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Marquette Iron Range and Lake Michigamme: [specimens 24953-24972]. No. 173 1894

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1894

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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 $2 \times 2\frac{1}{2} \times \frac{1}{4}$ 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. 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.

V rs / 95 C - 16

Marquette
Iron Range,
and
Lake Michigamme.

W. S. Bayley
with assistance of
G. O. Smith
and
Chas. Perry.

1894

S. $\frac{36}{1}$

T. $\frac{48}{47}$

R. 26

$\downarrow_8$

$\downarrow_8$

$\downarrow_8$

$\downarrow_{12}$

$\downarrow_{11}$

$\downarrow_{12}$

$\downarrow_{11}$

$\downarrow_{10}$

$\downarrow_8$

38

π'

$\downarrow_9$

π'

π'

$\pi^{1/2}$

$\pi^{1/2}$

π^2

$\downarrow_9$

$\downarrow_9$

$\downarrow_9$

$\downarrow_9$

S $\frac{1}{2}$

X $\frac{1}{4}$

$\downarrow_{10}$

$\downarrow_9$

SE Cor

NEL Cor

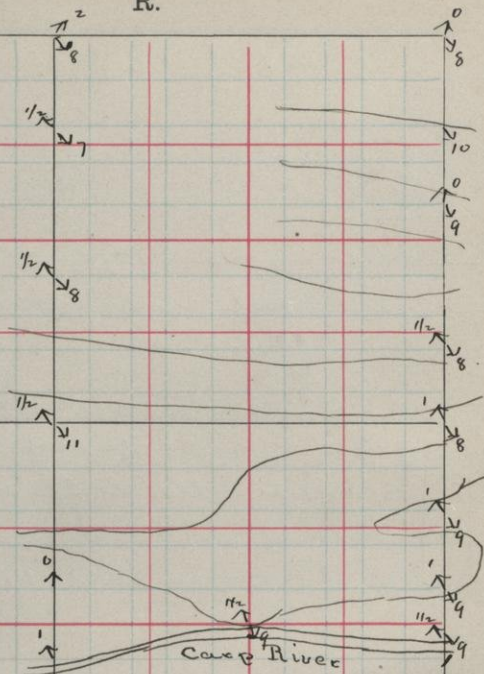
1
The S.E. $\frac{1}{4}$ of Sec 36-47-26 and the
N.E. $\frac{1}{4}$ of the NE $\frac{1}{4}$ Sec 1-47-26 are covered
with sand. The dip and variation
does not change materially over these
areas and so nothing can be learned
concerning the ore formation.

The lack of variation does not prove
the absence of the ore formation, since
there is no change in the variation
even in the vicinity of ore producing
pits.

S.
NW 1/4

T.

R.



NW 1/4

Center

The slight variations in Sec 47-26.
may indicate the presence of the same
formation. The country is sand cov-
ered so nothing can be learned with
reference to the rocks.

The Examination of Sec 32-48-28 had in view the discovery of any quartzite beds that might be present in the granite area.

All of the rock indicated by backures on opposite page is granite, unless otherwise stated.

24950 At 1500 N. 1650 W of S.E. Cr Sec 32-48-28 is a knob of Hornblende Schist.

At 1225 N. 1300-1500 W of S.E. Cr Sec 32 in the north facing of a great granite bluff overlooking a valley is a thin coating of white quartzite and on the opposite side of the valley, forming an isolated knob, separated from granite to the north by a little valley is another mass of same quartzite.

24951 At 1900 N. 1550 W of S.E. Cr Sec 32 are a few ledge looking like the quartzite phase of the Cascade Schists. The rock is so involved with the granite that they seem to grade into each other.

24955 Specimen from same ledge, where it

S. 32

T. 48

R. 28

N 1/2

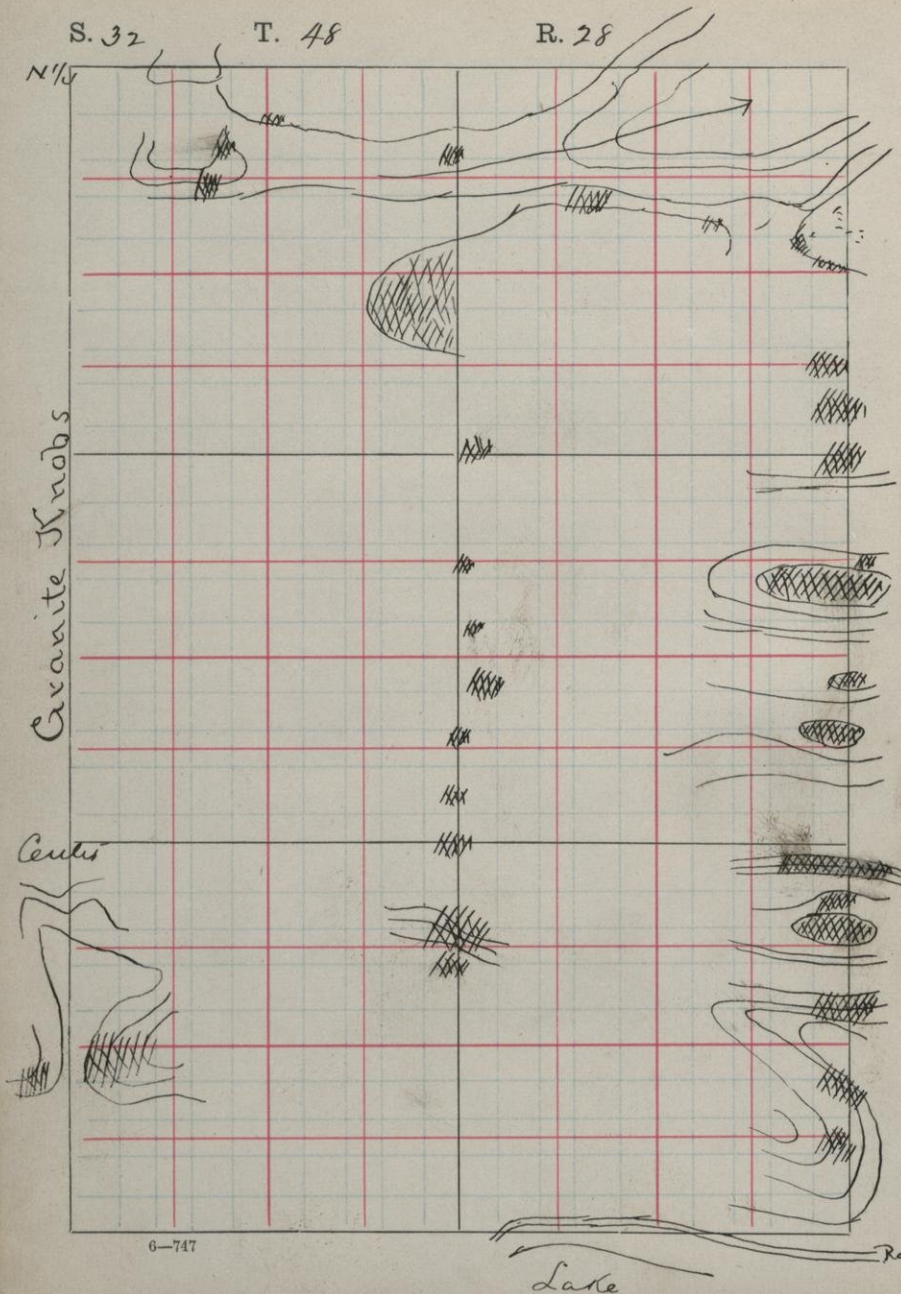
Granite Knobs

Creek

6-747

Lake

Road



is more Schistose? and thus resembles
more closely the Cascade Schisto?

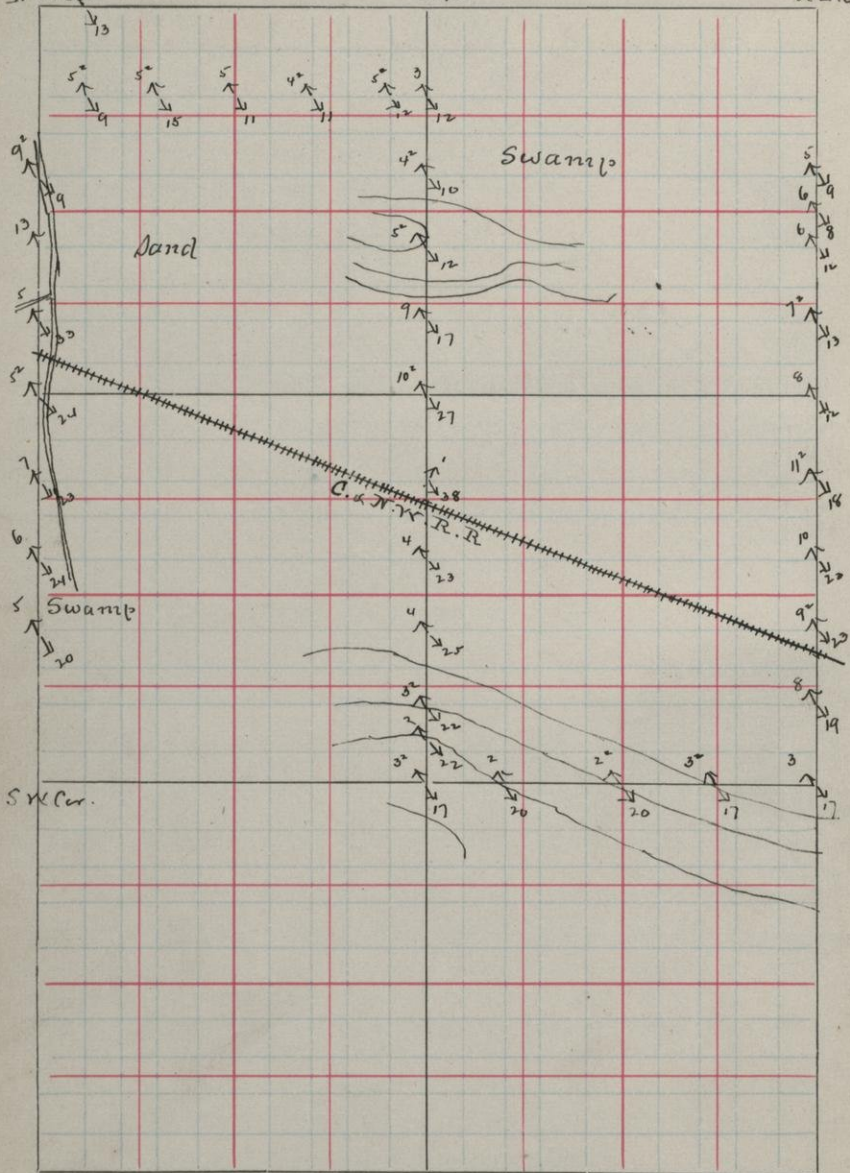
The N.E. $\frac{1}{4}$ Sec 32-48-28 - is practically
all granite? sometimes massive
at other times Schistose

S. 4th 31

T. 48

N. 1/2 R. 28

NE 1/4



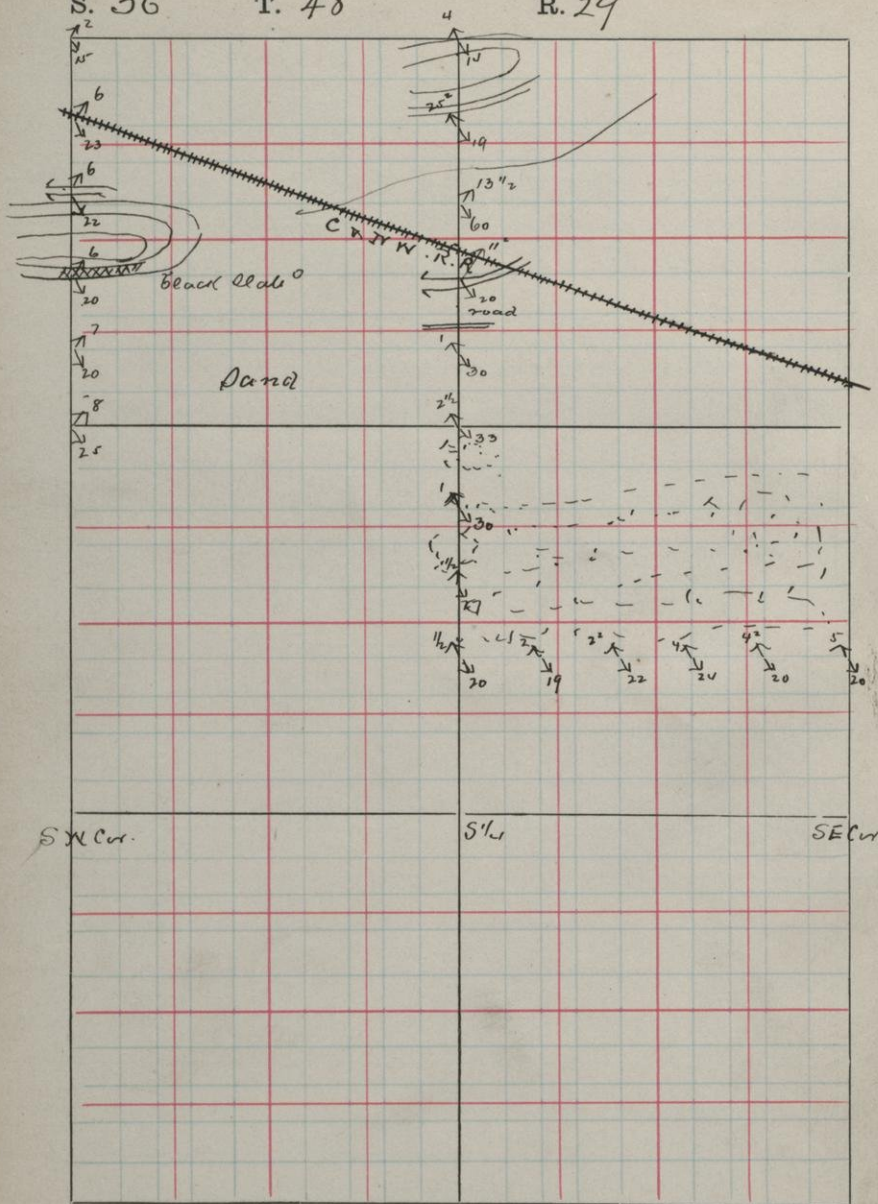
No rocks were seen in Sec 31-48-28.

The variations are all strong to the west and dips quite heavy. There seems to be no well defined line, but the whole country seems to contain by an attracting bed.

S. 36

T. 48

R. 29

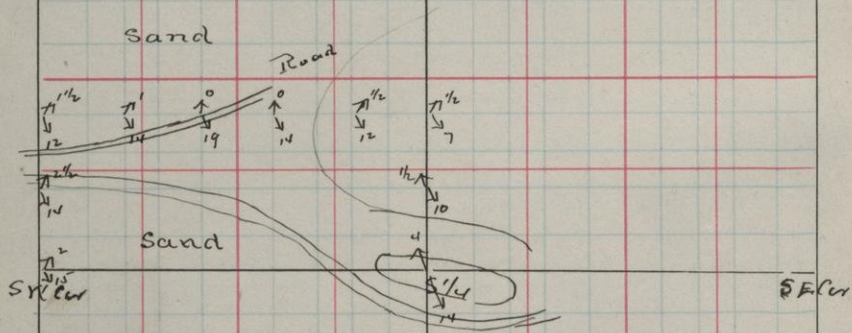


The only rocks seen in Sec 36-48-29
are black slates on the South side of
a little hill. The iron formation ap-
parently runs north of them.

S. 25

T. 48

R. 29

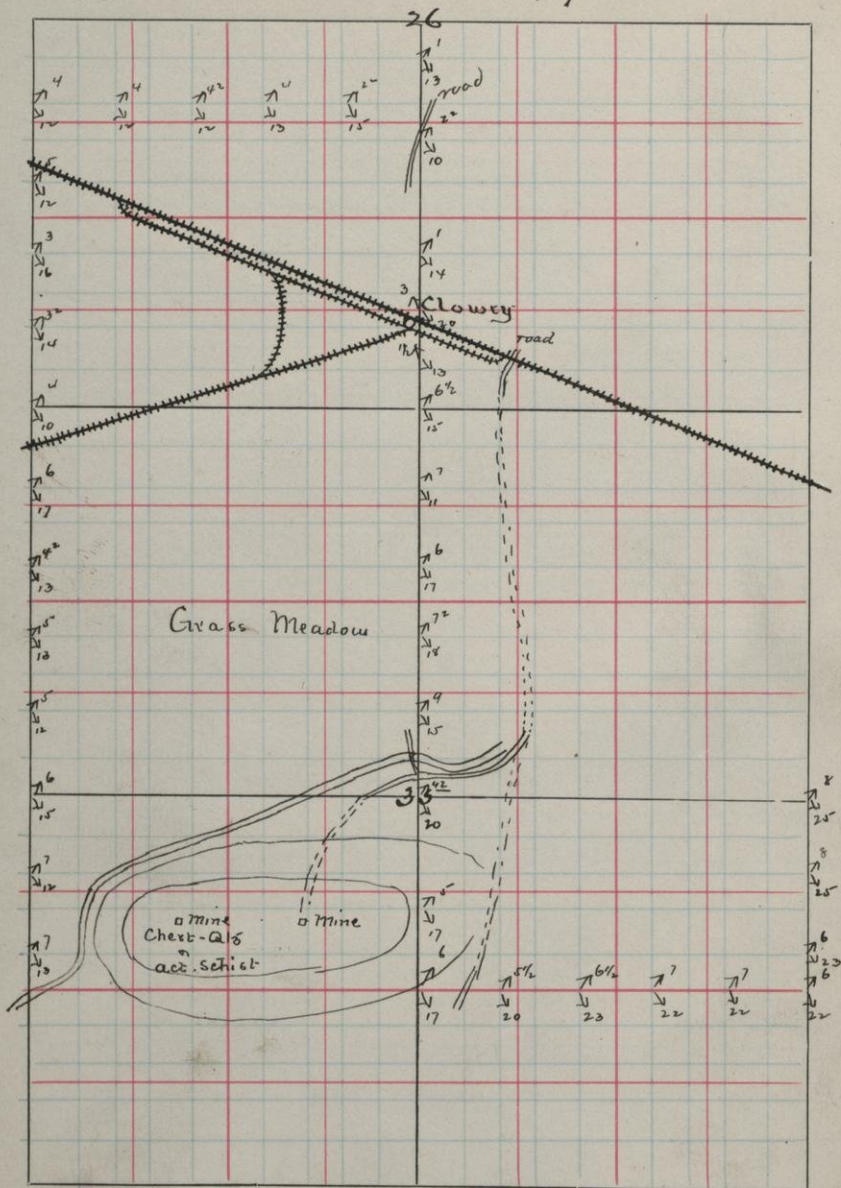


Nothing of note in Dec 25 - 48 - 29.

26
S. 35

T. 48

R. 29



The variation at Cherry is probably due to the presence of the large iron water-tank.

24956

In the S.W. of Sec 35-48-29 are two series mines, in an area colored for the slate formation in the general map. On the dump heap of the western mine we find

Chert^s, ore, quartzite^s and what looks like actinolite^s schist.

24957 Ore bearing chert

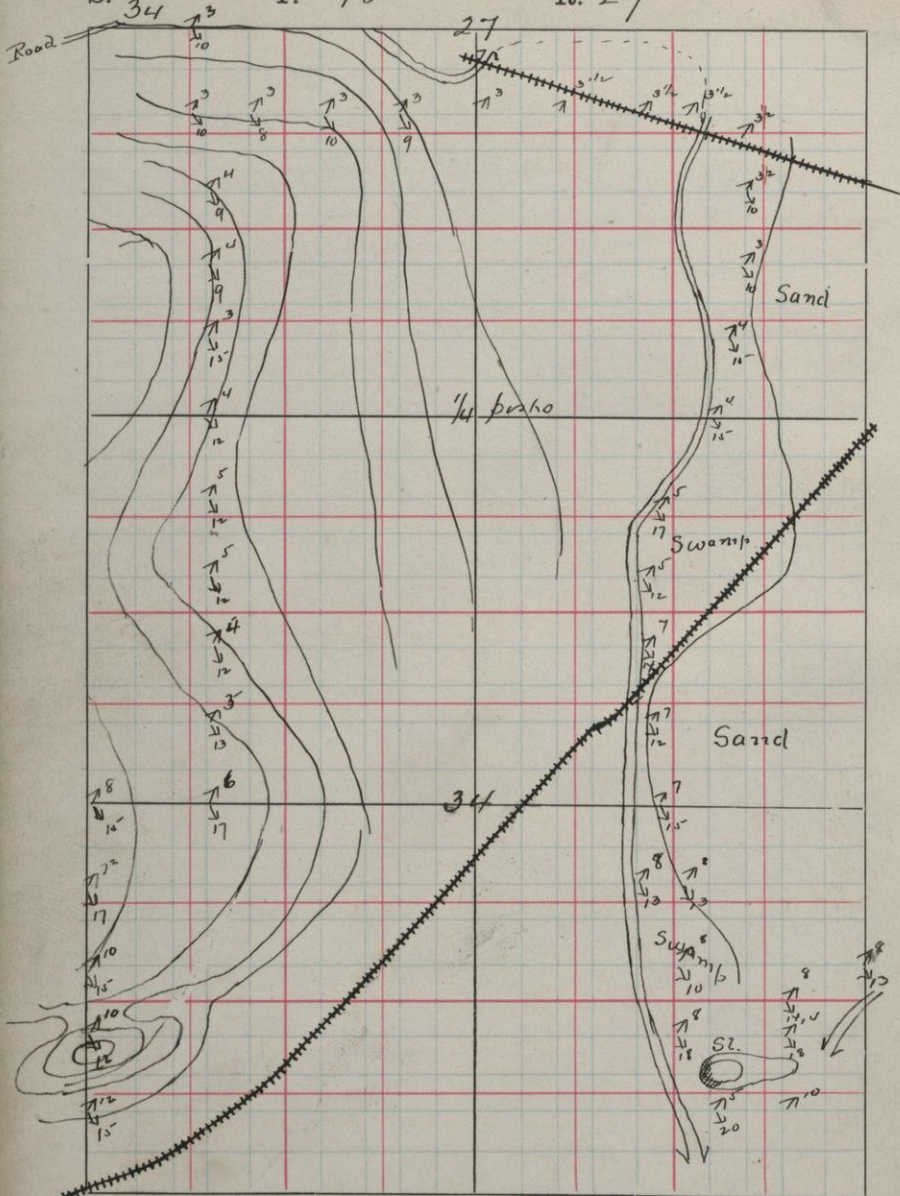
24958 Actinolite^s schist

It seems to me this is of importance, especially when taken together with mines further west, as indicating a belt of iron formation running through area marked 'slate'.

S. 27
34

T. 48

R. 29



R.R. 6-747
100 paces 100 feet b.

In the S. East $\frac{1}{4}$ Sec 34-48-29 is a
small hill on whose west side are
ledges of black slate. No other rocks
were seen in the Section.

S. $\frac{28}{33}$

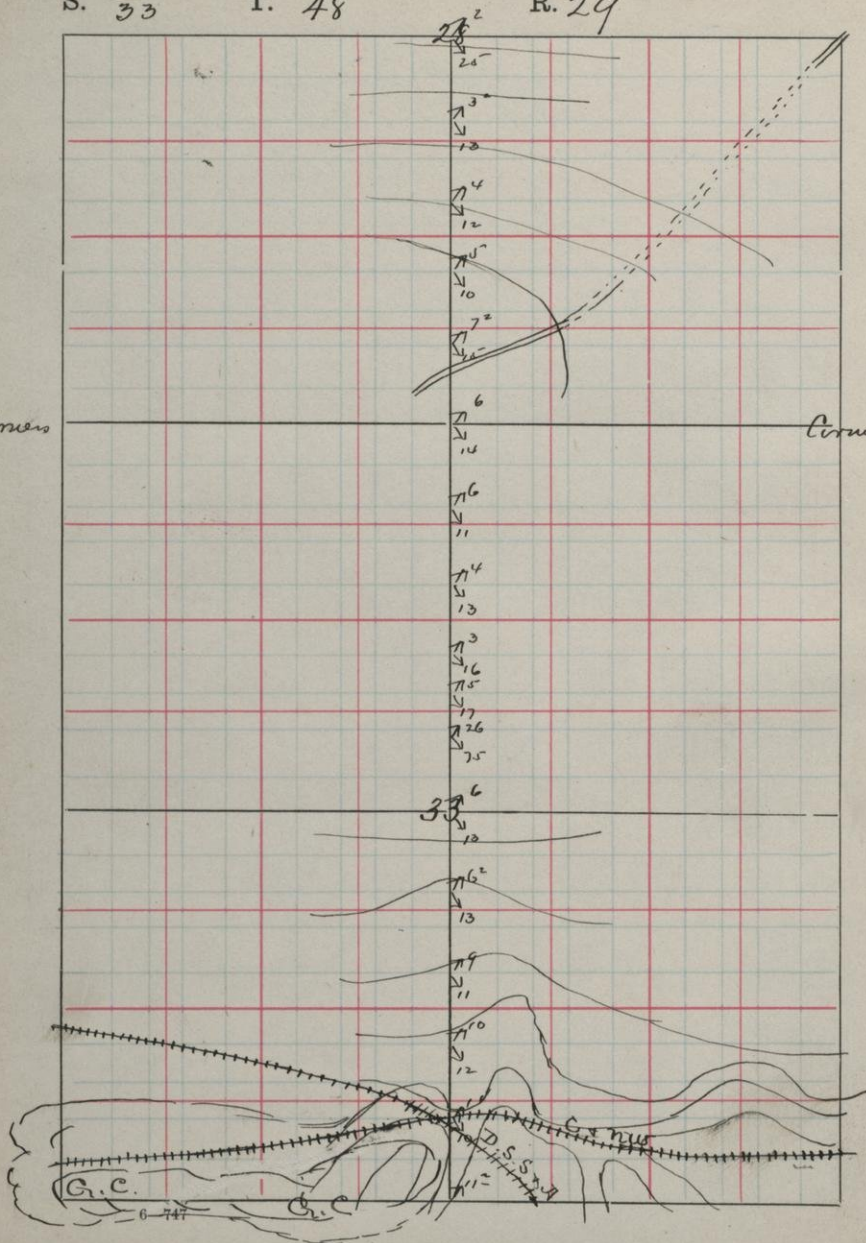
T. 48

R. 29

R

Canus

Canus



D¹/₂ Sec 28 and are of Sec 33 in T¹
48 R 29 so far as was seen in
the run through U.S. Center lines,
are bare of ledges. Sand lies around.

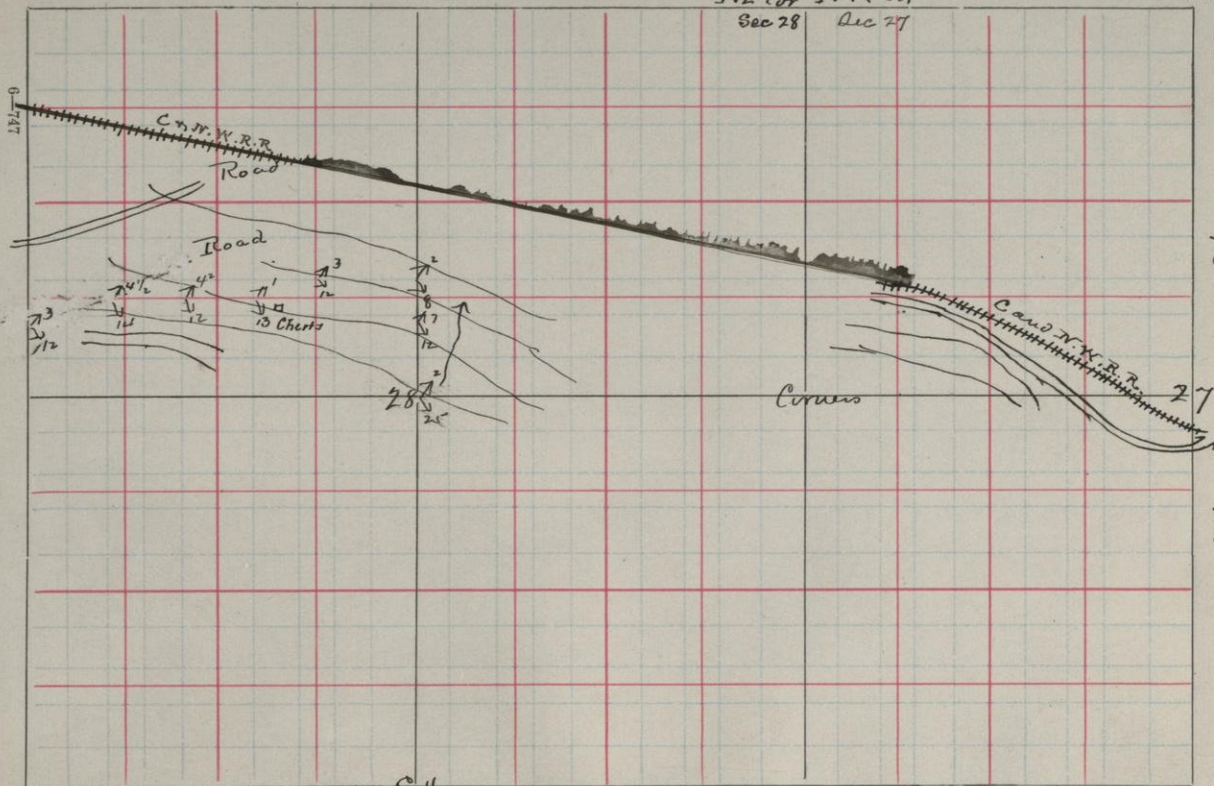
N 1/4

NE Cor NW Cor
Sec 28 Dec 27

N 27/28

T. 48

R. 29



In the NW 1/4 Sec 28-48-29 is a
small pit in whose dump heap are
cherts. No other rocks seen.

S. 29
NE

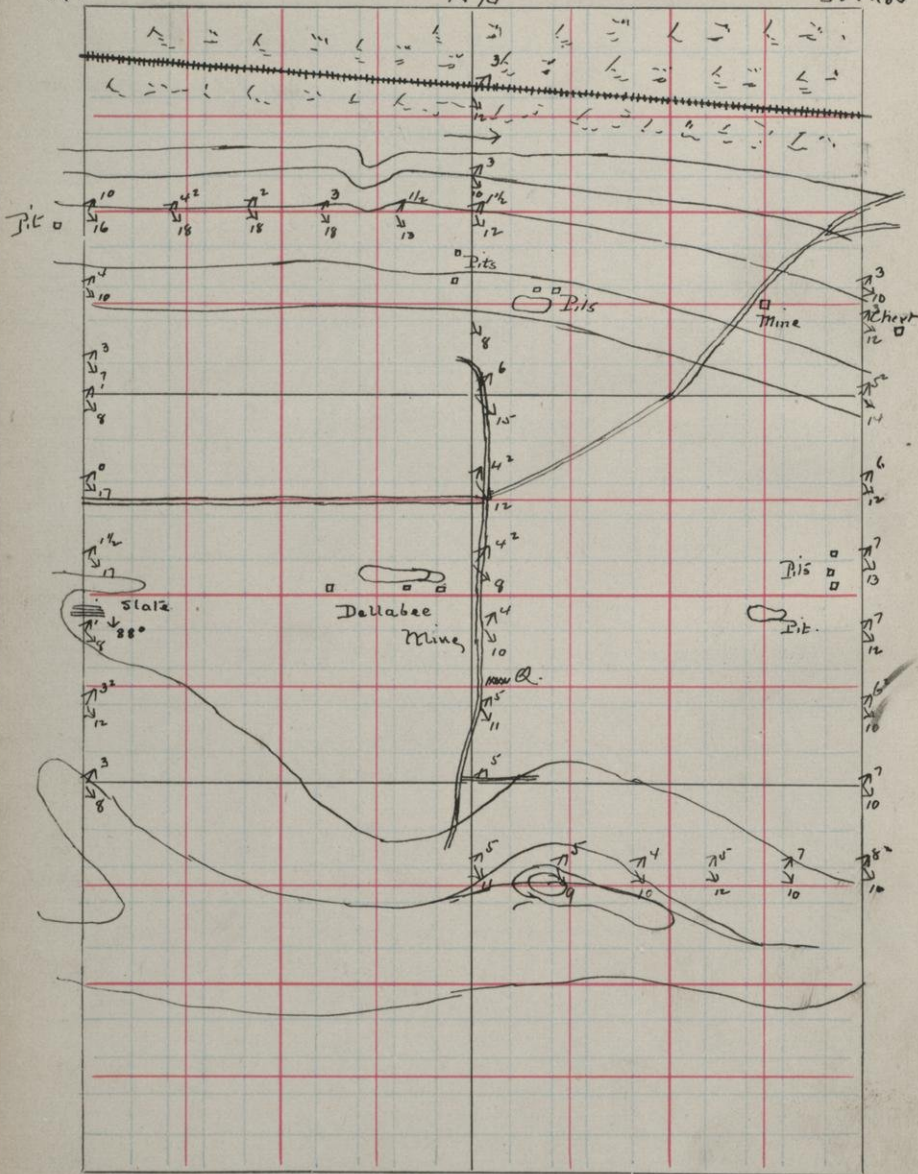
T. 48

R. 29

 $\sqrt{E}$

N 7/4

Итого



The pits and mounds scattered over
 Sec 29-48-29 indicate the presence
 of ore. Chert and poor iron ore are
 found in the dump heaps, and what
 seems like a black slate occasionally
 though not commonly.

The Dellabee Mines produced some
 new ore.

Revisited at 1000 W. 250 N of S.E. Cor of
 Sec 29

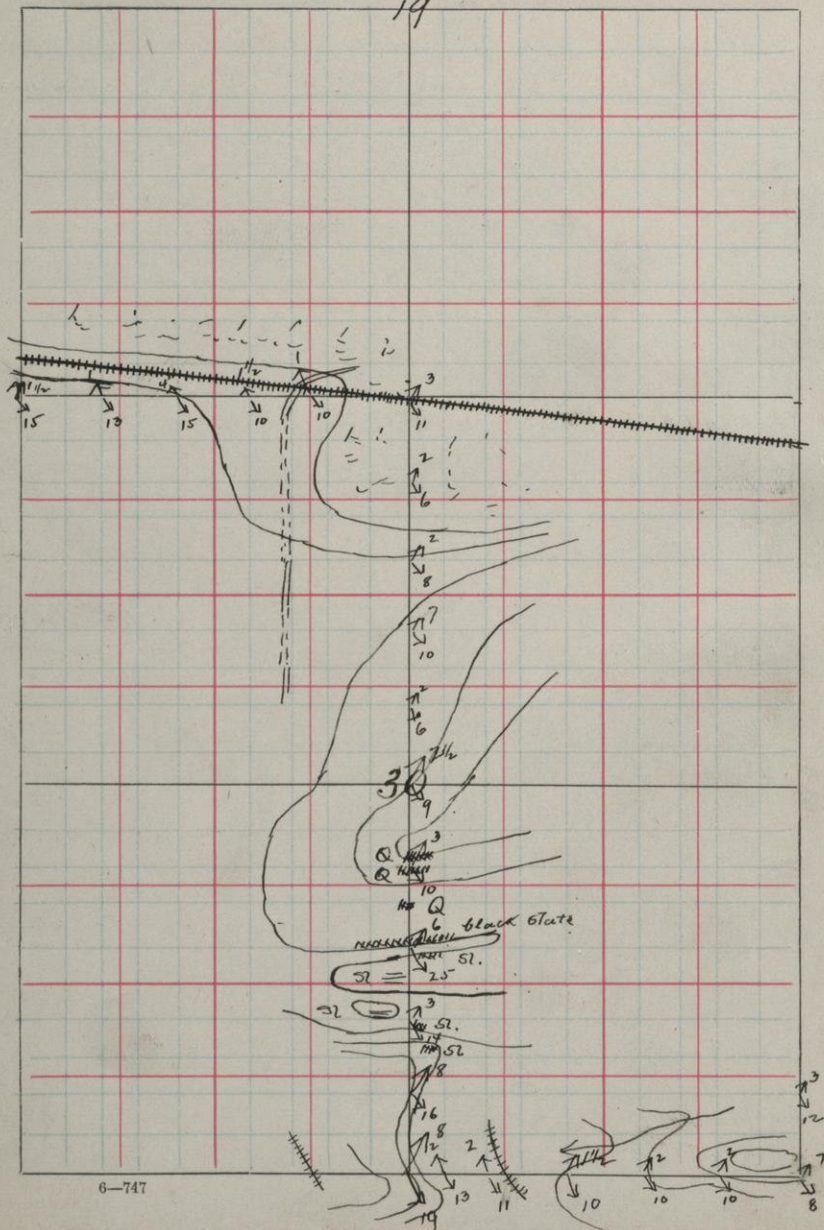
and black slate dipping 88° S. at
 2000 W. 450 N of S.E. Cor same section
 are the only ledges observed.

S. 30

T. 48

R. 29

19



Quartzites and black slates are the
only rocks noticed in runs through
Sec. 30 - 48 - 29.

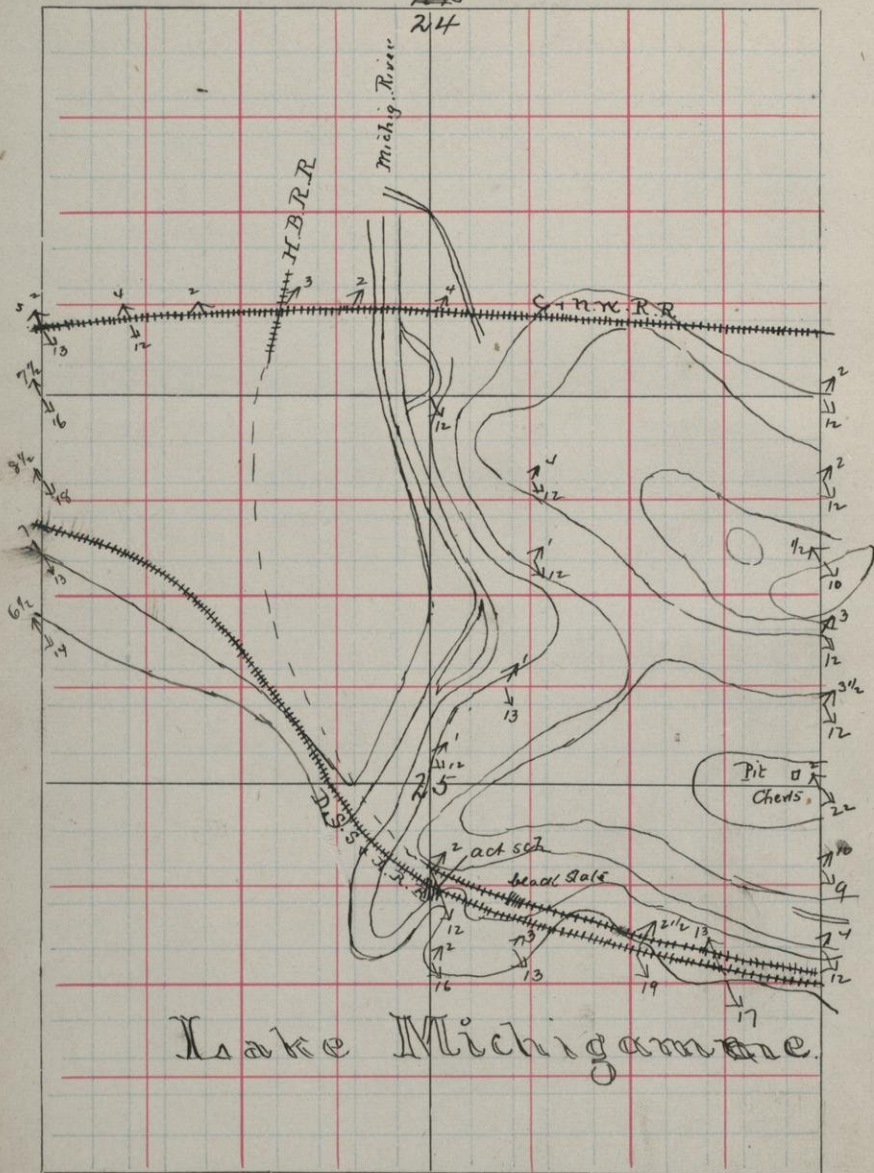
The slates are often ferruginous

They have all been located before so
made no attempt to locate them ac-
curately - nor to locate other ledges
than those directly on the 'run'.

S. 25

T. 48

R. 30

24
24

The rocks in Sec 25-48-30 are limited in their outcrops to the southern portion of the section, near Lake Michigan.

Near the E. N. part of the section is a pit showing chert?

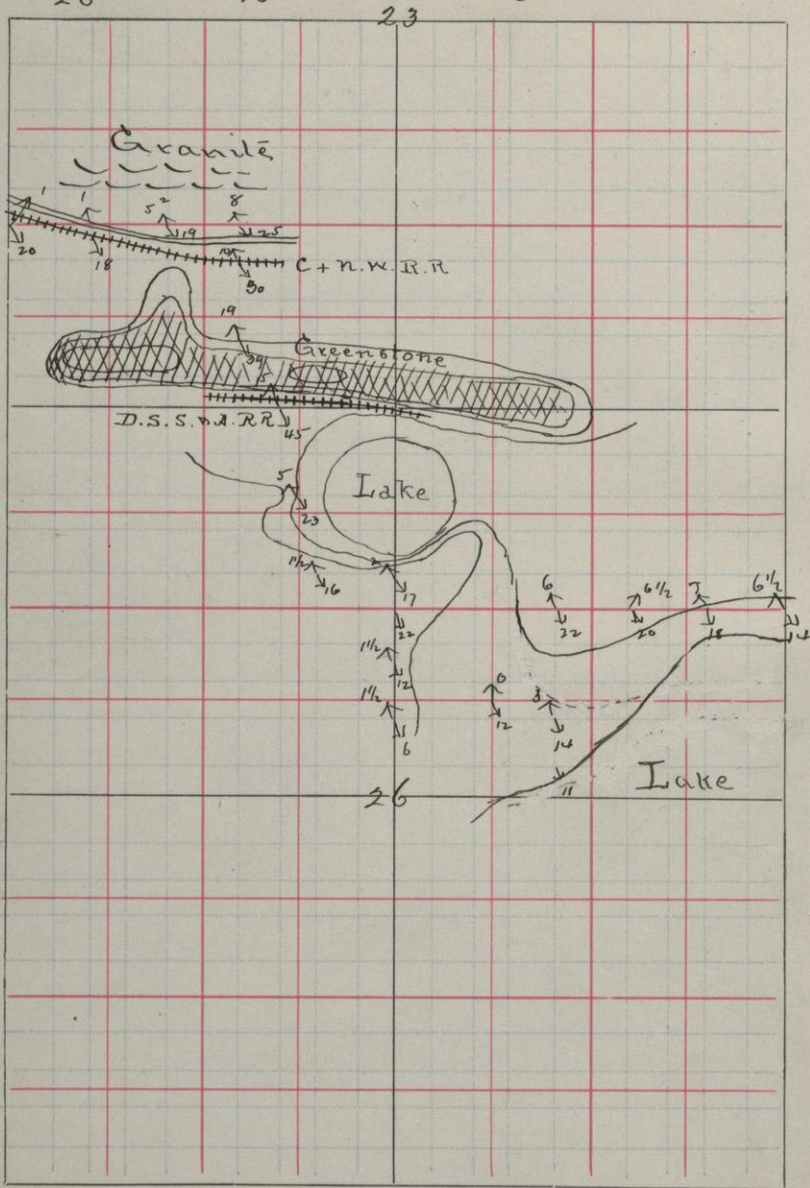
Along the rail road track are slaty rocks sometimes looking like typical black slates and at other times like actinolite? schists? Moreover here we see high dips and large variations in places, as though the slates were magnetic.

It seems to me again here that either the black slates are ore bearing - i.e. there is an ore horizon in the black slates, or that we have here a belt of Lower Huronian.

S. 23
26

T. 48

R. 30



D.S.S. & A.R.R.

Lake

Lake

26

The kind of greenstone near Sth post.
 Sec 23-48-30 is composed of a coarse
 dense mottled rock, that is evidently
 highly magnetic

24959 S. side of river - Coarse greenstone.

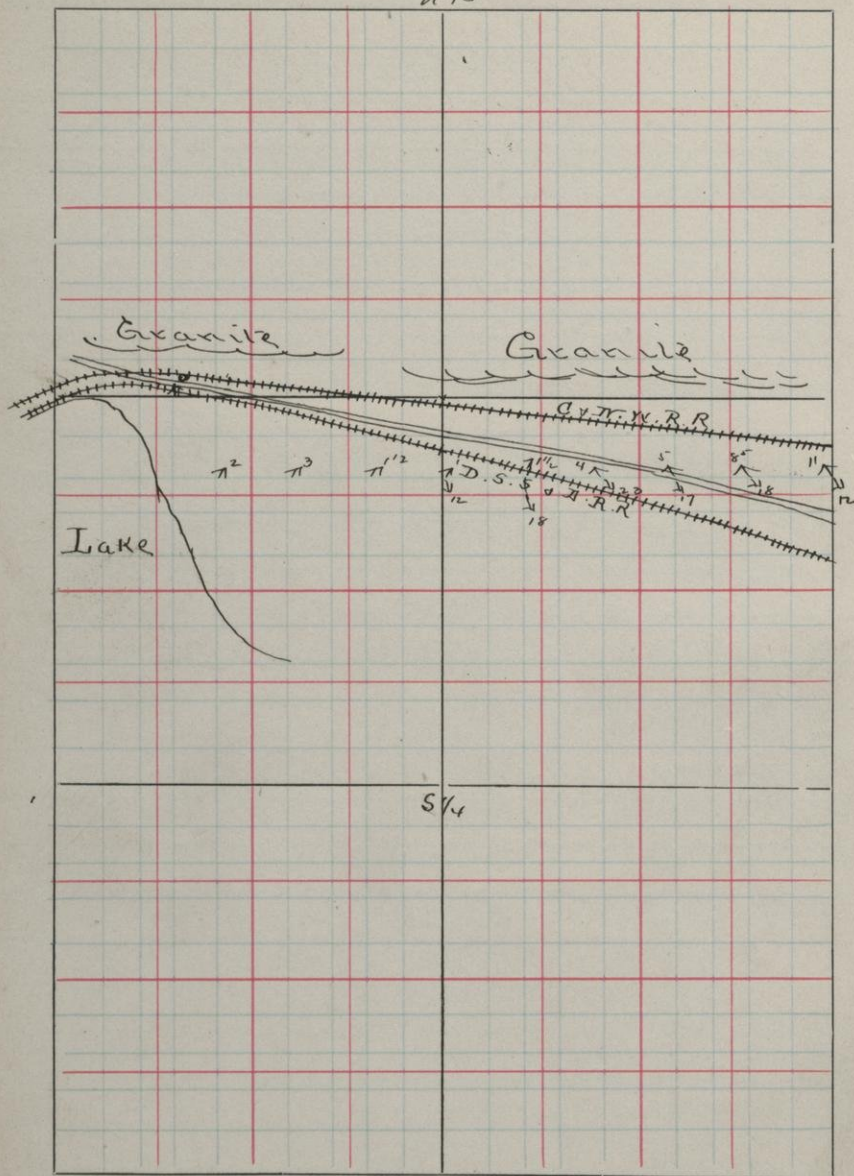
Quartzite on the railroad just south
of the center of the section and again
a small ledge 300 paces further west
are the only ledges noticed in the
run.

S. 21

T. 48

21/4

R. 30



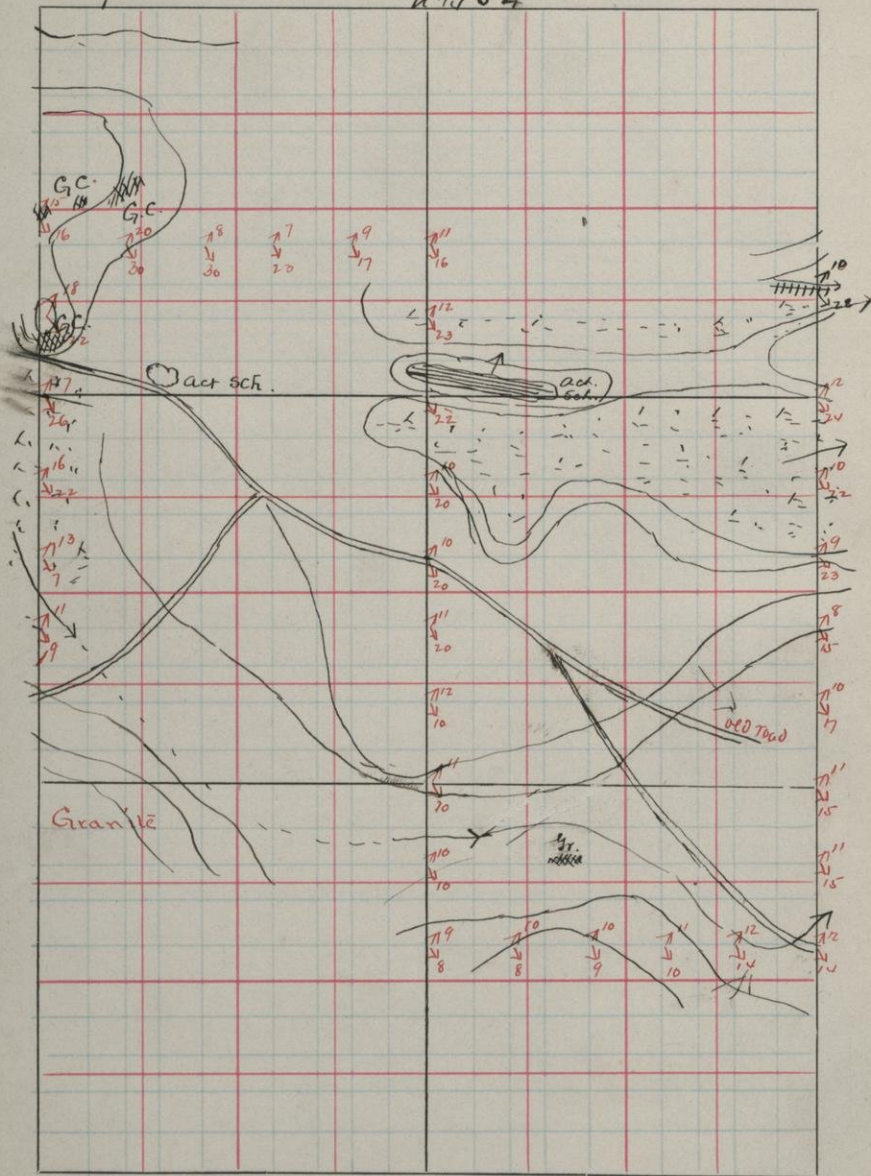
Nothing of note in Dec 21-28-30
so far as was observed from mag-
netic line, as now.

S. $\frac{4}{9}$

T. 47

R. 29
22/4 54

2014 54



The noticeable features of the Sec.-row
studied are

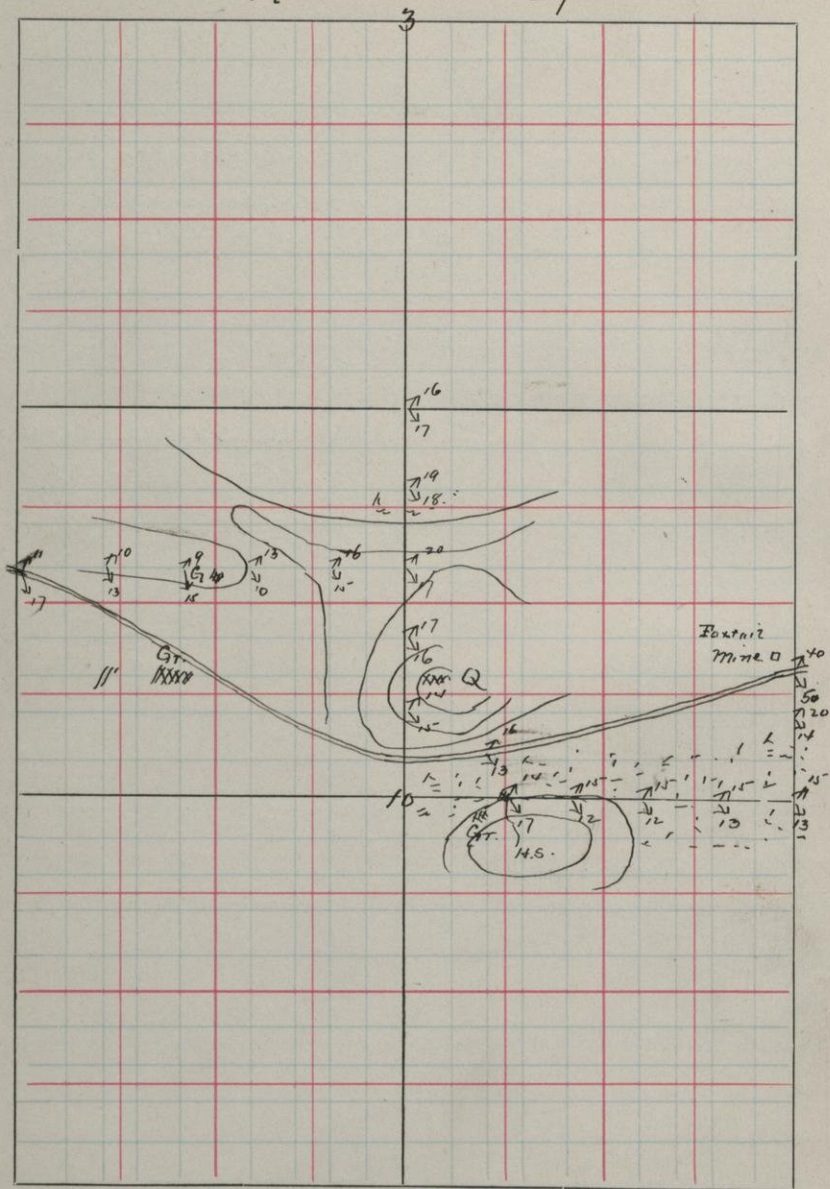
1st The occurrence of Greenstone
glomerals of the Clarksburg forma-
tion near the W. 1/2 post of Sec 4 and
northward from this point along the
line - and

2nd The occurrence of genuine actino-
lite schists forming a long narrow
ridge near the center of the decline. The
rock is well exposed. It is the typical
actinolite schist - more or less con-
torted, but with a general strike of a
few degrees S. of E. and a dip to the NE.

S. 10

T. 47

R. 29



The $U \frac{1}{2}$ of Dec 10 $\Pi 48 R 29$

contains ledges of

Greenstone at 1600 U . 1500 W of S.E. Cr

Granite " 1300 U . 1600 " " " "

" " 950 U . 800 " " " "

Hornblende Schist 1000 U . 750 " " " "

Quartzite at 1300 U . 950 " " " "

Fortune mine " 1350 U . 50 " " " "

This mine's ore is largely magnetite?

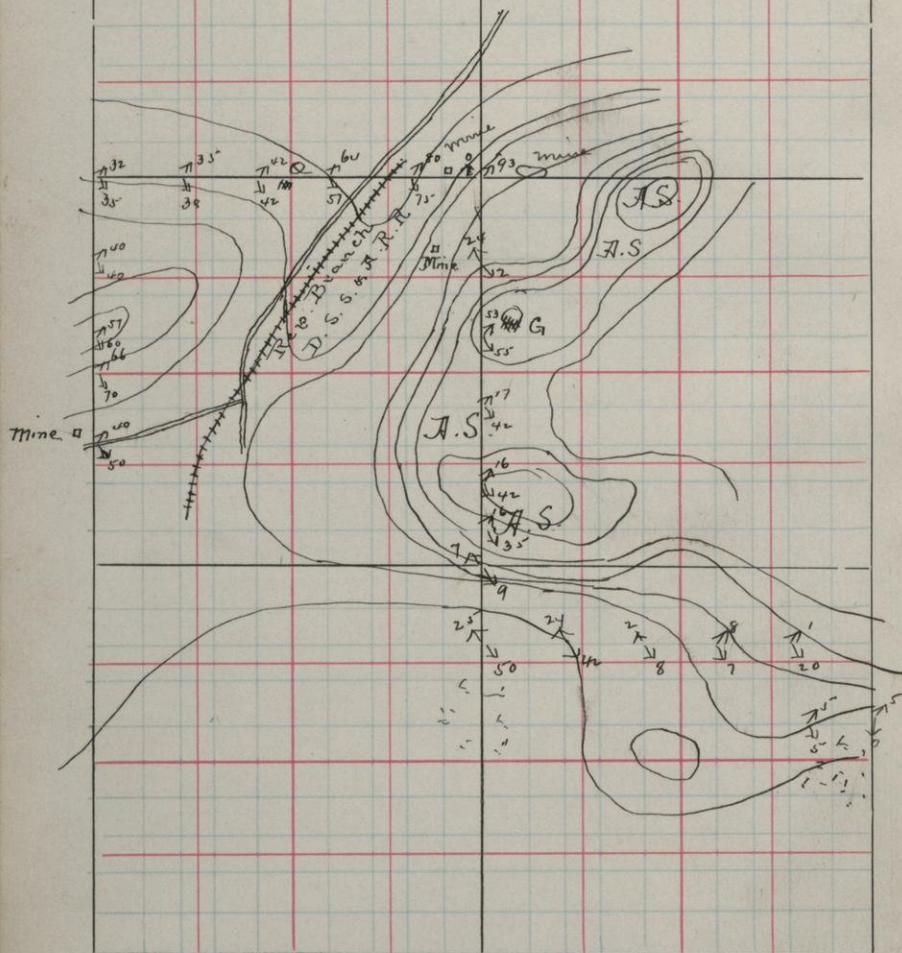
S. $\frac{2}{11}$

T. 47

R. 29

N $\frac{1}{4}$

2

E $\frac{1}{4}$ 

S.W. Cor.

6-747

S $\frac{1}{4}$

S.E. Cor.

In Sec 11 - 47-29 there are many Exposures but they are limited to three kinds of rocks.

Diorite occurs in small Exposures at 2000 N. 1500 W. J.S.E. Cor Sec 11

Greenstone cuts the Actinolite Schist in Twp. Humboldt, at 1650 N. 950 W.

All the rest of Twp. Humboldt is composed of Actinolite Schist, except at a few places where it is cut by greenstone dykes. These are fine grained and schistose. Garnets are abundant in them at their contacts with the Schist, and in these latter rocks have likewise been developed small red garnets.

- 24960 Actinolite Schist from S. side of Humboldt Twp. in S.E. 1/4 Sec 11.
Shows siliceous phase of Actinolite Schist.

S. 12

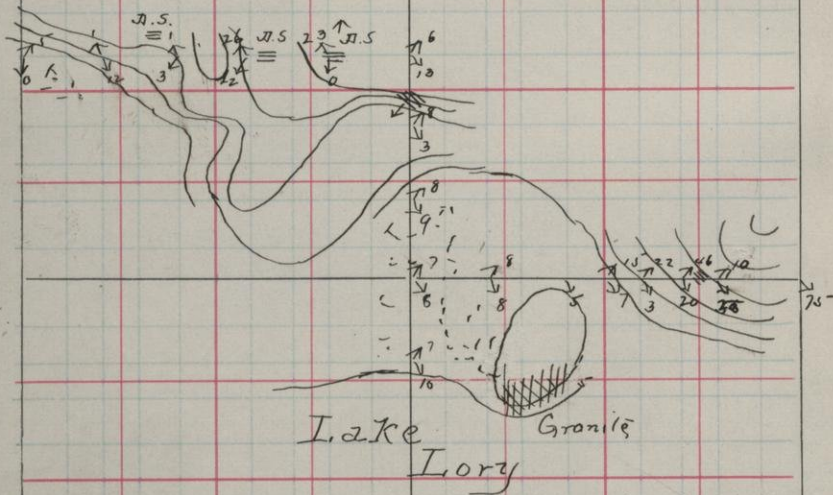
T. 47

R. 29

R. 29

W 1/2

12



In Sec 12 T 47 R 29 no rocks
were seen but granite & gneiss
and actinolite & schists.

The granite is on the North side
of Lake Lory. at 1750 N. 600-750 W of
S.E. cor of Sec 13.

Actinolite & schist layers are quite num-
erous. Some of these were located as
follows -

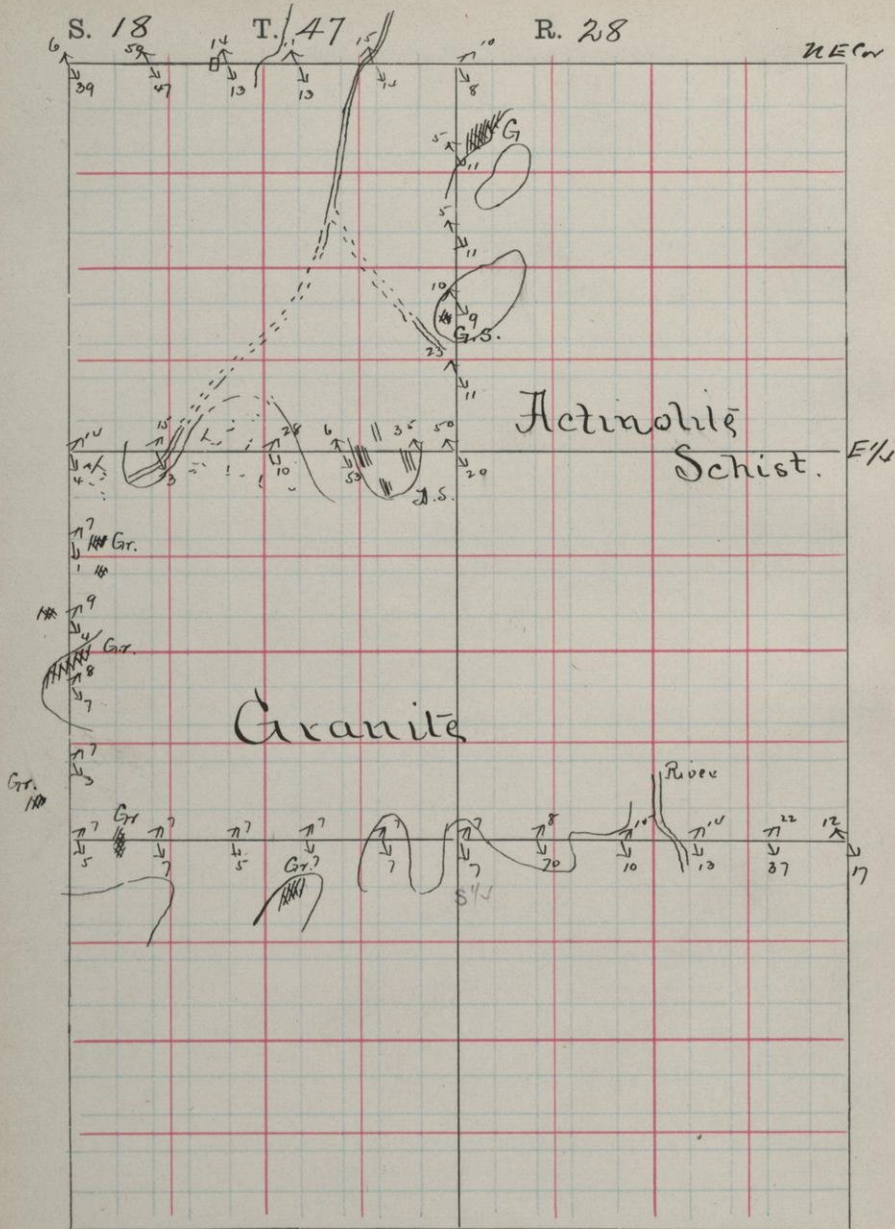
650 N.	1650 W.	of SE cor Sec 12	
600 N.	1350 W.	"	"
600 N.	1200 W.	"	" Sep. 21.
480 N.	1000 W.	"	" Sep. 1. W.
0 N.	250 W.	"	" "

S. 18

T. 47

R. 28

NECN



Sec 18 T47 R. 28.

Greenstone knots in northern half.

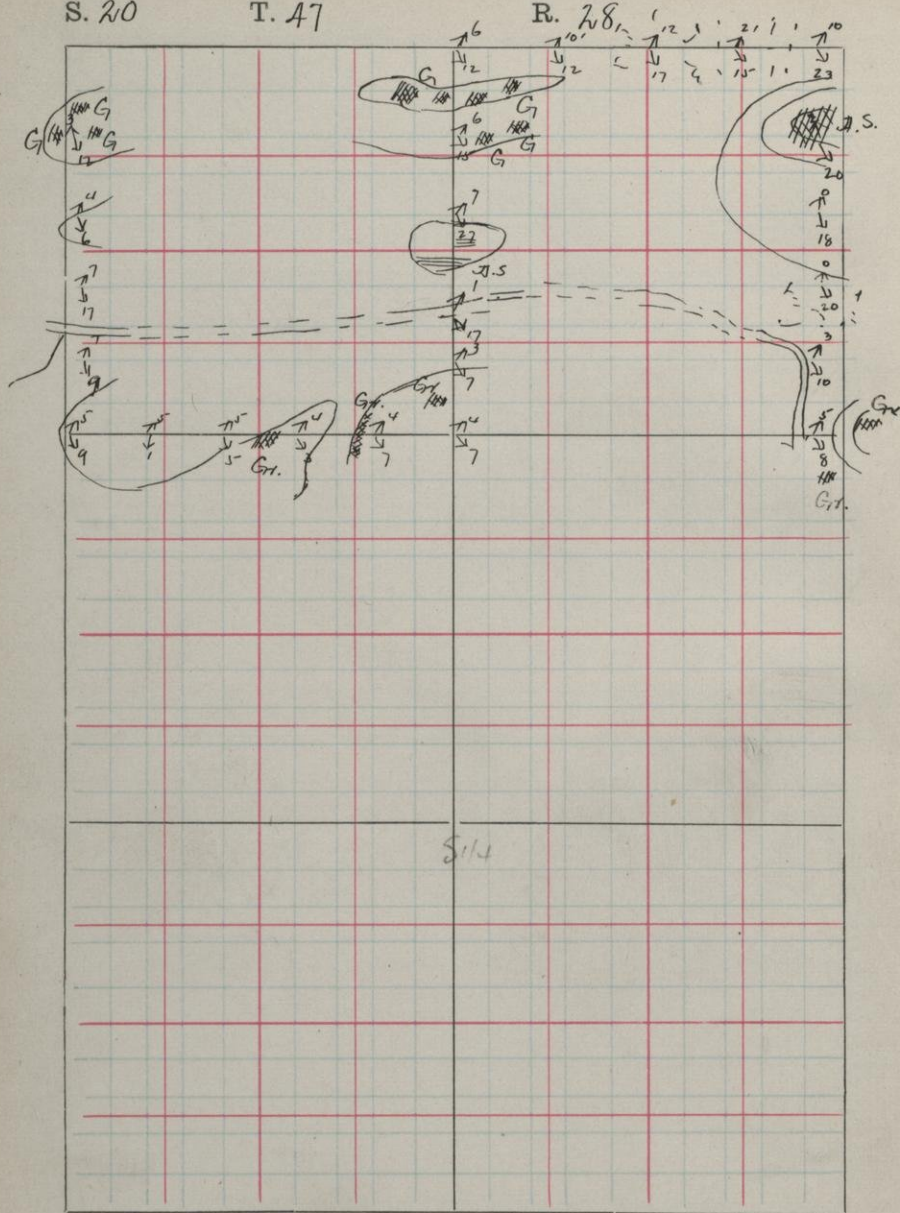
Actinolite Schist near center

Granite in southern portion

S. 20

T. 47

R. 28.



Sec 20 - 47 - 28

Greenstone Knots North

Actinolite Schist at

1500 N. 1000 W J.S.E. Co.

and

1800 N. 60 W " ...

Granite at

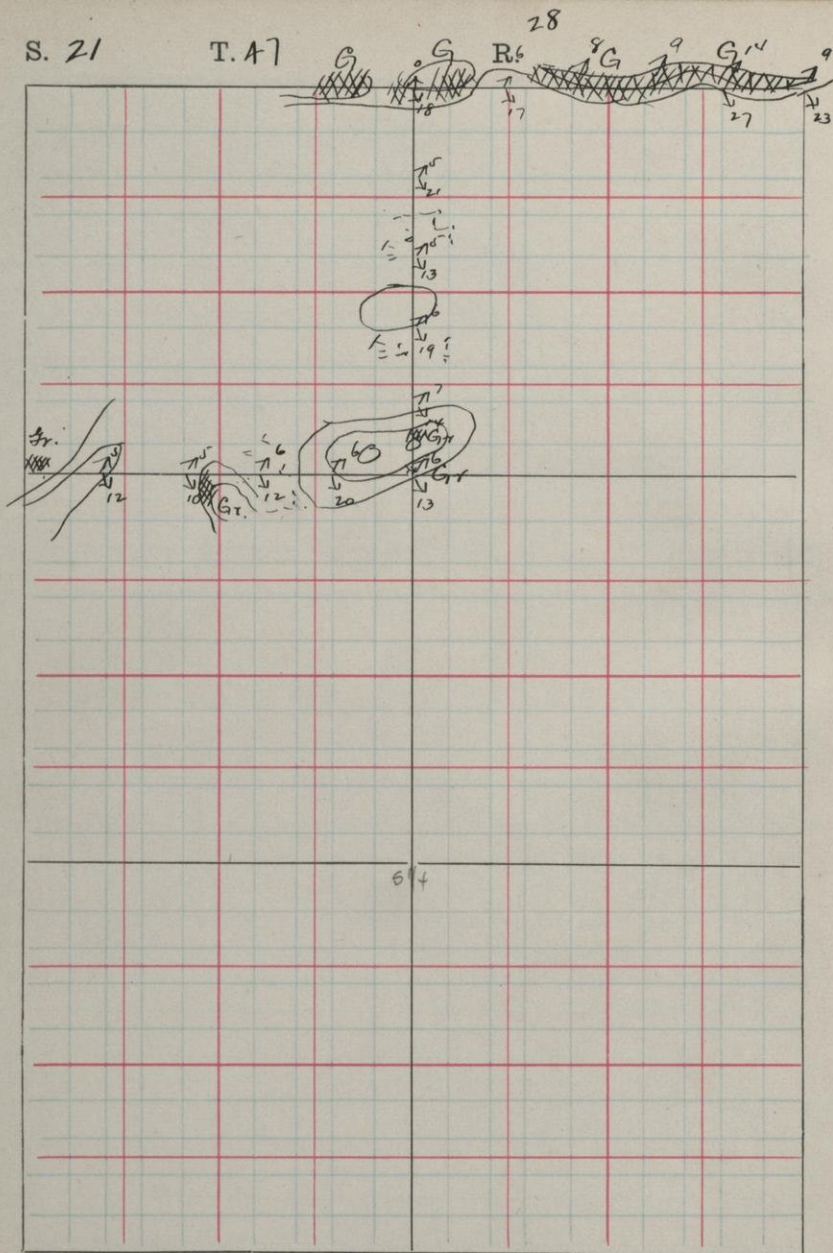
1000 N. 1500 W

1000 N 1000 - 1250 W.

1000 N. 0 W.

S. 21

T. 47



In Sec 21 T 47 R 28

Large greenstone hill running for
a mile East on N. line of Section

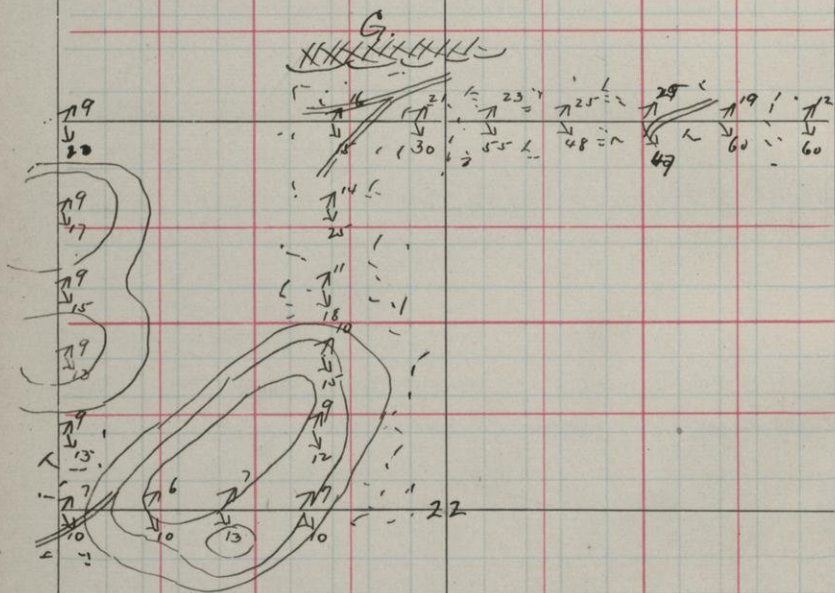
Rest of rock seen, along Etc.

Center line of Sec is granite?

S. 22

T. 47

R. 28

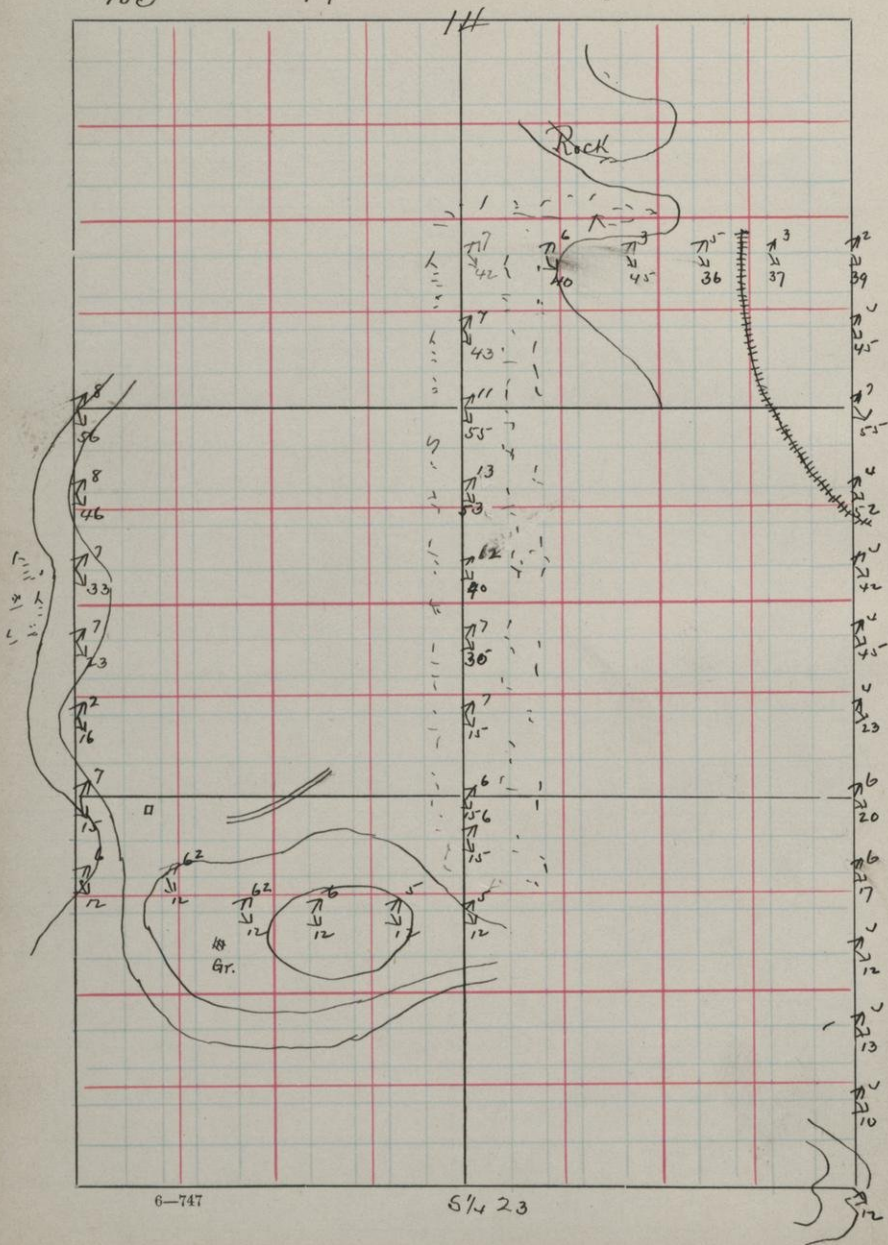


In Section 22 T. 47 R. 28 no
rocks were seen until reached
the North line, where a few hun-
dred paces N. is the Eastern
Continuation of the great green-
stone hill.

14
S. 23

T. 47

R. 28

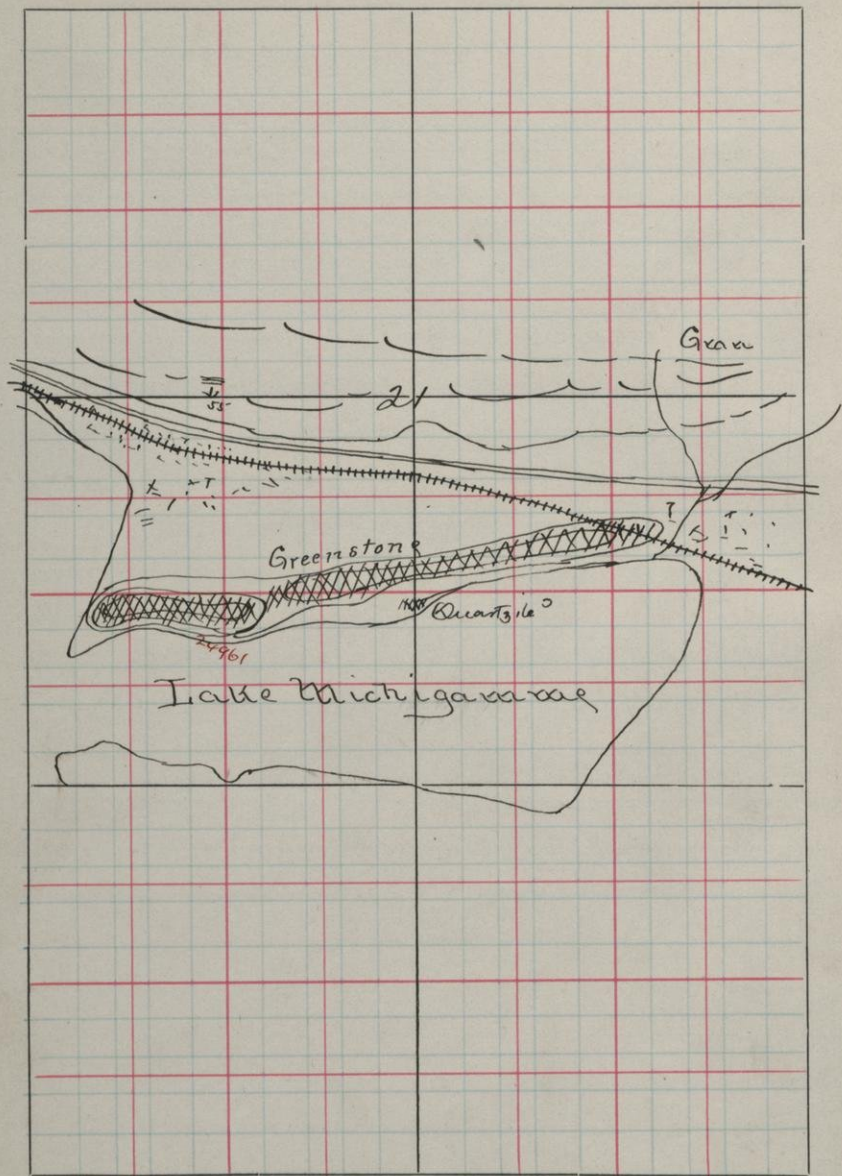


West of Sec 23-44-28 so far as was
seen is Swamp land. A small
ledge of granite was observed at
630 N. 1650 W of S.E. Cor. Sec 23.

S. 21

T. 48

R. 30



Along Road between the
Towns of
Michiganville & Champion.

The great hill on N. side of Lake Michigan in Sec 21 is a coarse amphibole greenstone with large hornblende crystals in a matrix that weathers greenish.

24961 is a schistose phase of the rock, which in places is so completely sheared as to resemble a chlorite schist.

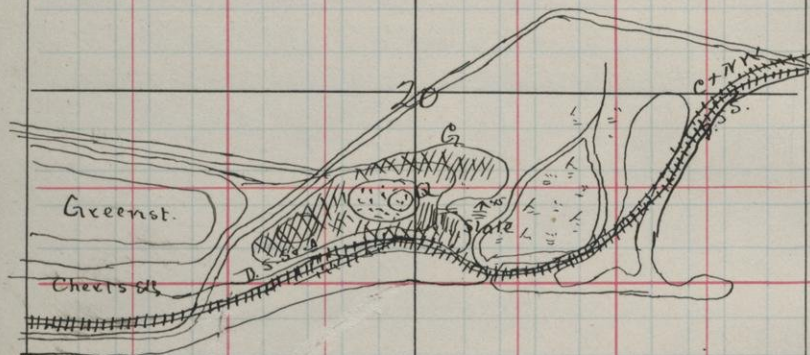
The hills further west, in Sec 20, are composed of fine grained greenstone, often with a diabasic or a porphyritic structure. In places this rock also is sheared to a chlorite schist.

The little knob just west of the road running S. from main road is capped with a deep bedded layer of 50° S. This platy structure is observable only from a distance. This is the only indication of surface phenomena observed within region.

S. 20

T. 48

R. 30



Lake Michigamme.

In Dec 20 T 48-30 - the greenstones
are as indicated on p. 28.

In the midst of the greenstone hills S.
of the center of the section are a few
ledges and a knob of a quartzites
scale.

The greenstones N. of Michigamme
from center of Dec 20 to W. line Dec
19 were carefully examined. They
are all of the usual character.

No evidences of fine structure were
seen, nor were any tuffs met with.

Between Champion and
Fennoldt.

The little group of hills in the S.E. $\frac{1}{4}$ Sec 3. 47-29 are composed mainly of coarse greenstone. On the north side of the hills there is a little bedding - and the rock is finer grained. This then looks like a fine grained greenstone conglomerate.

Pits dug near the greenstone show no rock.

On the north-west side of the Southern hill is a heap of loose fragments of quartzite that look as though they came from a near-by ledge. But could not be sure that such was the case.

The greenstone conglomerate north of the west $\frac{1}{4}$ p. Sec 4-47-29 is very typical for the conglomerate in the vicinity of Champion.

It is well bedded, striking and dipping uniformly over large areas. In places it is interbedded with a light

Colored quartzitic looking rock. The dark tuff is interleaved with the light rock often in thick beds, that are very coarse, and often in narrow fine grained ones. These are more or less faulted so that a surface at first sight presents a very confusing appearance.

In places there appear like fragments of the lighter rock in the tuff - and often what appear like tuff fragments are imbedded in the light rock. The dark rock seems like richer in amorphous material than the light rock - and the latter appears richer in sedimentary matter.

These phenomena look as though the quartzitic rock and the tuff are contemporaneous. If so, and if the quartzite is the same rock as quartzites elsewhere in the region - then the age of the Champion conglomerates is determined.

- 24962 Evenly banded fine grained tuff, from East side of hill near road.
- 24963 Light colored rock interleaved with tuff.

24964

Coarse greenstone pebbles in lighter colored
tuff
rock

24965

Fragmental matrix of 24964.

24963-4-5 are from the hill at the U.W.
Ln of Sec 4. Here the Conglomerate
is hardly developed, especially
at the East end of the hill - where in-
numerable irregular blocks of 24964 are
interbedded in 24965. These are frag-
mentary in many cases, while in
other cases the pebbles or boulders
seem to be thoroughly crystalline.
Massive beds of crystalline greenstone
are interbedded with the fragmental
beds - and the whole has every ap-
pearance of an agglomerate?

24968

On the North side of the hill near the
C & U.W. track the well defined Conglame-
nate is in contact with a slate, resem-
bling an actinolite schist. It is ap-
parently interbedded with the Conglame-
nate.

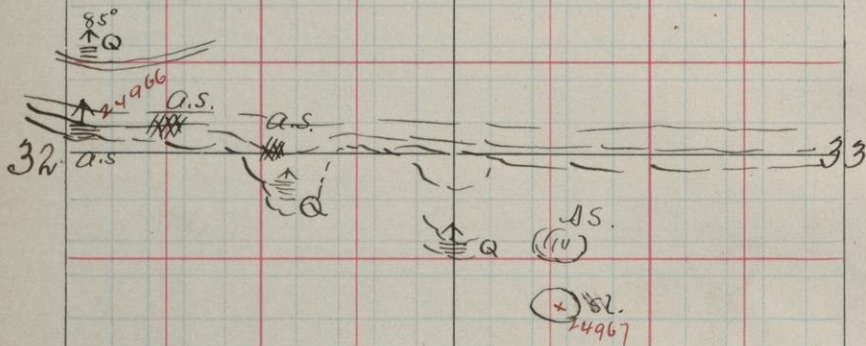
At the west end of the hill, where the
railroad cuts it as it turns south the

S. 32/33

T. 48

Corner R. 29

24



conglomerate is found to the South, and conformable with it in the North is a quartzitic appearing rock in light and dark beds.

24969 is the darker looking fragmental

24970 is the lighter rock.

While quartzitic in appearance these rocks both contain small irregular fragments that would seem to indicate a partial tripaccous character.

North of the R. R. Station at Champion is a range of hills in whose South face, overlooking the track are exposures of rock which have been marked as slates. These upon close examination are seen to be actinolite schists - or at any rate rocks closely resembling act. schists. They strike and dip as indicated by the mercur.

24966 From one of these ledges shows the character of the rock.

24967 Further East is quartzitic and South of this slate (24967) which looks actinolitic.

North of Champion, on R. R. track
leading from town to Lake Michigan
the, is a series of pits dug in a
red quartzite or slate.

To the south, near the main street
of the town the rock is quartzitic, while
further west it is more slaty. A
soft ochraceous material has been obtain-
ed from some of the pits, which the
Champion Iron Co. folks regard as soft
hematite.

24971

Specimen of quartzitic variety from
one of the pits.

Sec 30 of Town 48 R. 29. North of Cham-
pion contains a much greater number
of rock varieties than Merriam's
map would indicate.

At the S 1/2 of Sec. we find on the side
of the hill an exposure of Upper Con-
glomerate. On top of the hill are sev-
eral ledges of a crystalline chert, striking
about E.W. North of these again
is the Upper Conglomerate in sev-
eral exposures, and north of this a
pit containing scales.

Evidently there is at this place
the corner of an anticline, which
brings both the surface members of
the Lower Maquette.

On the general map, a belt marked
showing quartzite passes some-
where about this point. The southern

limit of this belt should be at a-
bout 50 paces S. of S. 1/2 Sec 30, and the belt should not be
more than 300 paces wide (200)
Though its center should pass a
narrow belt of the iron formation.

Near the northern portion of the
S 1/2 Sec 30, near the center are
Exposures and pits that are dif-
ficult of interpretation if we are
not to consider the presence of an
iron formation in the upper Slates.
There is unquestionably one in the
drum tops of these pits, and there
are no rocks that are surely from
the lower Marquette. Moreover
in the slates are bands of cherty
slate in which the cherts are very
much like the cherts of the soft iron
formation.

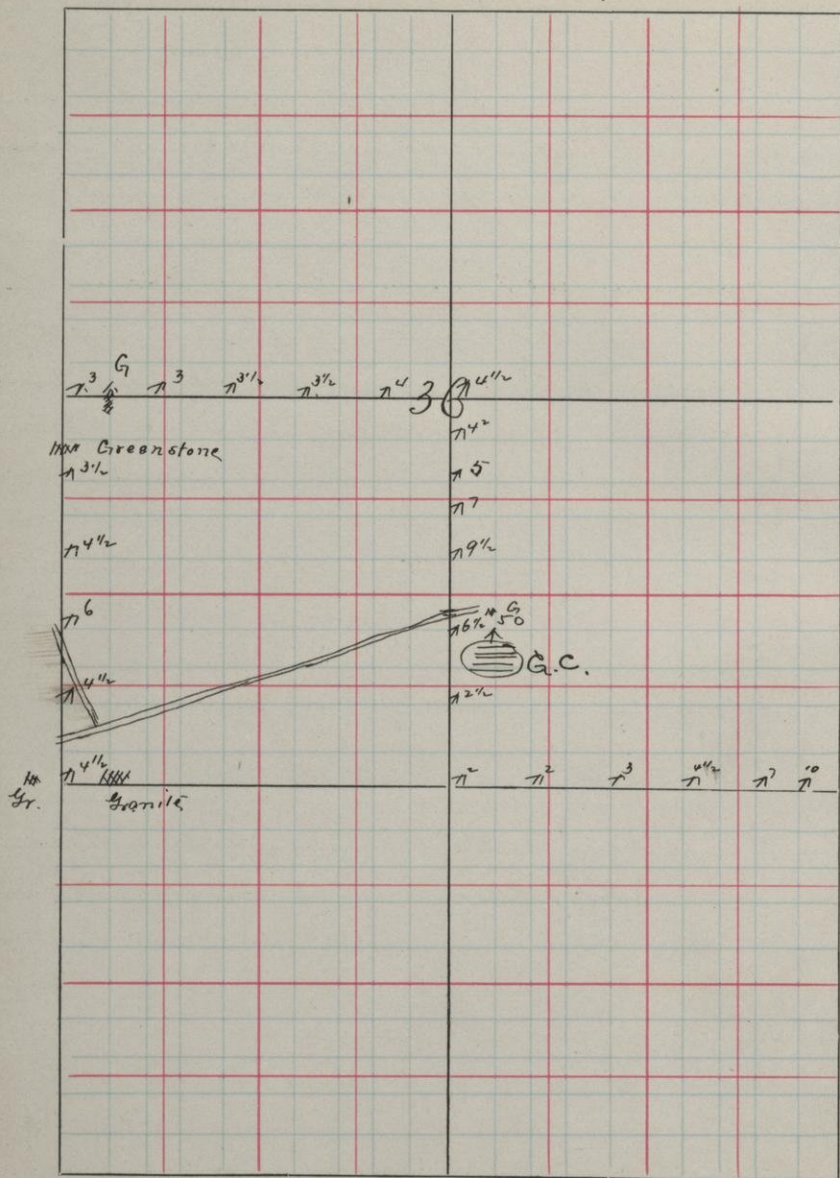
To the East of the center of the section,
for instance is an open pit and in
it near the face of the pits are cherts,
while in a cut north of the pit are
black slates. It seems necessary

to regard the Cherts as a portion of the
slate formation, or else to look upon
them as a part of the iron formation
raised by anticlinal folding. In
the latter case we should expect
to find conglomerates and quartzites
between the Cherts and the slates.

S. 36

T. 47

R. 29



The last shaft of the Champion Iron Co. is very near the E line of Sec 36 T47 R29 - west of this line it was thought to find the extension of the belt.

Two lines N-S across the northern half of the Sec. were made, but results were not definite. It is true that there was a line of greater variation across the lower portion of the Section, but it seemed to be very near a greenstone conglomerate outcrop, and north of it at the point where this outcrop was seen.

Elsewhere the greenstone conglomerate is not of iron formation.

Assumes seen give no aid in determining the presence or absence of the iron formation in this Section -

Greenstone Conglomerate at 900 W. 400 N.,
Greenstone (Diabase) at 1900 W. 1900 N.
and Granite near the S.W. Cor of the Section were all the rocks observed. There are other ledges within the Section (see Hermann's map) and these

might be looked into. Specimens
are in Uadim - these are - 16752,
16753, 16754, 16755, 16756,

Two trips were made into the granite^d are South of Lake Michigan. The object of which was to examine the Granite^d, mica and hornblende schists that look under the microscope to be so fragmental.

The first trip was South along the center line of Sec 35-48-29 to the ridge of hills just north of the S. line of the section, then west to the section line and north to the lake.

The second trip began at the S. line of Sec 4-147 R. 30. Went East to road on this line, then north half a mile and west to lake.

Since the rocks on both trips were the same they may be discussed together.

Mica schists^d and hornblende schists^d are cut by granite dykes and veins that extend from large knobs of this rock. The granite^d is coarse grained and light in color like the common granite^d in the region.

The hornblende schists are very schistose

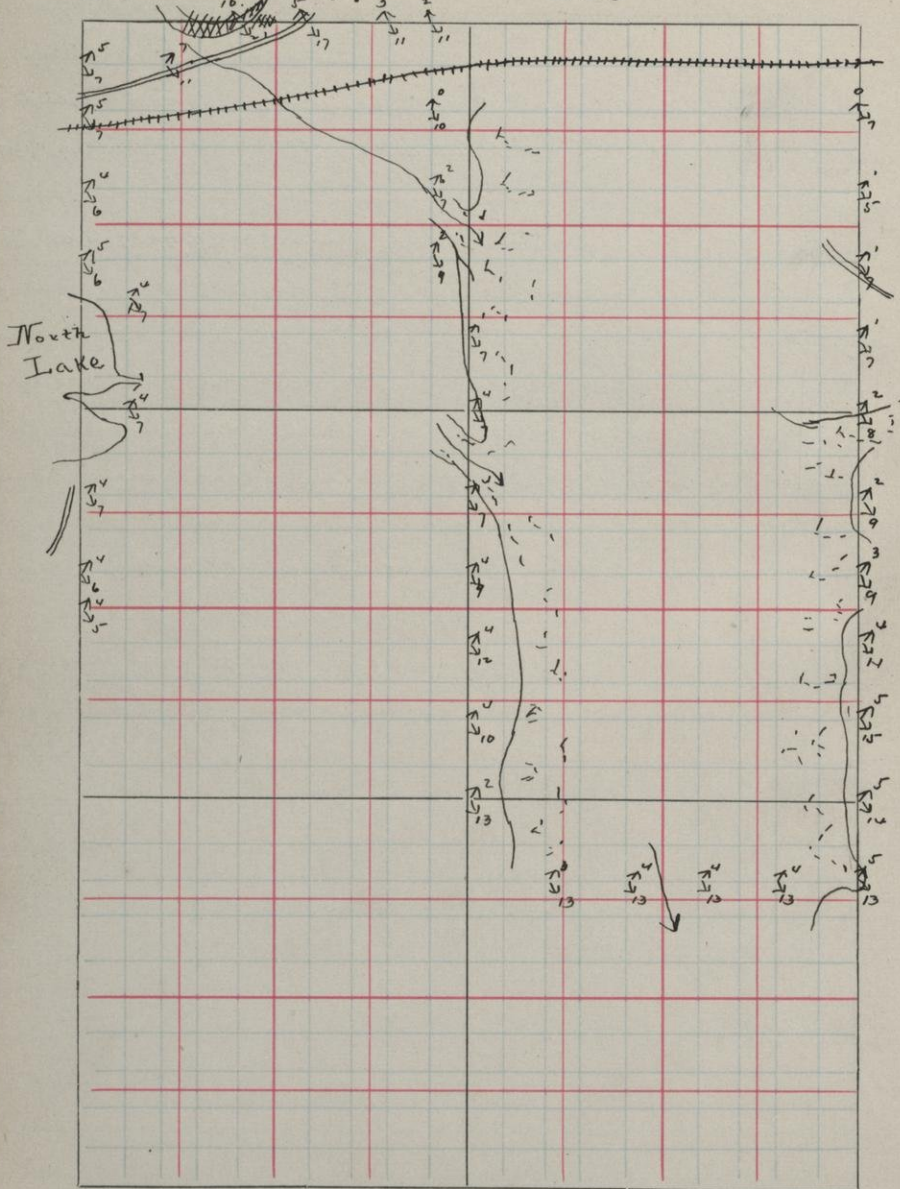
black rocks, that is green composed of
 evenly banded white and dark lay-
 ers - the white apparently gneiss and
 the dark resembles schist. The
 strike is uniformly NE and the dip
 N.W. Except in the contact with gran-
 ite dykes where the schist is more
 or less contorted.

The mica schists are sandy, yellow-
 ish brown rocks that are also well
 bedded. They look very fragmental
 but still are genuine schists asso-
 ciated with the hornblende schist - and
 cut by granite. Their even bedding
 etc, may be evidence of a sedimentary
 origin. The question can not be de-
 cided until more work in the field
 and more work with the microscope
 has been done upon them.

S. 1 *Peridotite*

47

R. 28



Smith & Thomas Perry

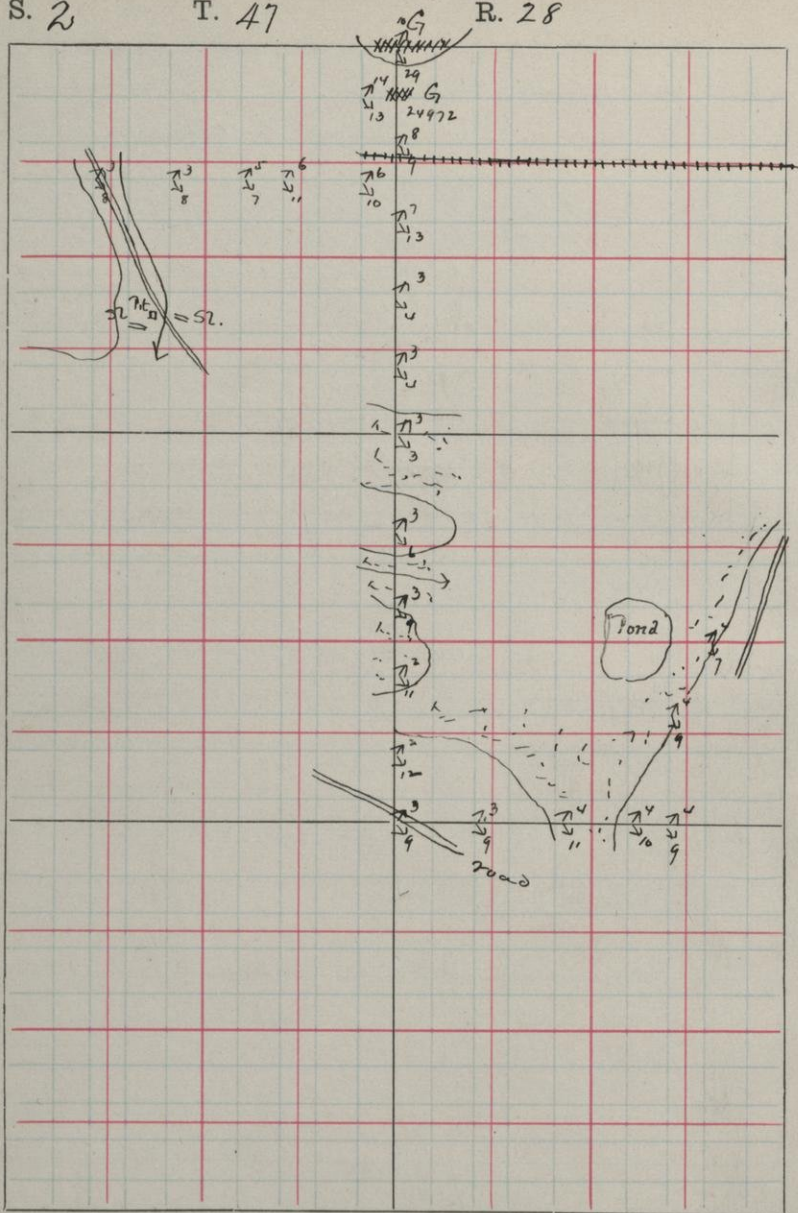
Ran South from fence corner, supposed where U.E. car Dec 1 - 47-28, afterwards discovered about 200 to 300 feet South.

No rock seen as run except in U.W. 1/4, where there is a ledge of dark serpentinous rock, supposed to be peridotite. Specimens 19340 taken a year or so ago is from the ledge.

S. 2

T. 47

R. 28



Smith and Perry -

From S¹/₂ post Sec 2 run north one mile, west and south as indicated. No correction could be made, so not certain that positions given are true ones. Map differs from the run as made, in that R. R. is south of north line (see opposite page) whereas on photographic map it is north of this line.

U.B. Examine Merriam's and Bailey's Note books of 1891 for data.

24972 1900 N. 1000 W. of SE cor Sec 2-47-28

Edge of coarse granular greenstone, with weathered surface very soft. The hand specimen shows division planes similar to bedding planes, but Examination of the outcrop shows these to be due to a system of jointing, there being no continuous strike.

From its position this outcrop seems to be the same as that from which Specs 14741 & 19387 were taken.

The Magnetic Maps

The magnetic map of Range 48 shows no definite line of attraction but at many places there are short lines, which in the western portion of the area many run into a single one.

The irregularity of the variations and the great number of western ones are the principal indications of the presence of the new formation under the surface.

The map of R. 47 R. 28 gives no more evidence of the presence of iron formation than does the map referred to above, except in that the dip angles are very large.

Maps will be found
in

Pocket at End of Book.

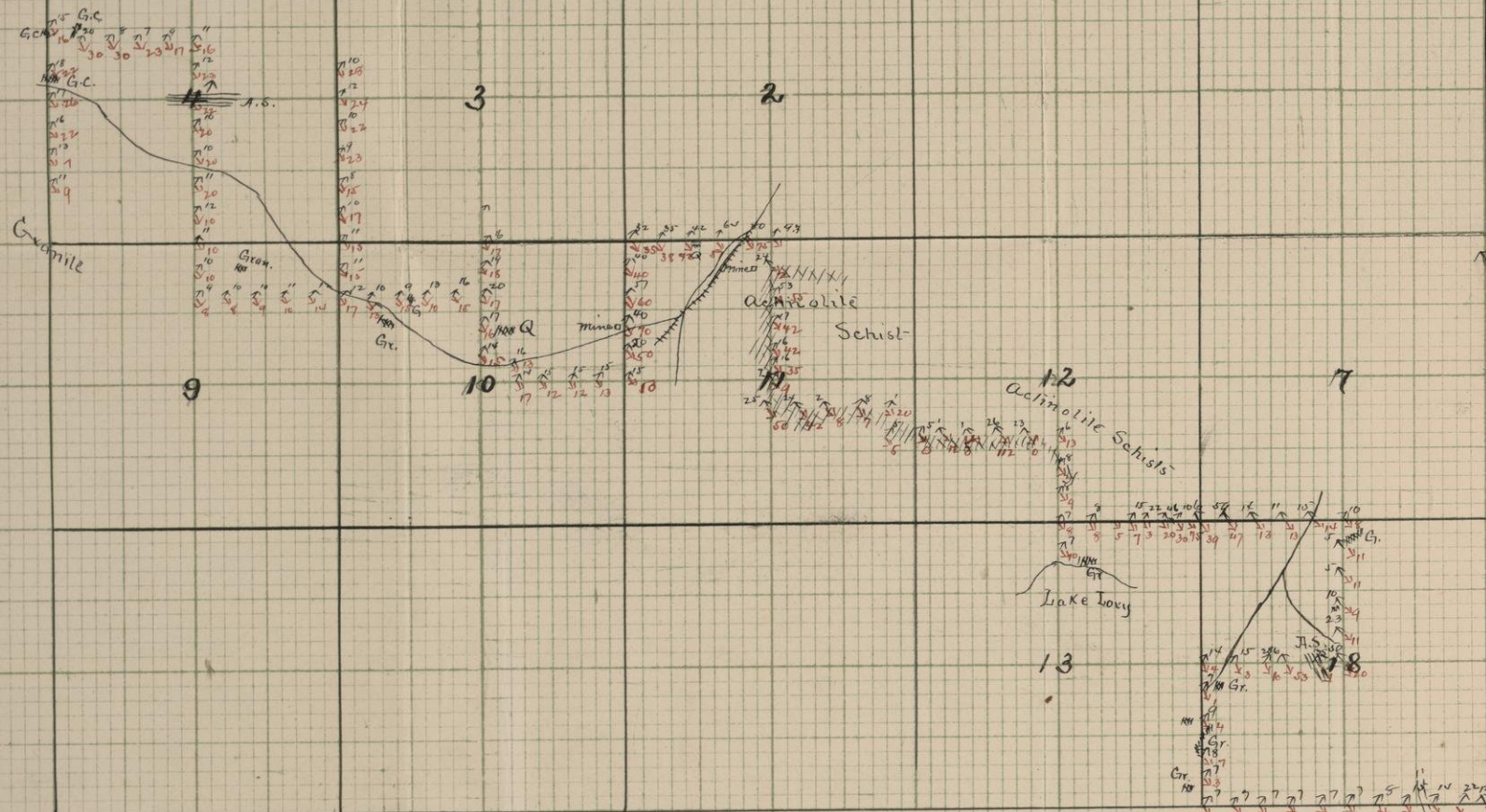
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2000

160-
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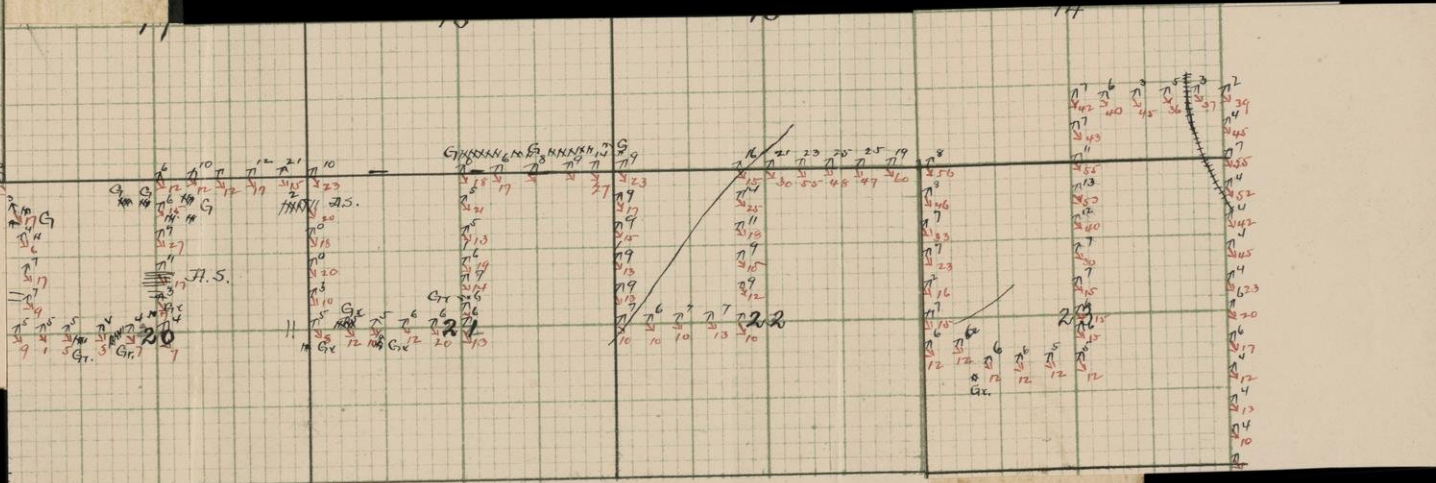
190
240
50

2



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T 47 R 29



T 47 R 28

