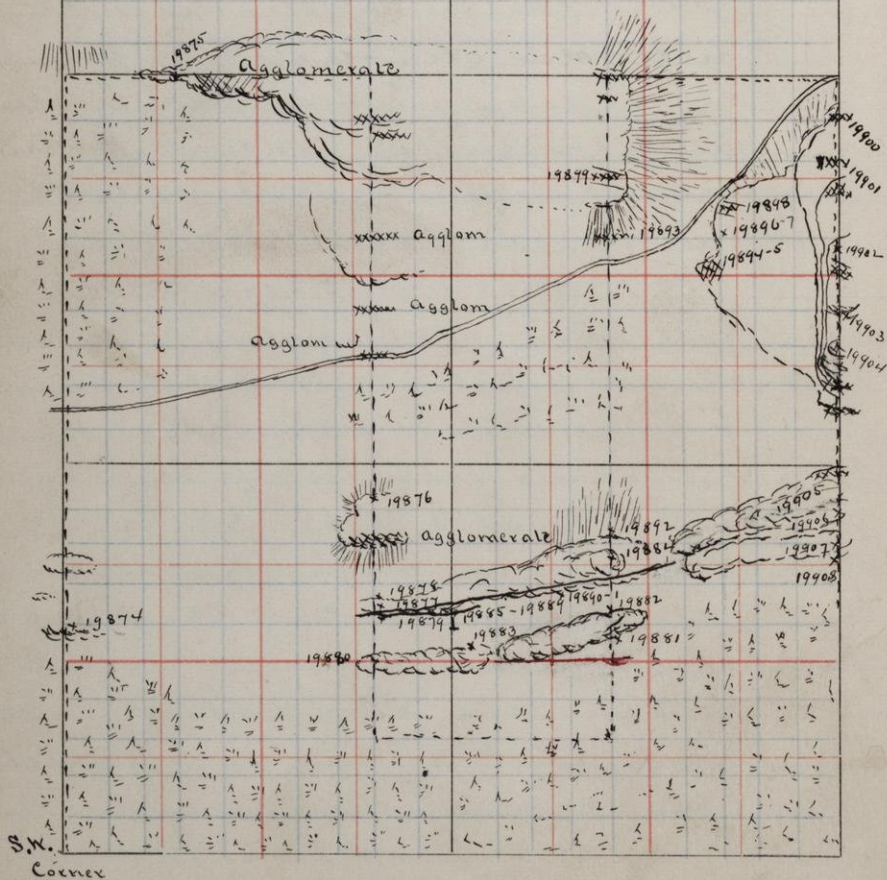
- ✓19885 Conglomerate 320 N. 1540 W
- ✓19886 Pebble " "
- ✓19886_a " " "
- ✓19887 " 330 N 1500 W
- ✓19888 " " "
- ✓19889 Cement " "

of S.E. Cor. Sec. 33.
When the quartzitic cement
includes quartzitic pebbles
the former is like the materi-
al of the latter, but it never-
theless seems to grade into the
talcose rock (see Rominger
p.). This would seem to indi-
cate that the conglomerate and
the conglomerate have nothing
to do with each other.

- ✓19890 Quartzitic cement, from
1370 W. 300 N of S.E. Cor Sec 33
- ✓19891 Pebble from same place.
At 1300 W. 430 N of S.E. Sec 33
- ✓19892 is a small ledge of talcose
rock on the north slope of the
same hill as that from which
took 19884

From this point to 775 are in
swamp, but at 775 begin bas-

Map of S.W. 1/4 Sec 33



and another hill of agglomerate from which took specimens.

19893

30 paces East of this point is the west end of another knob, where peculiar relations exist between the various rocks.

19894

Here a pink, fine grained rock appears to intrude a dark schist.

19895

Use me that may be the greenstone agglomerate. It does not cut it so acutely like a dyke, but seems rather to intrude it irregularly, and to form a lenticular mass within it, which mass is cut by quartz veins.

About 20 paces N.E. of this point dark basic rocks and lighter ones are interbanded. The lighter

19896

one is spotted with little red dots like the agglomerate, while the

19897

darker one seems to have an irregular contact.

Beyond this again a few paces to the N.E. is another mass of

19898

greenstone agglomerate, cut by an undoubted eruptive mass with a dyke like form.

At 820 N. 1300 W. V.E. Cor Sec 33
found another ledge of agglomerate on the East slope of the
hill, and at 880 N a diabase
cutting the agglomerate.

19899

Specimen Diabase.

At 1400 N went East 300 to
1000 W of S.E. Cor Sec. (Center of Sec)
and ran South.

For about 500 steps continued
up top of a high hill of ag-
glomerate that breaks off to
the west where it overlooks the
swamp already mentioned as
crossed on our north. Discov-
ered many many ledges of the ag-
glomerate in the run as near
the entire top of hill is bare
except for little hollows between
larger ledges.

At 960 N 1400 W. V.E. Cor Sec 33

19900

Crossed a small dyke of green
stone in this conglomerate,
and at 920 N in same line a
larger dyke and at

19901

800 N another small dyke

at 480 N the agglomerate contains well rounded pebbles as though it had been formed by tuffs falling in a stream with boulders and pebble bottom.

✓ 19902 Specimens of pebbles from agglomerate at 480 N. 1000 N of S.E. cor. Sec. 33.

✓ 19903 is specimen of agglomerate from 400 N. where it was thought to be changing in character. At 460 N was encountered another dike of Diabase.

✓ 19904 Pebbles from high ridge of conglomerate at the top of a high narrow ridge.

Beyond this hill, to the south, is a little swamp and in this swamp at 500 N 1000 N of S.E.

✓ 19905 At Sec 33 is a greenish grey dike cutting a black schistose rock like 19884.

A little further south the black rock appears to grade into quartzite.

✓ 19906 Black schistose rock at 400 N. 1000 N of S.E. Sec. 33.

Source of this is a ridge of
 19907 very characteristic quartzite?
 stained in places with a bright
 green color. To the south the
 hill is precipitous, as are all
 the quartzite hills in this re-
 gion, and its southern face
 overlooks a big Swamp.

It contains bands of the schis-
 19908 taceous slate or talc rock, but
 whether as interbedded layers
 or not could not be ascertained

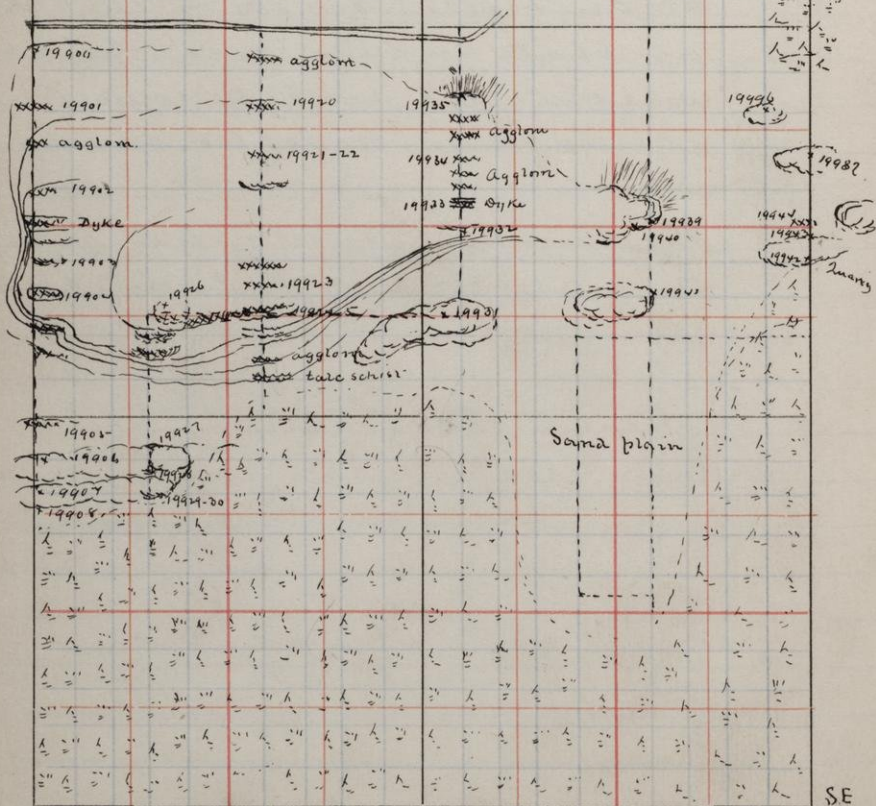
The southern face of this quartz-
 ite is at 380 ft. of S. line of section.

19909 }
 15 } Plane table notes.
 19916 }

T. 48

R. 27

Map of S.E. 1/4 Sec 33

SE
Corner

Aug 18/91.

Started from Center Sec 33. T₄₇
 R. 28 and ran north to Camp River,
 crossing swamps and little
 knolls of the Deer Lake Agglom-
 erate as indicated in the map.
 This rock is of the same nature
 as that already described by
 Irving, Williams etc. It is Schis-
 tose with the ledges trending a-
 bout E & W, and the strike of the
 schistosity in nearly the same
 direction. But few dykes were
 seen, none that could be pro-
 nounced such without question,
 although some of the specimens
 taken may be those of a diabase.
 Only a few specimens were ta-
 ken, although all the ledges seen
 were located.

19917 is agglomerate from 1289 N. 1000
 W of S.E. cor Sec 33. from north side
 of a little knob.

19918 is from 1900 N. 805 W of S.E. cor
 Sec 33. from the top of another hill.
 All the hills are perfectly bare
 on top and on their sides, so

that the rock may everywhere
be studied without difficulty.
At 900 N. when separated
from the Carp River by a swamp
and, ran East 300 paces and
then South to the S. limit
of the quartzite.

19919

may be a dyke rock. It is from
1750 N. 700 W of S.E. Cor Sec 33.

All the hillocks north of the
center line of the section are
isolated, forming independent
knobs entirely surrounded by
swamp. South of this center
line the country is more jag-
ged, the hills are rougher and
more closely crowded together,
while the rocks are more
complex and their relations to
each other are of less obscure.

19920

From little bluff facing north,
at 925 N. ~~1500~~¹⁰⁰⁰ W of S.E. Cor Sec 33
at 1835 N. ~~1300~~¹⁰⁰⁰ W " " "

see map

the agglomerate is cut by a dyke
running E & W. The strike of the
Schistosity of the agglomerate is
about E and W, and its dip

is quite high to the north.

✓19921 Agglomerate

✓19922 Dyke rock.

South of this exposure are the usual ledges of the same rock forming little knobs and precipices on a great hill.

At 660 N. ⁷⁵⁰ 1300 N. of S.E. Sec 33

✓19923 Took another specimen of agglomerate.

all map
At 630 N. ⁷⁵⁰ 1300 N. is a little cliff of the same rock, which is cut by a dyke of schistose greenstone.

✓19924 Agglomerate

✓19925 Schistose dyke.

At 610 north is a high precipitous bluff at foot of which is swamp. The main mass of this bluff is agglomerate, but in its southern face is a comparatively thin layer of the lacustrine schist.

No quartzite lies beyond this.

Here went west 150 paces, keeping well in, top of the hill, and crossing many large surfaces of bare agglomerate?

19926 At 630 N. 850 W 75E Cr 33
Took specimen.

From this point went South
crossing the edge of a precipice
of agglomerate at 575 N and
a little Swamp at 475, when
found North side of another
ledge which is the extension of
the talcose rock (19906) to the west.

19927 Talcose schist from 475 N. 850
W 75E. Cr. Sec 33.

19928 Took specimen also from 440
N. 850 W, where the Talcose
rock forms a little precipice
facing South,

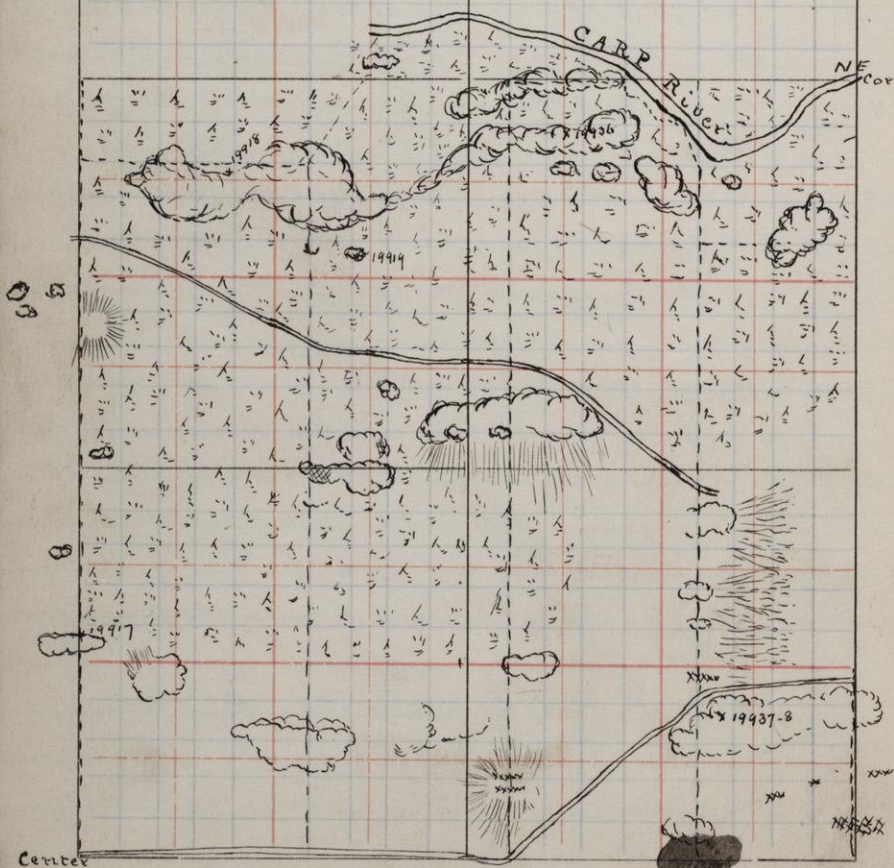
19929 and another specimen at 420
N. 850 W. where the same rock
forms a cliff overlooking the
Swamp. At this point the tal-
cose rock is cut by a vein from
which iron oxides have separated.

19930 Returned from this point to
630 N. 700 E and from there
went 250 paces further East
and North on the line 450 N of
E. line of Section

On the new East crossed a lit-

Map of N.E. 1/4 Sec. 33.

All the hills are of agglomerate



the knob of talcose rock over-
looking the large swamp with
south and separated from the
agglomerate hills to the north
by a small swamp.

- 19931 is a specimen from this knob,
taken from near the top of the
hill at 570 N. 630 U. of SE Cr
Sec. 33.

- 19932 From the south face of the next
ridge north took specimen,
at 450 N. 730 U. of SE Cr 33.

- Further up the bluff at 475 U
the ledge is high and precipi-
tous, much resembling the Grod-
ed form of a dyke.

- 19933 Other ledges of agglomerate
were noticed at 800, 820 and 830
U.

- 19934 From ledge at 830 U. 450 N of SE 33.

- At 920 U is a ledge with precip-
itous face north, that is proba-
bly a dyke.

- 19935 Continued north as far as 2015
U. of line of Sec 33, then went east
250 paces to 200 N of E line of
Sec. and thence south.

in the run north crossed the usual knobs of agglomerate and stretches of Swamp.

✓19936 At 1950 N. 377 N of S.E. - Cor Sec 33
Took Specimens of agglomerate from the top of one of the bare hills.

At 1175 N 200 N of S.E. Sec 33
found a very high precipitous ledge of the agglomerate, apparently cut by a great dyke of greenstone.

✓19937 Agglomerate

✓19938 Greenstone.

At 475 N. begin the ascent of a hill, that at 440 N. affords a precipitous face to the north.

Here the rock is a black slaty or talcose one, while a little west and south of it is the usual talcose variety.

✓19939 Black slaty rock

✓19940 Talcose schist

At 680 N 200 N of S.E. Sec 33
✓19941 is the East end of a quartzite ridge that extends west 100 paces.

Continued south to 265 N of

south line of section, over drift plain, then west 100 and N to 600 N, when found west end of quartzite knob. From here went East 300 paces to E line of sec 33 and north along this to N.E. corner of the section.

At 400 N of S.E. cor sec 33,
 19942 Censed a ridge of quartzite 30 paces wide

At this distance north and 30 paces E of the line is the west end of a quarry from which a very large quantity of rock has been taken. Here the quartzite beds are well exposed, striking nearly E and W, perhaps a few degrees N of E and dipping at 45° to the South.

On the North side of the quartzite bluff the rock is well banded and is quite a little bent and contorted, so that its strike and dip varies.
 19943

At 752 N. is a rock that resembles something intermediate between quartzite and the talcose
 19944

rock.

all the ledges north of this
point are agglomeratic.

19945 }
15 } Plane table notes.
19986 }

19987 Agglomerate from 830 N. of SE cor
Sec 33.

19988 }
15 } Plane table notes
19995 }

19996 Agglomerate from 900 N. 40 W.
f.s.e. cor Sec. 33.

19997 }
15 } Plane table notes
19999 }

21000 }
15 } Plane table notes
21136 }

Sep 12/91.

Began running North from center of sec 12 T 47 R. 27.

The center of the section is on the south slope of a very high and long ridge of greenstone, very steep both on the north and on the south sides.

✓ 21137 is from 35 N. 25 W. of Center [1035 N. 1025 W. of SE cor Sec 12] on traveling road crossed many ridges of greenstone, between which are swamps and marshes. The general trend of all the ridges is east and west. The materials of all is so nearly alike that only a few were specimened.

At the base of some of the hills was discovered a facing of well banded rock, like that called actinolite schist in King's and Grieksen's notes. This rock is probably the carbonated or siderite rock from which cherts were made. The occurrence of the rock only at bases of Great greenstone

ridges may indicate that any in these positions was sufficiently protected to resist alteration

✓ 21138 is greenstone from 1220 U. 990
NE of S.E. Cor Sec 12

✓ 21139 greenstone from 1700 U. 1010
N of S.E. Cor Sec 12.

At 1825 U. the topography changes somewhat. Instead of the great bare, rough ridges of quartzite, we now begin to ascend a more gradual slope. On the south side of this slope are several test pits, some of them of large size. Great quantities of slate and cherty material have been taken from all of them.

The largest is at about 825 U. 30 E of Center of Section [1825 U. 970 N of S.E. Cor] Some waste material around this took specimens of

✓ 21140 Slate and

✓ 21141. Cherty rock

Further up in the hill are two small ledges of greenstone, and on its north slope are several large ones.

At 100 ft of supposed quartz pit between 12 & 1 took specimen.

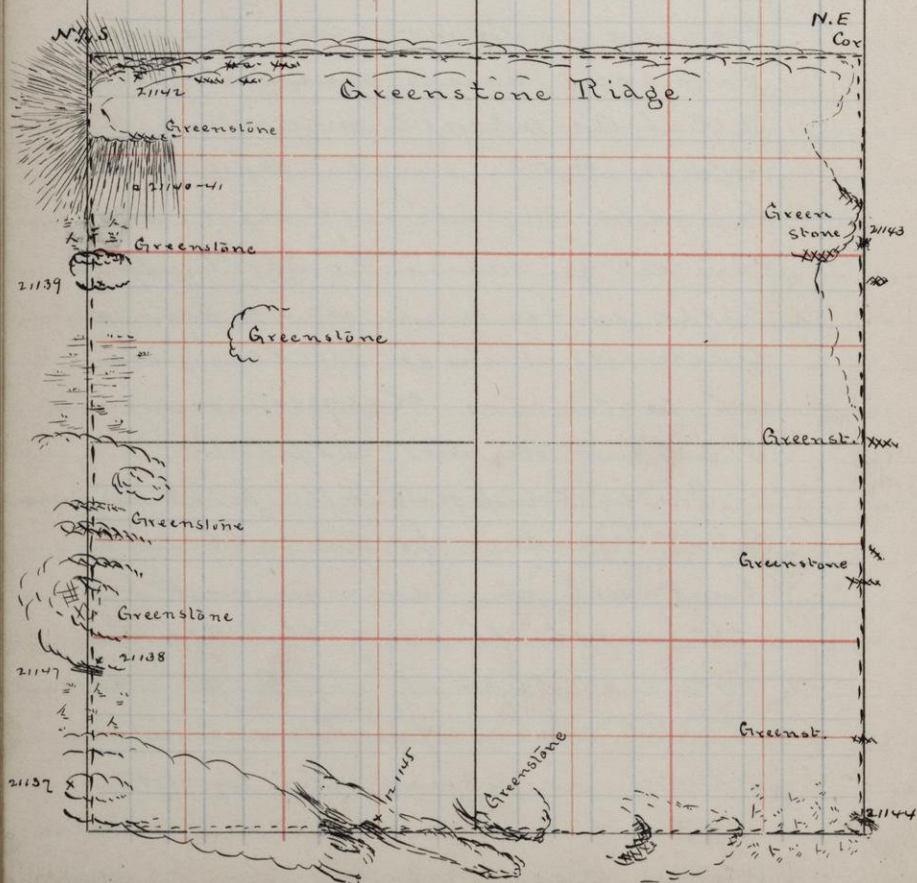
N.B. about a month later discovered that true quartz pit was some distance north of this supposed one and a little to the west. Did not correct location, however, for the ridge runs east half a mile or so and west some little distance. Along its whole course the greenstone is similar in all respects.

From supposed $\frac{1}{4}$ pit went east until found cut out line, which turned out to be the north line of the section. Followed this to N. E. or Sec 12. It runs for this entire distance along the north slope of a great hill of greenstone overlooking the plain.

T. 47

R. 27

N.E. $\frac{1}{4}$ Sec. 12.



Scrub of the granite. Rocks are everywhere exposed in quantity forming an almost precipitous ledge.

Found corner, which is marked by small iron peg.

From this corner went south over greenstone for nearly half a mile. East of the line is a clearing in which are situated the Lucy and several other soft ore mines. These were studied later with the plane table.

✓ 21143 Greenstone from 235 S. of U.S. Cr. Sec 12

✓ 21144 At 900 S. found low ledge of slaty material whose strike and dip could not be accurately determined. The strike of the schistosity, however, is 8° N by W and the dip about 85° S.

On the opposite side of the line here formed by this rock are other exposures in which the strike of the beds is 20° N by W and their dip about 40° - 45° to the S.

From the E $\frac{1}{4}$ post Dec 12 went west, crossing swamp and ascending slope of first greenstone hill at 150 W of $\frac{1}{4}$ post.

On the run west crossed quite a number of these hills, which are trend just a little S of East.

At 400 W. reached top of another greenstone hill. As soon as began to descend it, on its S. W. side found the slaty, siderite rock, here very fresh, dense and terribly hard. It is beautifully banded, with layers perfectly regular, striking N of W about 18° and dipping 22° S. The south slope of the ridge consists entirely of this rock.

21145

Specimen from 640 W of E $\frac{1}{4}$ post Dec 12.

Upon following along the valley south of this ridge discovered that almost its entire south slope for a long distance west was covered by the same bedded

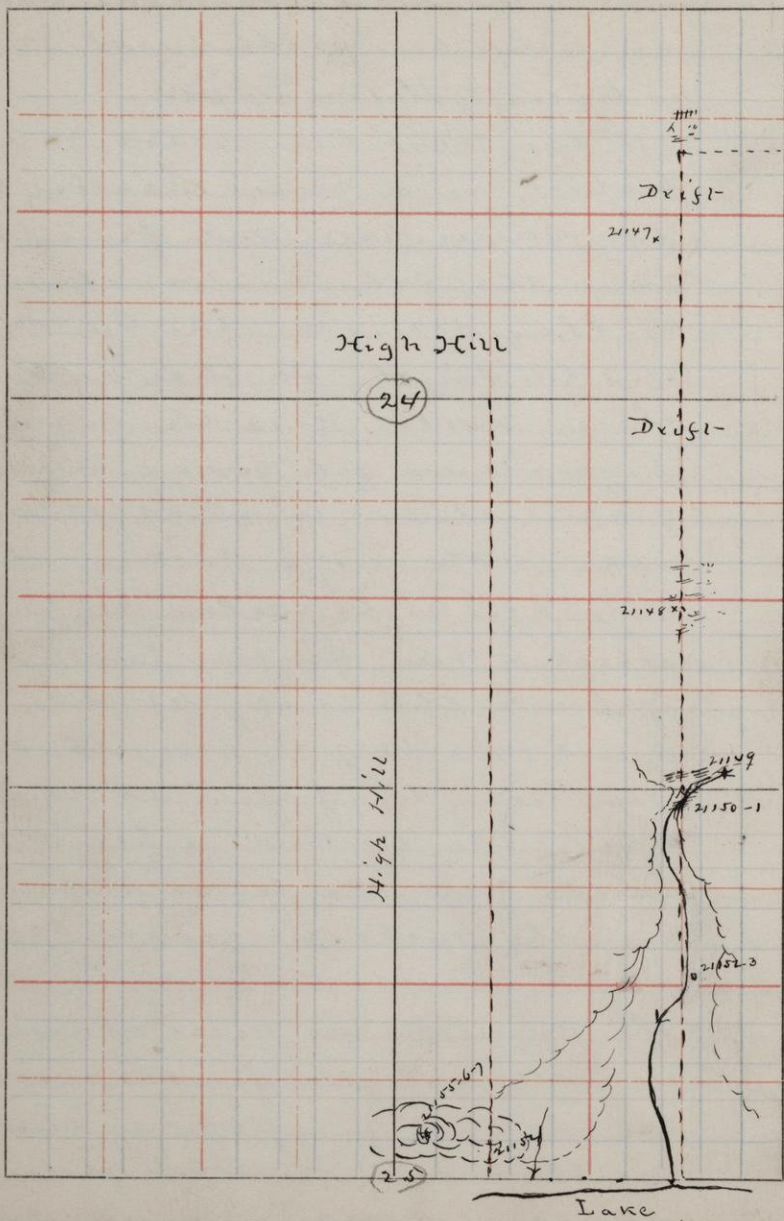
rocks. On the north side of the greenstone hill to the south are no traces of these rocks.

On the next hill west, or more properly in a more westerly spur of the same hill are found again the schistose rocks. Here too they occur on the S.W. slope and dip south. To the back of these, north, rise the rough proportions of a great mass of greenstone, of which the schist appears to be only a facies. The ledge here is similar in every respect to that further east.

Opposite the valley at this point (400 W of $1/4$ post) the same rocks may be found at the base of the greenstone hill to the south. Here the ledge is small and the rocks are much decomposed.

The same rocks were again met with a little further west, say at 450 W of $1/4$ post, on the south side of another greenstone hill, and again on the south

R. 27



side of another greenhouse
bluff at about 200 paces west
of the center of the section.

Sept 5/91

Started at 330 S. 250 N of U.E.
Cov. Sec. 20 T. 47 R. 27, and
ran south.

Between the railroad and
this point is swamp, which
did not cross the swamp line
and at 275 S.

Most of the country south of
this point is drift covered or
swampy.

At 575 S. 300 N of U.E. Cov of
the Sec.

✓ 21147 [1425 N. 300 N of S.E. Cov Sec
24]

are a few small broken
ledges of a slaty rock whose
dip and strike could not be
determined.

It is barely possible that these
supposed ledges are only boulders
buried in the drift, but think
not.

✓ 21148 At 485 N. 250 W of S.E. Cor 24.
 Found a very large mass of
 brown ore etc., which at first
 took for ledge. Very close in-
 spection, however, seems rather
 to indicate that it is an
 immense boulder. The con-
 crete around is strewn with large
 boulders most of which are of
 the character of the present
 one.

✓ 21149 At 40 N. 215 W of S.E. Cor 24
 found undoubted ledges of flag-
 ings. They occur as low ledges
 bounding the north side of a
 swamp.

Their strike is 45° N of E and
 dip about 30° N.

At another point the layers
 strike 30° E of N

The exposures occur only in
 a few places along the north-
 ern boundary of the swamp, and
 their material is so much de-
 composed that could get but
 little evidence as to their char-
 acter.

after crossing N. line of Dec 25, begin to ascend a hill covered with hardwood growth. At 30 paces S. of the line and 250 paces W. of E line of Dec 25 [1970 N. 250 W of S.E. Cor Dec 25] the little stream crossed near the line makes a plunge over a great ledge of slaty rocks. They seem to be slates and cherts, dipping 20-25° N.W. and striking 33°-40° E of N. They surround the little stream on both sides and consequently are evidently in place.

✓ 21150 Chert

✓ 21151 Slate.

At 1645 N. 250 W of S.E. Cor Dec 25, is another large boulder of chert & slates, from which took no specimens.

At 1550 N. 250 W of S.E. Cor Dec 25 is a small tree pit in a drift hill. The pit has gone down to the chert, that seem to be horizontal. They are so much

decomposed that strike and dip could not be ascertained.

- 21152 } are specimens from the
21153 } dump heap of this pit. The
two are interbedded, the chest
forming bed, thin layers in
the other rock.

at 1000 ft of S. line of Sec 25-
struck N. side of little lake.
From here went 500 paces
W. W 750 W of E line Sec 25-
and then N.

at 750 W. 1070 ft of S.E. Cor
25. we climb a hill with
very steep side to the south. It
is this hill in which Oley &
Luther found the strike of granite.
at the point where our line
of travel crosses hill is a spur
making out from its east
side, the main portion of the
hill being further west.

- 21154 The material of the spur is
granite.

The main mass of the hill to the
west is a greenish quartz, or

a very gneissoid greenstone,
whose schistosity dips north
and strikes a little S. of the
line to the Palmer Mine
(No Sun). This is cut by a
granite dike as reported by
Vee & Luther.

✓ 21155 granite from apex of hill.

✓ 21156 gneiss " " " "

The gneiss in some places
has inclusions, which may
either be true inclusions or
lenticular masses of some
crystalline, like granite.

✓ 21157 Inclusion in gneiss.

Continued north to 1475
N. 45° W. of S.E. Cr. of Sec 24
where struck R.R. No rocks
were discovered on northern
trip. The country is covered
with a second growth of
maples etc., and its topogra-
phy is rolling. We have in
this course evidently crossed
the eastern slope of Summit
Mountain.

Before returning to Camp
 visited large pit at
 630 E and 1950 of N. E. cor.
 Sec 24 [1805 N. 1370 W of S. E. cor
 Sec 24]

21158

The pit is in the side of
 a hill, where the rocks are
 well bedded slates etc., striking
 35° N of W and dipping about
 14° S W. A great deal of work
 has been done here; large
 dump heaps have been formed
 and a little settlement
 was begun, but so far as
 could see no ore was ever
 taken out.

Photographs taken

1. Quartzite Conglomerate Dec 33
2. " " "
3. " " "
4. Deer Lake Agglomerate "
5. " " "

Photographs desirable

1. South wall of Foster Mine Pit
near road
2. West end Lake Superior Hard
rock pit.
3. West end Old Cleveland Pit (?)

