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**Region between D., SS. and A. Ry and M. L. S.
and W. Ry, west to Gogebic, Michigan:
[specimens] 14173-14174, 14409-14500, 11197,
11199. No. 93 1889**

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1889

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 93

1889

Region between D., S. Va. Ry and
M. L. S. & W. Ry., west to Goebic, Mich.

W. A. Bayley.

14173-14174 14409-14500, 11197, 11198

SURVEY OF THE PRE-CAMBRIAN ROCKS OF THE N. W. STATES.

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 figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. In all cases where there is the least doubt about the true bedding directions, 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 as 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.

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.

3. The ruling of the left hand page is also arranged so that a smaller scale can be used. Each one of the black lines may represent a section line and the red lines quarter sections and "forties." The scale of the maps may thus be reduced, if desirable, to two inches to the mile (the ordinary town plat scale.)

4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with a note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples, 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 § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. All specimens are to have numbers painted on them, in white on a black background, in the field.

5. 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., etc.

Field Notes for
Season of 1889.

Region bet. D. S. & A. R. R
and
M. L. S. & W. and C. & N. W
railroad

West as far as Lake Gorge-
vie and East to Hemlock

W. S. Bayley

No 2.

14409 At 800 W and 325 S. of $\frac{1}{4}$ Sec 13, T. 46. R. 42 is the top of a high ledge of schistose dark rock, striking about N.E.

The ledge runs to N.W. corner of the second clearing and ends. Variation at this point is normal and Dip 23-28°.

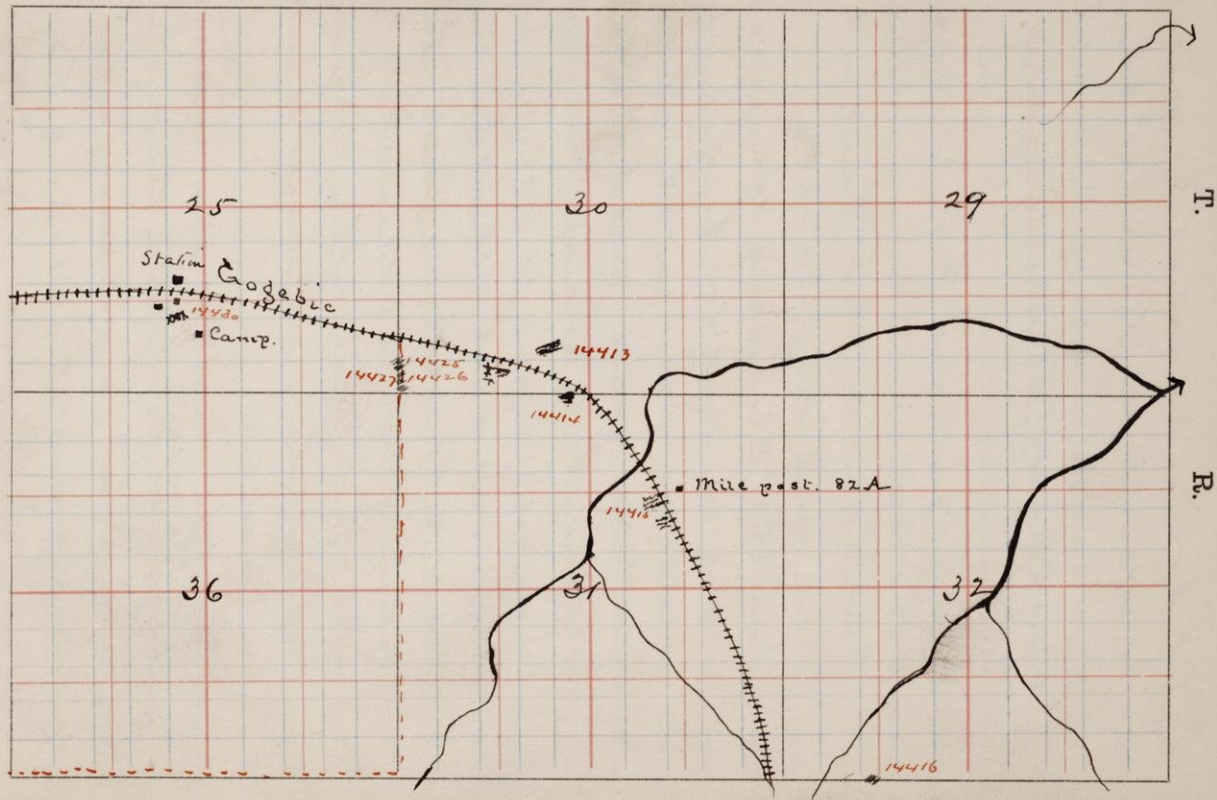
14410 In the clearing whose center is 660 W. and 400 S. of $\frac{1}{4}$ point between Sec 13 & 12. is a best pit, just west of which is a rock exposure. The variation here is only 6° to the E. The rock is a dark schistose chloritic and hornblende rock, containing some actinolite?

14411 With this are often veins of chrysotile sometimes 4 inches in thickness

14412 To the west of this ^{in the} is the rock of another ledge, which often contains inclusions, or at any rate? lenticular masses of a sandy, gray and yellow sandstone or decomposed gneiss, the long

T 46 R 42

T 46 R 41



2

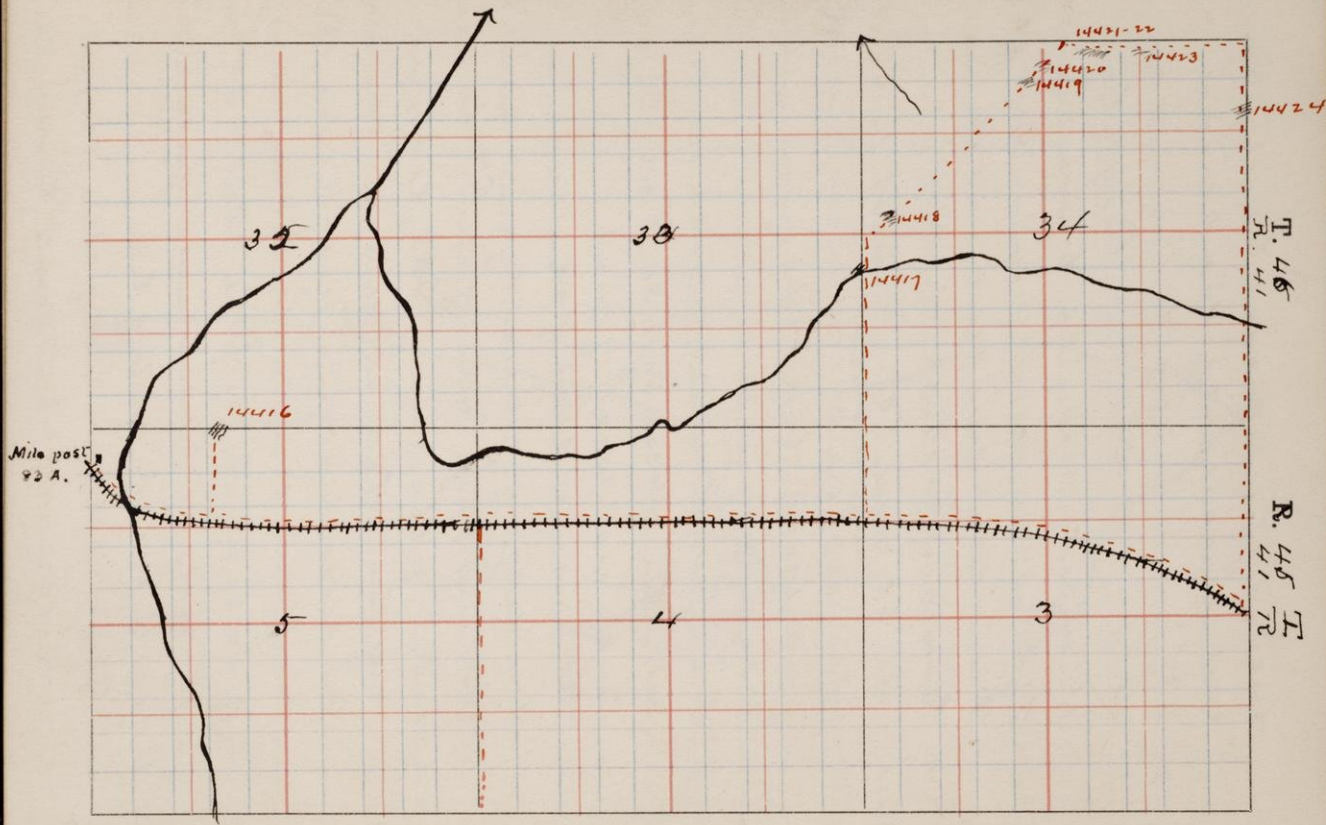
axis of the masses being in
the direction of the strike.

Aug 16/89.

Transferred camp to Gogebic
Station on M. L. & W. R.R.
Ran east on railroad from
Gogebic Station.

- 14413 At 68 rails E of range line
between ^{Ranges 41 + 42} and 100 paces north
of railroad took specimen from
ledge of gneiss.
- 14414 From south side of road on line
between Secs. 30 & 31 T 46. R 41,
50 paces west of road.
- 14415 At 66 rails east of this line a
low ledge of bluish gray quartzose
looking rock was found ^{on} the west
side of the road. The ledge is
very low where it crosses the road,
but rises a few feet above the
sand and drift at a distance
of 40 paces S.W. of the road. It is
probably a horn blende gneiss, and
has a dip of 20° N of E.

Another exposure of this same
rock occurs at 76 rails east of the



line between 30 and 31. It is cut with glacial striations running N+S, and is very free of quartz veins.

14416 When crossed the first branch of the Outmagu river in Dec 32 ran north to ledge marked on town line, which found to be a hornblende schist with a strike 20° N of E.

Most of the country bordering the railroad is swampy, or low flat boulder ridges into which the road cuts but a few feet.

When reached the line between Decs 30 & 31 went north, remaining in swamp until the river was reached, 800 steps north of the corner between Decs 33 & 34, T 46, R. 41.

On the north side of the river a few fathoms west of where the line crosses it is a very low ledge of a rock striking N.E. It is a coarse grained hornblende rock of which only a very

14417 small chip could be obtained,
as the rock ledge was entirely
covered by water.

Continued north to the west $\frac{1}{4}$
part of Sec 30, then N.E. to
north $\frac{1}{4}$ part.

14418 At 100 paces N.E. of W $\frac{1}{4}$ part
is a ledge of Lomblende schist
striking N.E.

14419 At 1200 is another ledge of
a darker, more compact va-
riety of the same rock

14420 More slaty variety at 1350 N.E.
These are probably of the same
rock varying slightly in tex-
ture at the different exposures,
but possessing the same general
characteristics.

Struck the north line of Sec 30
at 170 E of $\frac{1}{4}$ part.

30 paces East of this $\frac{1}{4}$ part is
a ledge of compact schistose rock
like the others noted on this run.

14421 It is generally quite fine grained,

14422 but occasionally coarse. This
ledge extends along the north
side of the section as far as

200 paces East of the $\frac{1}{4}$ post, in this distance exhibiting various phases, similar in general respects. They all strike about N.E.

14423

At 500 E of $\frac{1}{4}$ post on south side of the line about 20 paces from it are two ledges, one resembling slate and striking 40° E of N. The other looking like horn blende schist. They are probably the same rock with a different texture.

At 665 paces E of $\frac{1}{4}$ post, on north side of the line is another ledge of the same kind.

From N.E. cor. of the section went south to rail road.

14424

At 400 S. of this corner is a small, but well characterized ledge of a coarse grained, dark lustrous rock.

When reached the railroad went west to camp.

At 44 rails east of range line between ranges 41 and 42 is a low ledge in a cut. The rock

14425 is a dark dense massive rock resembling a quartzite

14426 At about 5 miles west of this, on the south side of the road is a coarse Diabase dyke

King and Ferreis went south on range line between towns 46 R. 41 and T 46 R. 42, following this to O. E. cr ^{Sec} 25.

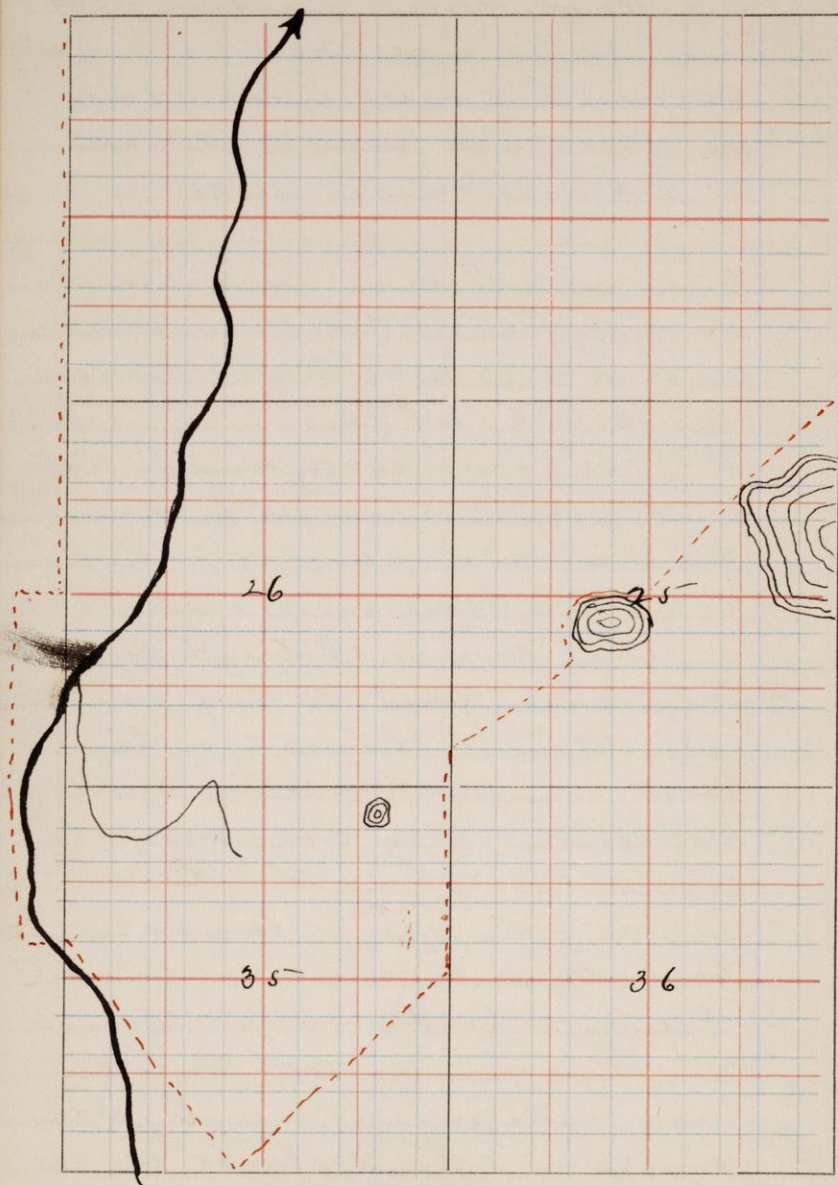
14427 At 135 paces north and 20 paces east of this corner took specimen from a ledge about 7 ft in height. From here continued south to town corner through swamp. Then ran west along the town line through a hard-wood country to railroad, without seeing any other rocks.

Aug 17

Went east on railroad line between Secs 5 & 6 in T 45, R 41, then ran south to O. E. cr. Sec 6. The entire country to the corner is swamp with the exception of a small ridge at the

T. 45

R. 42



quarter post and another just west of the line and running nearly parallel with it at 100 - 150 paces south of the quarter post.

Continued south through swampy boggy corner then west to the $S \frac{1}{4}$ post of Sec 6 and south $1 \frac{1}{2}$ miles to lake. The last $1 \frac{1}{2}$ miles was through hardwood country, rolling and well wooded, in which, however, no rocks were discovered.

Aug 19-20.

Ran S.W. from N.E. cor Sec 25 of T 45 R. 42 and struck west line of Section at 500 ft of S.W. corner. Ran south to the corner and beyond to $E \frac{1}{4}$ post Sec 35, then ^{South} west 200 paces and south $\frac{1}{4}$ post Sec 35, then N.E. to W $\frac{1}{4}$ post same Section, west 200 paces, north one mile and East to W $\frac{1}{4}$ post Sec 26, then north in line to trail road.

The country traversed, like that

covered yesterday is swampy with occasional hills of hard-wood. The hills are all steep, and their sides are covered with boulders. No rock was seen in place. The knob west of the S. 1/4 part of Sec 35 is composed of boulders covered with moss.

14428 At about 1900 S and 43 W of N.W. cor Sec 2 in T 45. R. 42 is a low ledge of Limestone schist, striking 30° N of E.

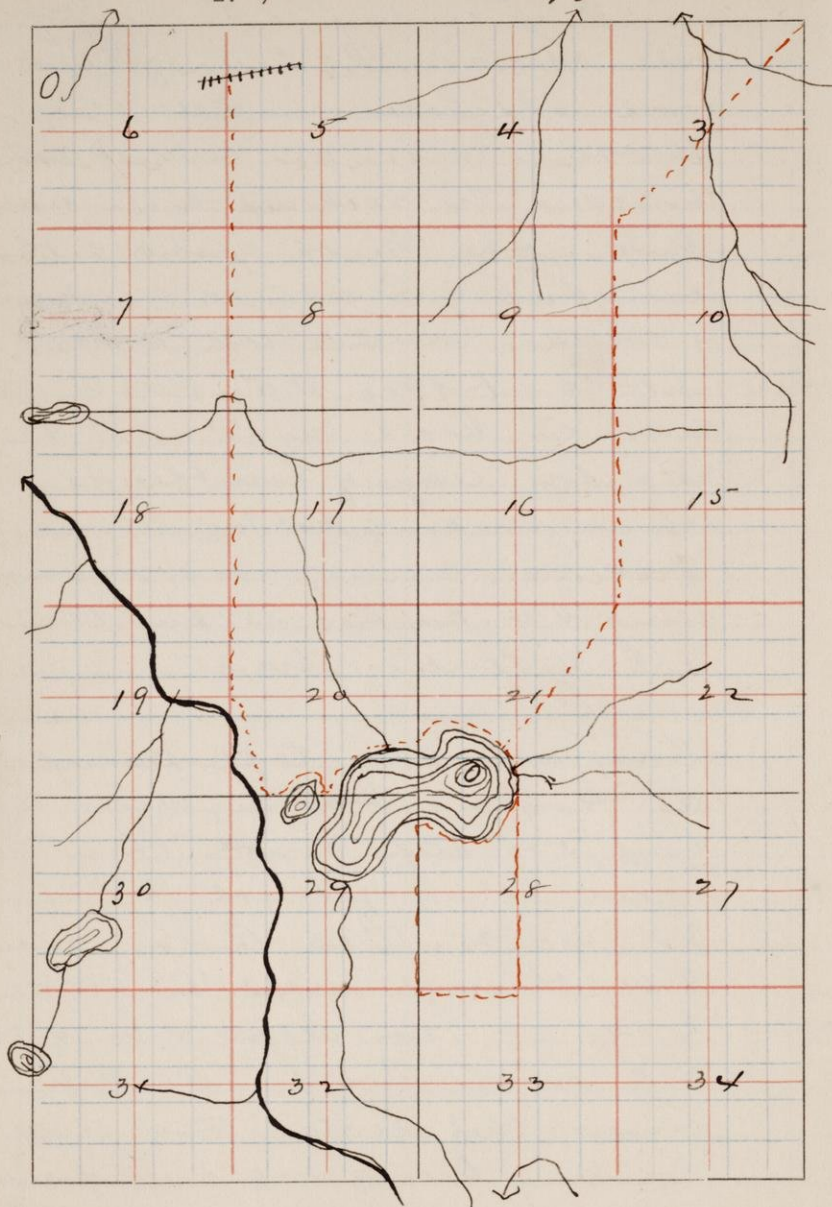
Took new county road running along S.W. cor. Sec 35 and then N.E. to center of Sec 25.

King and Alley left camp at Gogebic Station, went about 500 steps south, then about 60° N of south to S.W. cor. Sec 35. T 46. R. 42. then S.W. through Sec 3 T 45 R. 42.

14429 Ledge at 1300 steps S.W. of the N.E. corner Sec 3. At S.W. corner this section took line between Secs 9 & 10 and followed south to corner between Sec 15, 16,

T. 45

R. 42



21022.

From this corner went S. W. to Lake in Dec 21.

Went around lake to $\frac{1}{4}$ post between Decs. 21 and 28 and then south one mile to $\frac{1}{4}$ post between Decs 28 and 33, then west one half mile to S.W. cor Dec 28, north to lake and East around lake to point of departure.

All this country is swampy and bouldery. No rocks in place.

Continued along north shore of lake to south line of Dec 20, then west to river crossing this line, N.E. along river to west line of Dec 20 and north along this railroad.

14430

Trap just south of railroad station at Gogebic

Aug 21

Went East along railroad track to Crow lake between Secs. 2 and 11 T 45 R 41, which struck near quarter post. Then went East to E corner of these two sections and north to stream at $\frac{1}{4}$ post between Secs 35 & 36 T 46 R. 41. The country is principally swamp, with a few hills in which no rocks were seen. The last $\frac{1}{2}$ mile was through hardwood.

Aug 22.

Ran north in line between Secs 35 and 36 T 46 R. 41, to within 500 paces of N. E. cor Sec. 35, then N.E. to north line of section, north 500 paces and N. W. to N. W. cor Sec 26

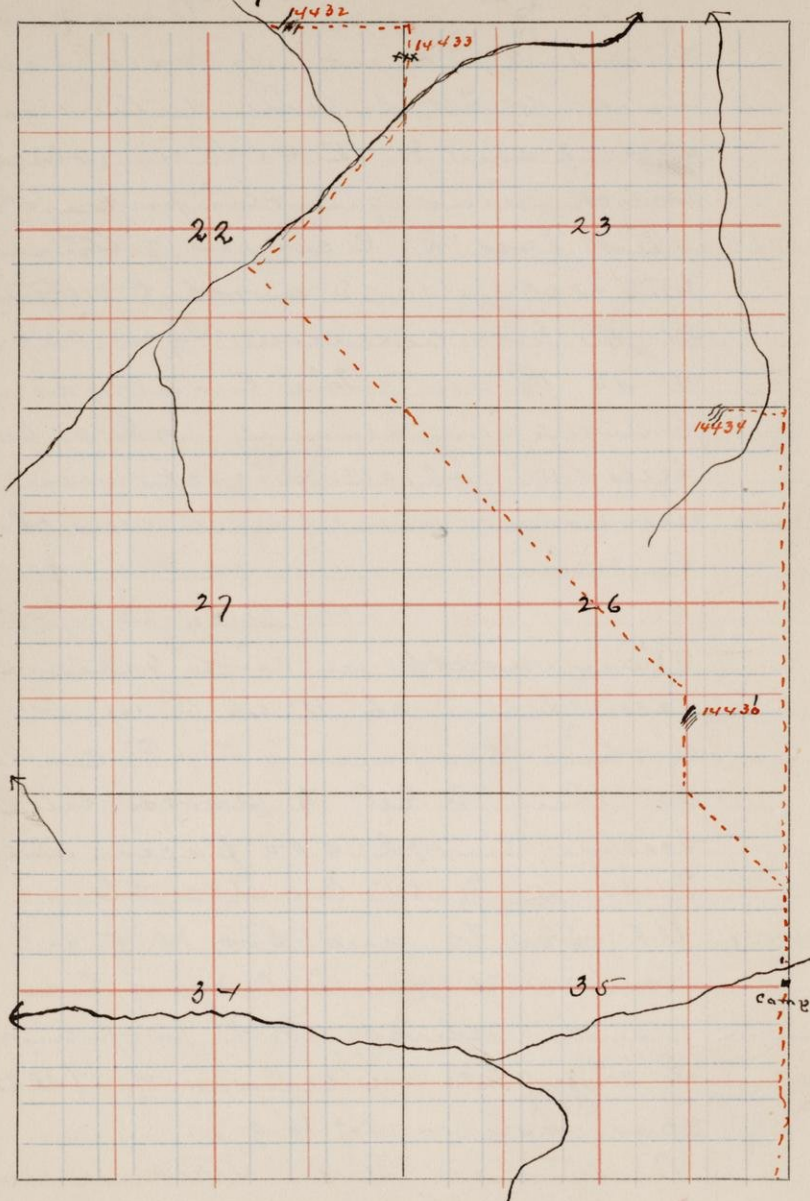
14431

At 330 N and 500 W of S. E. cor Sec 26 found ledge of horn-blende schist, with porphyritic crystals or lenses of feldspar. Strikes 30° N of E.

Continued N.W. striking river at 1200 paces N.W. of S.E. cor

T. 46

R. 41



Sec 22. Finding it impossible to
 cross here followed it north until
 struck N-S line on East side
 of Sec 22. Crossed river, ran
 north on line to corner and
 west to ledge 530 W of N-E. cor
 Sec 22. It is a very feldspathic
 i.e. hornblende schist, striking
 about 20° - 25° N of E. It forms
 quite a high perpendicular
 face to the N.W.

14432

14433

At Co 5 of this same corner,
 another ledge is exposed a few
 paces west of the line. It is a
 coarse grained olivine(?) Dia-
 base, trending a little East of
 North.

From the river ran East one
 mile, then Southern line be-
 tween Secs. 23 & 24 and South
 to Camp.

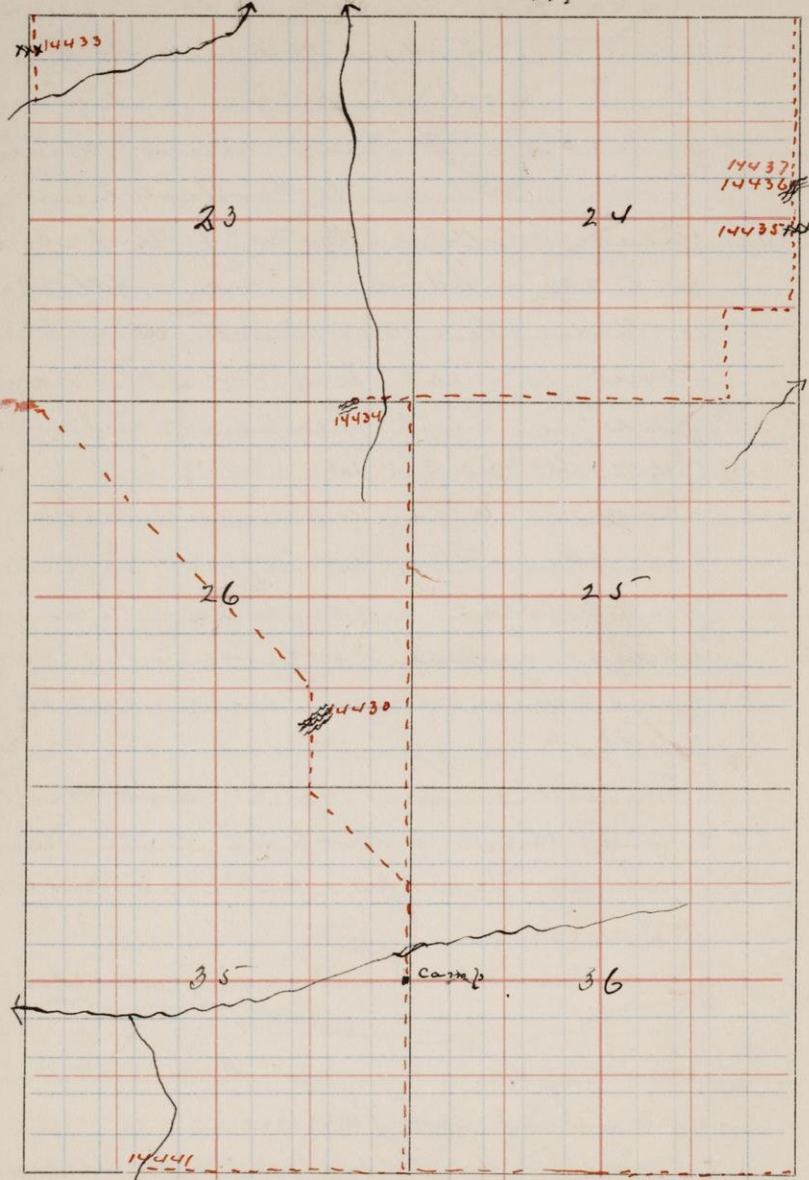
Hardwood country. No rocks.

Took variation at several points
 and found as follows:

Variation at Camp - 14 feet between
 Secs 35 and 36 1° to E.

T.46

R. 41



Variation at U. E. cr 26 = 1° E.

" " 1200 NW. of S. E. cr
Dec 22 = 1° E.

Aug 23

Ran north in line between
Dees 35 and 36 5° to R 41 to
U. E. cr Dec 26, then west 200
paces to find trap marked on
flat.

14434 About 505 and 250^W of U. E.
cr Dec 26 is a ledge of horn-
blende schist striking about
U. E.

The variation here seems quite
heavy in the vicinity of the
ledge, varying from 10° W at
a few paces north of ledge. It
diminishing to 5° W a little
N. W. of this point, and then
back to normal (2° E) at 15-
paces N. W. of this second point.

Along the east side of ledge
it varies from 5° - 10° W.

Since the rock is undoubtedly
a hornblende schist, it
is probable that there is

an accumulation of magne-
tite in some of the bands of
the hornblende schist, a condi-
tion somewhat resembling?,
the condition of affairs at the
test pits near Logyebie Lake.

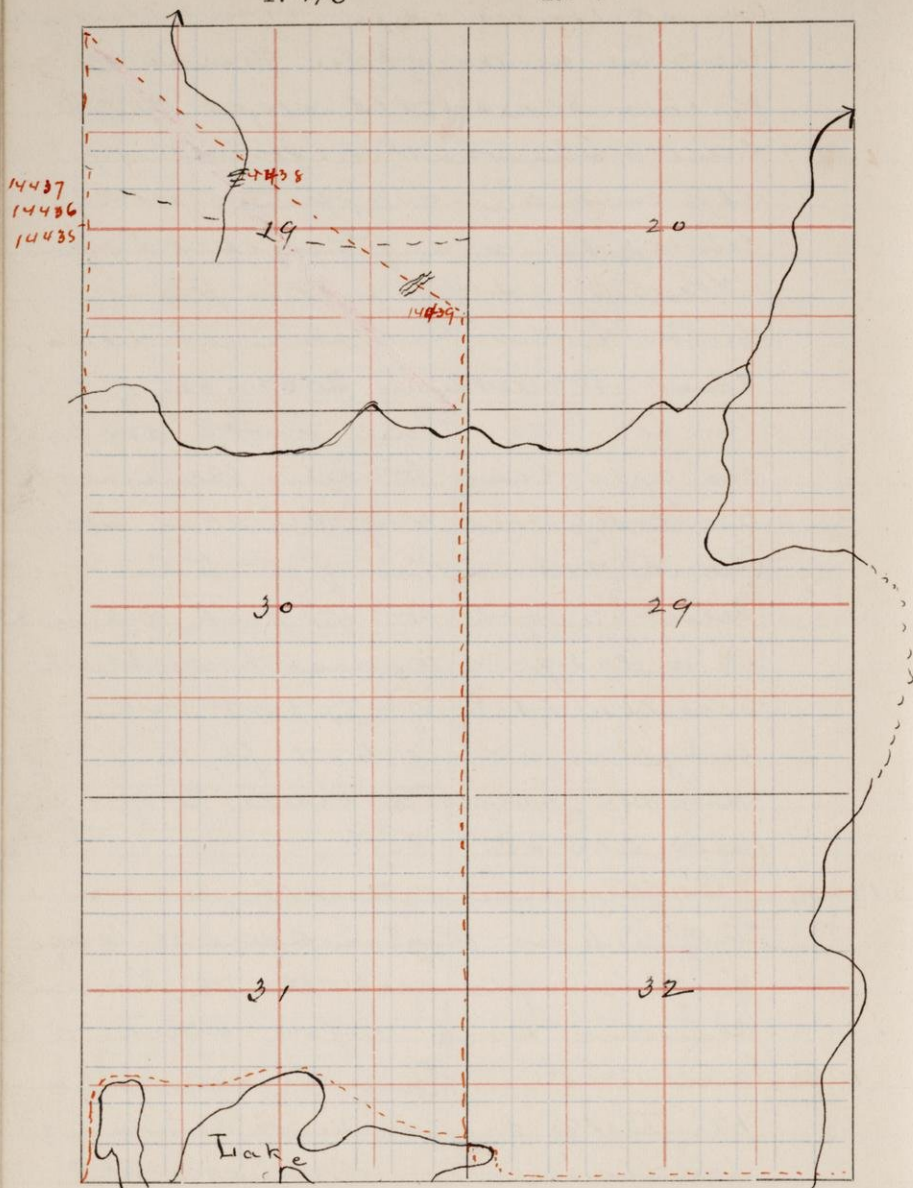
Returned from this point
to N.E. cor Sec 26 and went
east to within 300 paces of S.E.
cor Sec 24. Ran north 500 pa-
ces and east blin. On line
at 500 paces N of S.E. cor Sec.
found variation of 50° to E.

14435 Went north to $\frac{1}{4}$ post, where
is a ledge of coarse hornblende
rock at 65° E of $\frac{1}{4}$ post. This
ledge is about 6-7 ft in
height, runs a little N of E,
and strikes N.E.

14436 Continuing north, at 100
N of $\frac{1}{4}$ post found small ledge
of fine grained dark, horn-
blende rock, with strike a-
bout N.E. This contains por-
phyritic crystals or lenses of
feldspar. Variation 20° E.

T. 46

R. 40



14437 About 100 paces north of this
 1/4 pt is another small ledge
 a few paces to the west of the
 line. This is composed of a
 fine grained, dark rock,
 containing a few flecks of
 feldspar. It is probably a
 fine grained variety of 14436.
 Chip, only taken.

Variation 2° E.

From S. E. cor Sec 13, ran north
 to E 1/4 pt of this section
 over boulder hills, taking va-
 riation as follows:

Corner	2° E
250 N	1 1/2° E
500 N	2° E,
750 N	2° E,
1000 N	5° E.

Returned to corner and ran
 S.E. from this point. The coun-
 try is covered with hardwood and
 balsam.

14438 At 1170 S.E. from NW cor Sec
 19, T 46 R. 40, in the bed of
 a stream is a shelving
 ledge of slate containing

lenses of quartzite? The slate has a smooth surface, dipping at about 30° to the north, strike 5° N of E. The dip of the rock is high to the south.

14439 Continuing S. E. found a small ledge of a schistose rock in the side of a hill. The rock is a gray, schistose rock with flecks of hornblende, and its location 200 S. E. of N. W. corner of Sec 19. When struck the line on East of this section found it 500 N of corner. Continued to corner and went south to the Lake.

14440 At about 150 South of this corner on an island in the swamp, found low ledge of grayish white mica schist.

No other rocks were seen. The country being covered with swamps and boulder piles.

The camp moved camp along the S. line of Sec 36 T 46 R 41 to S. W. corner Sec 31. T 46 R 40, then around

lake to east line of section.

When reached S. E. cor. Sec 35, ran west to stream to get specimens from ledge on its bank.

14441 250 W and 20 S of S. $\frac{1}{4}$ post Sec. 35 T 46 R. 41. Garnetiferous mica schist. No other rocks were seen in trip.

Aug 24/04

Ran from lake along town line between towns 45 & 46 on trail to S. E. cor. Secs 33.

For first mile the trail runs through the swamp, very close to the line and crosses river, running over small hardwood ridges and again into swamps. These latter are strewn with boulders of Hornblende schist.

14442 At 140 W and 40 N of S. $\frac{1}{4}$ post Sec 33 is a 4-5 ft. high ledge. To the east the same rock occurs outcropping in various places. 14442 is a Hornblende schist striking 20-30° N of E. It is cut by veins of a fine grained, schistose rock, which is probably

a squeezed granite?

- 14443 Specimen of squeezed granite?
Ran north from D. E. cor Sec 33,
to river in Sec 21 and returned
to little stream crossing
line between Sec 33 & 34 about
700 paces S. of their north cor-
ners (not marked in plat), near
which camped.

- 14444 At 380 S of N. E. cor Sec 33 on
west of line is a low ledge of a
hornblende or mica schist, cut
by veins of a quartziferous rock,
with garnets. Strike about E.W.
at 335 south of same corner,
on east side of line is another
ledge of the same rock, containing
a large amount of chlorite.
As far north as the corner ad-
ditional low ledges abound.

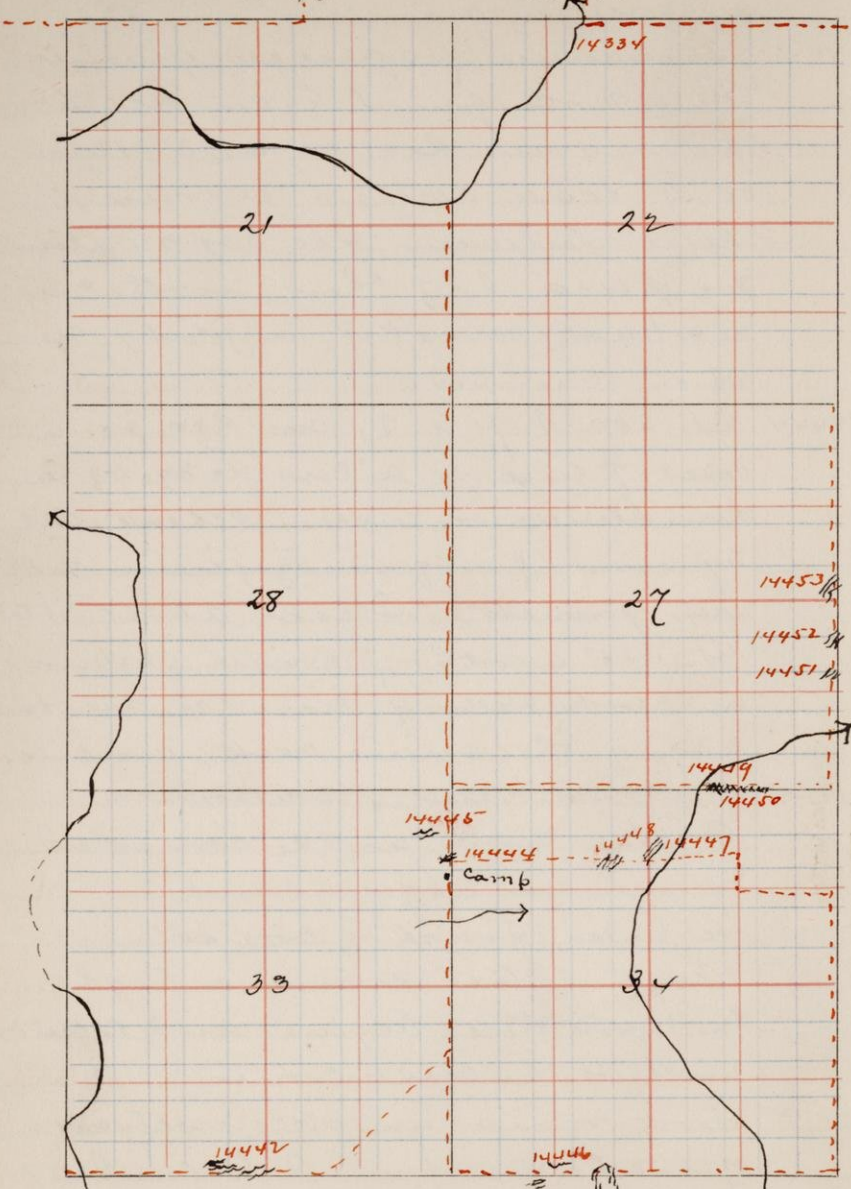
- 14445 100 paces south of corner.

North of the corner a high
hardwood hill begins and extends
north to the next corner.

Took variations at intervals
of 250 paces from D. E. cor Sec 21
to stream about 200 north of

T. 46

R. 40



quarles fms.

Variation S. E. on Dec 21 = 2° E.

250 N of " " = 2° E

500 " " " = 10° E

750 " " " = 2° E

1000 " " " = 2° E

1120 " " " = 2° E.

Aug 25.

Went South on line between
Secs. 33 & 34, T. 46 R. 40 to S
corner between these sections,
where found road running al-
ong line to the East. Ran
East along this line and found
a ledge of black hornblende and
chloritic schist at 450 paces East.

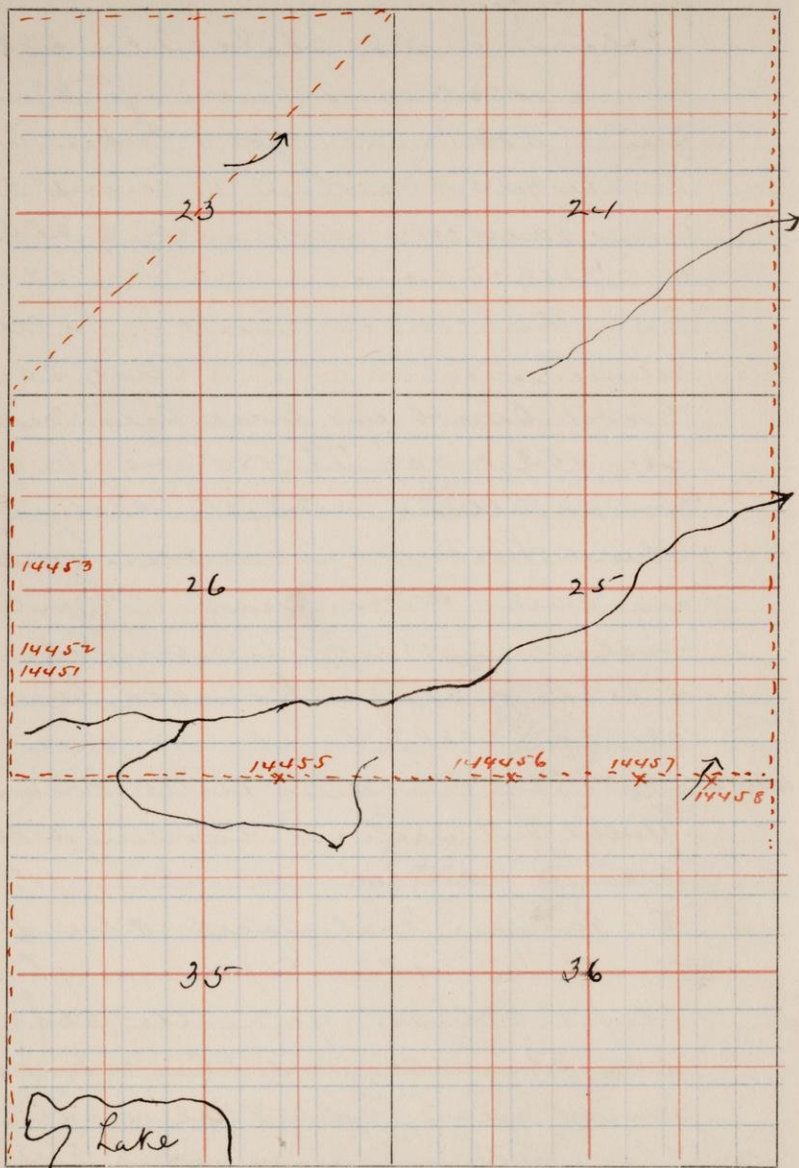
14446

The rock contains little round
globular masses looking like
altered garnets?

At various distances along
this line other exposures of horn-
blende schist, granite?, etc.
were observed, but the number
was so great, and the weight of
the specimen was becoming
such a burden that no samples

T. 46

R. 40



were taken.

When reached the N. E. cor. Sec 34 went S. 1200 paces without seeing additional rocks, when were compelled to return to camp in consequence of approach of heavy thunder shower.

In this corner went N on line between Sec 34 & 35, to 1500 paces north, then west 500 paces, north 100, when struck a road, which followed West. On this road found
14447 several ledges of horn blende schist in about the position indicated in the map. The ledge forms a fall in creek; The rock here striking N of E.

14448 When struck road running west to camp found large ledge of mica schist, running 10° S of E and striking about 30° S of E.

Aug 26.

Heavy rain in morning. In afternoon moved ^{part of} camp along the north line of Sec 34 to N. E. cor Sec 36.

Aug 27

Raw east to N E cor Sec 34, T.
416 R. 40

At 200 E of $N\frac{1}{4}$ first at the point where stream crosses the line is a high ledge of rock like that at Gall 250 paces south (11447). The rock occurs in a bluff facing the north and extending 200 paces east.

14449 Its height varies from 5-20 ft. It consists of a very lustrous chloritic slate or gneiss striking 10° N of E. It seems at first sight to belong to the Archaean, as it is partially cut out and filled with veins of quartz. The strike and the slight southern dip seem to indicate its connection with the slate series.

14450 With this is a harder rock, looking like Hornblende gneiss. The view that these are slates appears to find confirmation as we run north from the N. E. cor. Sec 35, for

14451 at 5 to N and 10 E is a broken

ledge of hard splintery rock, breaking like quartzite. It is of a grayish color and is schistose in places, where it strikes 10° N of E, and dips high to the south.

Ledges of the schistose variety of this rock occur at varying intervals on the line. At two north the rocks ~~from~~ become slaty like those found on the south line of the section (14449-14450), dipping high to the south and striking 10° N of E. The rock is highly micaceous, contains garnets and is in every way like other garnetiferous schists collected.

14452 80 paces north of the quarter post is another ledge of micaceous rock, striking and dipping like 14452. With this is a massive, dark siliceous rock,

14454 that is apparently a quartzite.

Continued north on the line to the S.W. corner Sec 23, then N.E. to N.E. on same section. No rocks observed. Country

rolling, covered with boulders,
and wooded by hardwood and
a few pines. Crossed stream
at 1900 paces N.E. from S.W.
Camer.

Continued N.E. to Center Sec.
13 T 46 R. 49, then East to
range line. The country is all
hardwood and pine, rolling
and covered with moss-covered
boulders.

From this point ran south
to N.E. cor. Sec 36 over the same
kind of country and south to
camp.

Variation

560 N of S.E. cor S 27 = 2° E.
1000 " " " = 2° E.
1080 " " " = 2° E.
S.W. cor Sec 13 = 2° E.
1440 N.E. of " " " = 2° E.
N.E. cor. Sec 24 = 2° E.
N.E. " " 25 = 3° E.

In moving camp the boys
followed north line of Sec 34

35, and 36 to N. E. cir last section and found following specimens.

14455	600	paces	W of N.E.	cir	Sec 35	
14456	1400	"	" " " N.E.	"	"	36
14457	840	"	" " " " " "	"	"	36
14458	400	"	" " " " " "	"	"	36,

The microscope will have to decide the character of these rocks before the country can be correctly plotted.

Aug 28.

Ran to S. W. cir Sec 30 T 46 R. 39 then N. E.

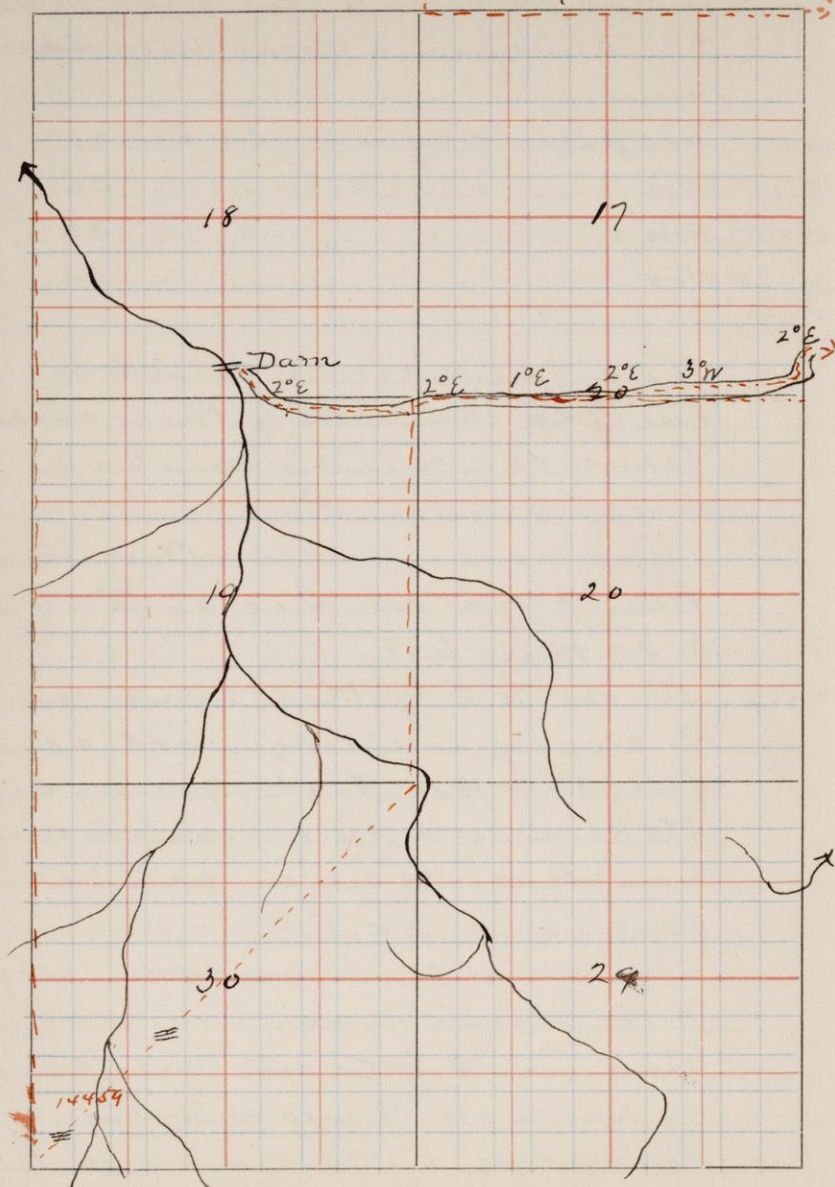
14459 At 120 N. E. of this corner in the swamp is a ledge with abrupt face 3- or 4 ft. high, facing south. The rock is a fine grained gray hornblende or mica schist, striking 10° N. of E.

At 860 N. E. is another ledge of the same rock.

Continued to corner over scrubby hardwood, pines and ground-hemlock. At S. E. cir Sec 19 ran north one mile through swamp,

T. 46

R. 39



and lumbered region to the road.
 On this went west 650 paces
 to Sucker Creek, where is a new
 dam. On the sides of this the
 hills are cut away to some
 extent showing stratified sand
 with only a few large boulders
 of granite.

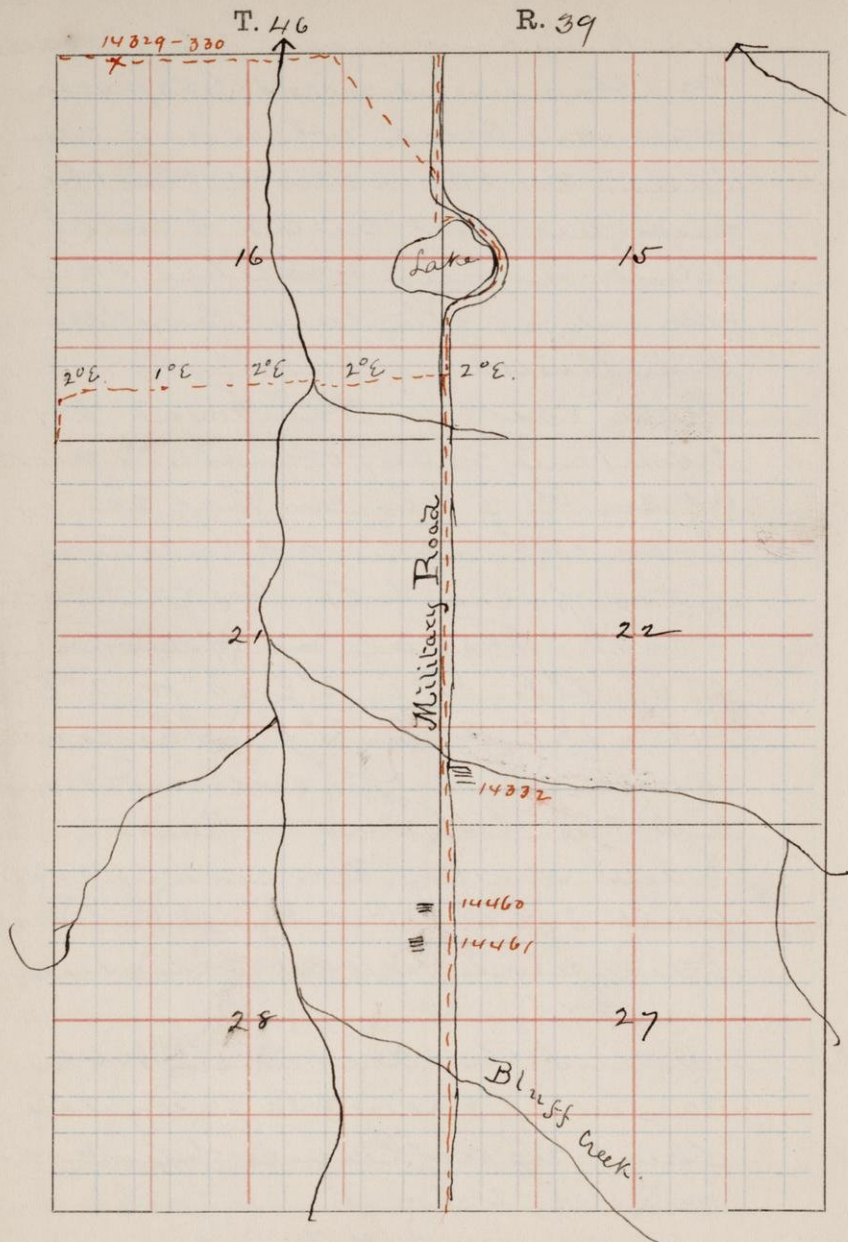
Ran East on this road to
 Military road, which is met
 at 300 ft. of S.E. cor Sec ¹⁶ 20.

Took variations at intervals
 of 500 paces from Sucker Creek
 to road. They are as follows -
 $2^{\circ}E$, $2^{\circ}E$, $1^{\circ}E$, $2^{\circ}E$, $3^{\circ}W$, $2^{\circ}E$,
 $1^{\circ}E$, $2^{\circ}E$, $2^{\circ}E$, $2^{\circ}E$. The road
 is over sand the entire distance
 and the timber is pine.

When struck Military road,
 went south to camp on Bluff
 Creek, near $1/4$ 1st between
 Secs. 27 and 28.

During this distance took
 variation every 250 paces and
 found no difference from nor-
 mal of $2^{\circ}E$.

About 400 S. of N.E. corner



Sec 28 is a ledge of graywacke on the west side of the road a short distance in the woods.

- 14467 Again at 550 or 600 is another high ledge of the same rock.

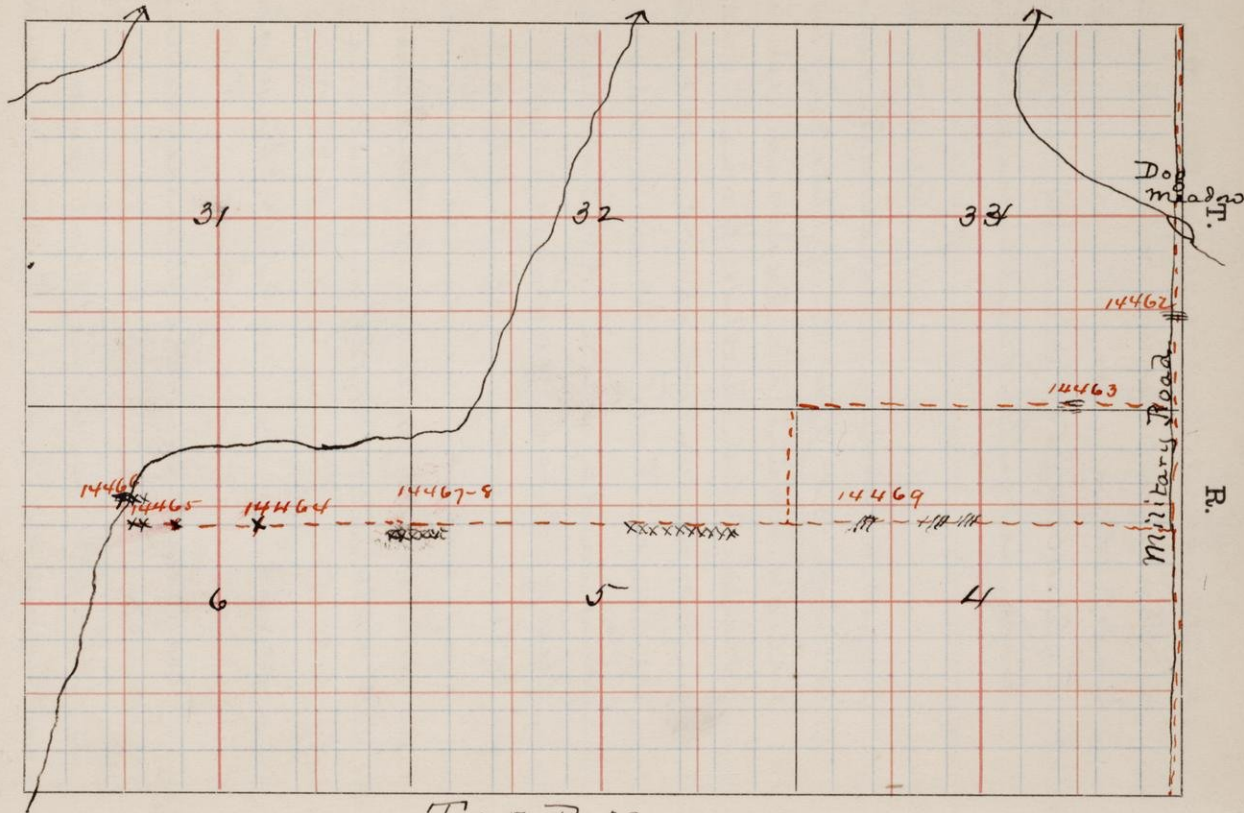
Aug 29

- 14462 Went south on Military road to ledge at 500 S. of W. 1/4 part Sec 34. This is exposed in bed of road as a light gray shielving rock in which the schistosity strikes E.W. It is a dark graywacke, with schistose bands full of fresh garnets.

When reached S.E. cor Sec 33 ran west one mile over Sway and little ridges of hardwood to S.W. cor Sec 32.

- 14463 At 500 faces W. of S.E. cor Sec. 33. is a light schistose gneissic rock, striking E.W., with joint cracks running S.W. and dipping S.E. The rock looks like a typical gneiss, but is also similar in appearance to schistose graywacke.

T 46 . R . 39



T 45 R 39

When reached S. W. cor Sec 32
ran south wood road that runs
to little lake in N. W. 1/4 Sec
6. T 46 R. 39.

14464 Followed this road west, finding
a fine grained, decomposed
olivine gabbro(?) at 1180 E and
500 N of W 1/4 part Sec 6. It
is exposed in small ledge on
south side of the road. The rock
appears somewhat loose, but
since all in the vicinity is of the
same kind it is supposed to be
in place.

At 875 E. and 500 N. of same 1/4
part another ledge of the same
kind of rock outcrops.

14465 A Hornblende schist is found at
500 E and 500 N, on East side
of dam of Sucker Creek.

The Falls on Sucker Creek
are over high ledges of granited
and gneiss. There is a dam of
the Interior Lumber Co, across
the ledge where the creek cuts
14466 through it. Here also exposed
a coarse grained gray gneiss,

in which are apparent fragments of hornblende schist. The gneiss is contorted, winding around the fragments in such a way that its true strike can not be detected. Its general strike is about E-W, and its dip about 30° to the north. In one place it is cut by a trap dyke. The location of the ledge is 500 N and 550 E of N $\frac{1}{4}$ Sect Sec 6. T. 45 N. R. 39.

Returned on road and followed it to Military road and to Camp.

At 550 N of E. $\frac{1}{4}$ Sect Sec 6 found large E-W trending ledge of a light colored rock containing seams of a schistose rock of the same composition. The rock contains large patches of yellow, Elaeolite^d-looking material and large, fresh garnets. It is associated with a dark, coarse hornblende rock, the two striking about E-W.

The ledge presents a high wall (50 ft.) to the north.

14467 Schistose variety

14468 Massive variety.

Continued along this road, which runs East along ridge of rock, whose character, where exposed is found to resemble that of granite veins cutting Lomblende schist. Such ledges were found at

1200, 1300, 1400, 1500 E and 550 N of E $\frac{1}{4}$ part Sec 6.

14469 At 300 East of E $\frac{1}{4}$ part Sec 5 - about 500 paces N. is a knob of Lomblende schist cut by a granite dyke.

Other ledges of granite and Lomblende schist are at 500 and 700 E of this quarter part.

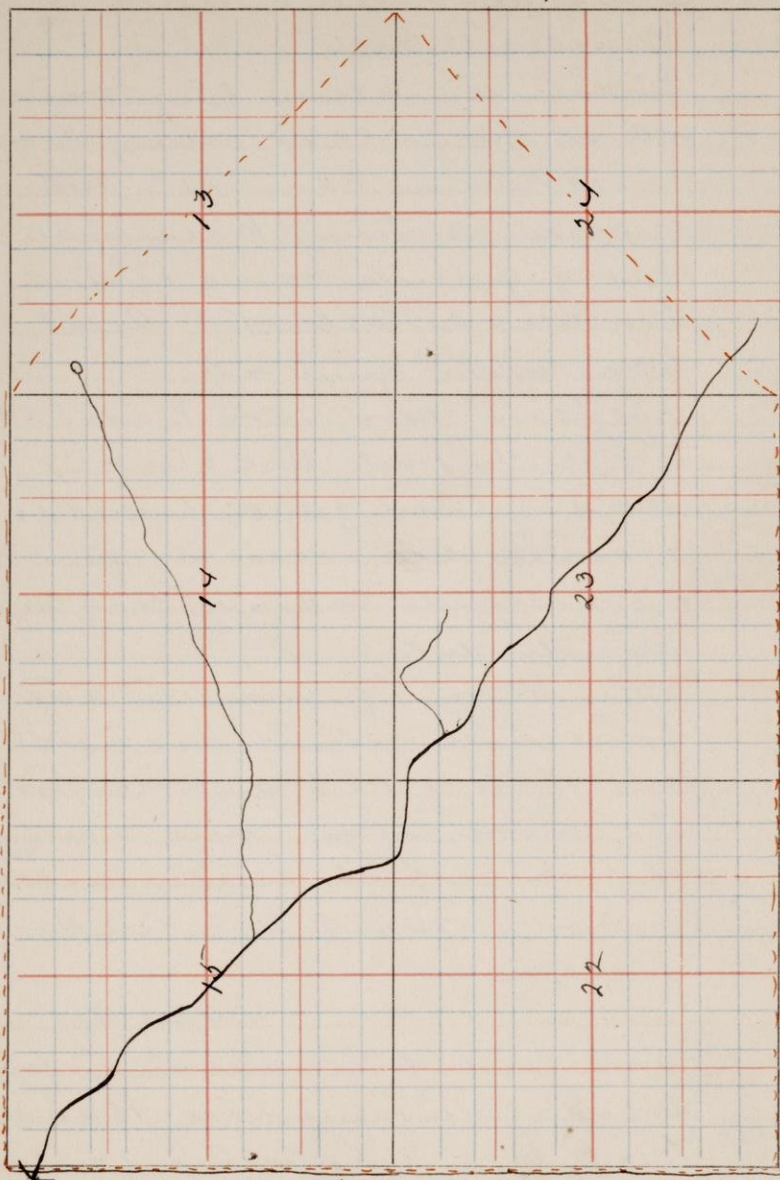
No more ledges were seen on the road, which strikes Military road at 675 S of N.E. Cor Sec. 4.

Aug 30th

Ran East from Military road on line between Secs. 16 and 15 - T46 R. 39 to N.E. Cor Sec 14, then S.E. to S.E. Cor. Sec 13, S.W. to S.W. Cor

T. 46

R. 39



Sec 24 and west to Military road.
No rocks seen in place. On the
southern line there were numer-
ous boulders of slate. The northern
half of the run was over sand and
drift hills covered with pines. In
the Swamp near the W $\frac{1}{4}$ part
are very many slate boulders, so
that it seems probable that slate
underlies the country.

Aug 31

Went East on north town line
of T 45 R 39 one mile from Mil-
itary road, to N.W. cor Sec 2, then
S. & S.W. cor Sec 2, East to S.E.
Cor same section and south
two miles to R.R. No rocks
seen. Boulders of slate and gran-
ite are common. The cuts in
railroad are through sand and
drift.

Sept 1.

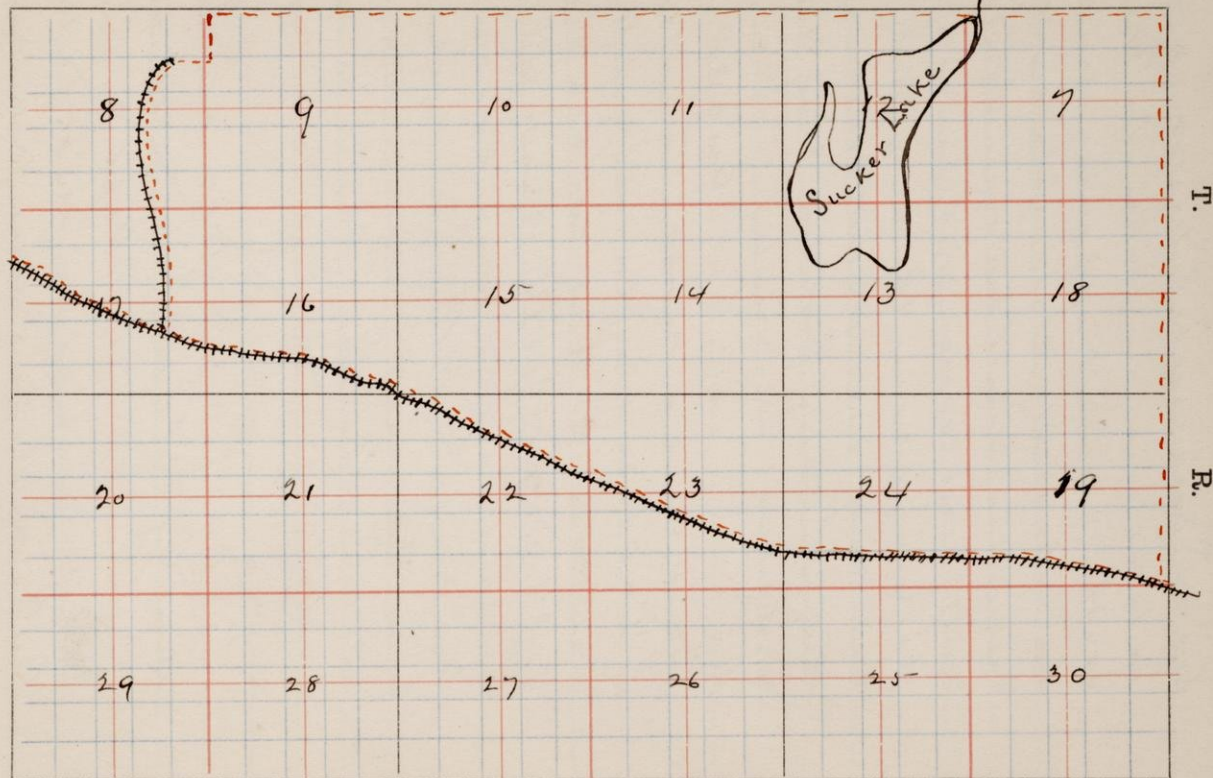
Sunday. Rested at Watersmeet.

Sept. 2.

Went west along N. L. & W.
R. R. as far as line between
Secs 2 and " T 45, R. 41.

T 45 R 40

T45-R.41



For the entire distance the railroad cuts are through sand, some of which appears stratified, but most is apparently unconsolidated with boulders of granite etc.

Sept 3-4.

Ran north on spur of R.R. running from main line in Sec 17. T 45 R 40 to point 500 S. of N. line of Sec 8. in same town. Went East on this $\frac{1}{8}$ line to East line of Sec 8, then N. to N.E. corner, East to N.E. cor Sec 7 in T 45 R 39 and S. to R.R. The country East of Snicker Lake is rough, open swampy land and small boulder hills abounding. Upon southerly run from N.E. cor Sec 7 found better country. Rolling hardwood hills are numerous. No rocks seen, but predominant boulders are granite.

Sept 3

King, Tereis and Less left the M. L. S. & W. R.R. tracks and followed

T. 45

R. 41



The line between Secs 11 & 12
T 45 R. 41, as far south as
500 paces N of S. E. cor Sec 11,
then went west to west line
of section and south two (2) miles
to S. W. cor Sec 23. From this point
went East to S. W. cor Sec 24.
All the country traversed was
swampy or a mixed growth of
pine, hemlock, spruce etc.

The greenstone marked on the
S. E. cor. of Sec 23 could not be
found, though boulders of quartzite,
trap and hornblende schist were
plenty.

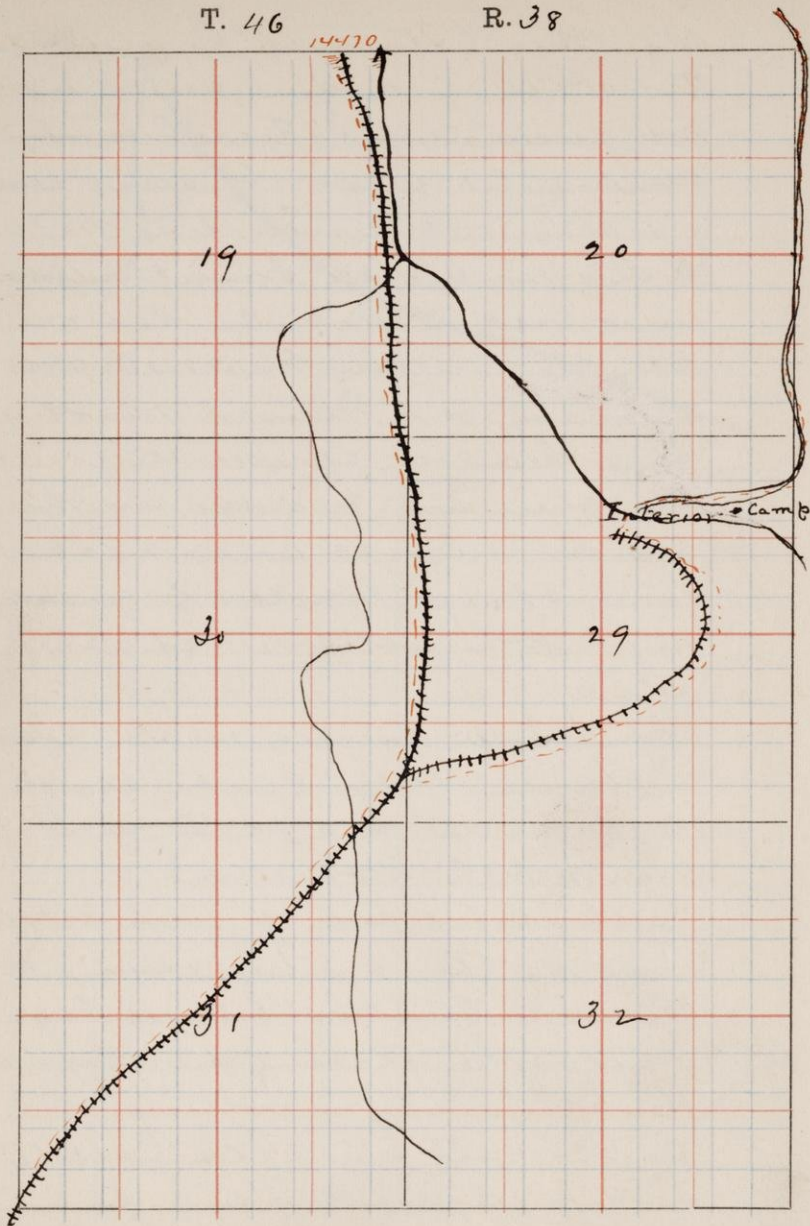
From S. W. cor Sec 24 ran South
one mile, then East six miles
to S. E. cor Sec 26 T 45 R 40
and north to rail road.

At the west side of town 45 N.
R. 40 W the country begins to
change. Hardwood hills begin
to take the place of swamps, and
the topography is rolling.

At 230 East of S. W. cor Sec 30 T
45 R. 40, 15 paces N of line found
small ledge 3 to 6 ft high and

T. 46

R. 38



12 ft. long. The rock is granite.
No other rocks were seen in place,
but numerous boulder ^{beds} ~~beds~~
abound.

Sept 5/89

Ran from Watrous along
Interior railroad to U. line
of Sec 19 T 46 R. 38. Up to
within a few fathoms of this line
the cuts on the railroad are all
in sand and boulder clay. This
sand is fine, yellow, fine strati-
fied and frequently intermi-
gled with a few boulders.

14470

At 300 N and 100 S of U. C. Co
Sec 19 is a ledge of slate on
west side of the railroad. This
slate strikes E-W and dips
high to the south.

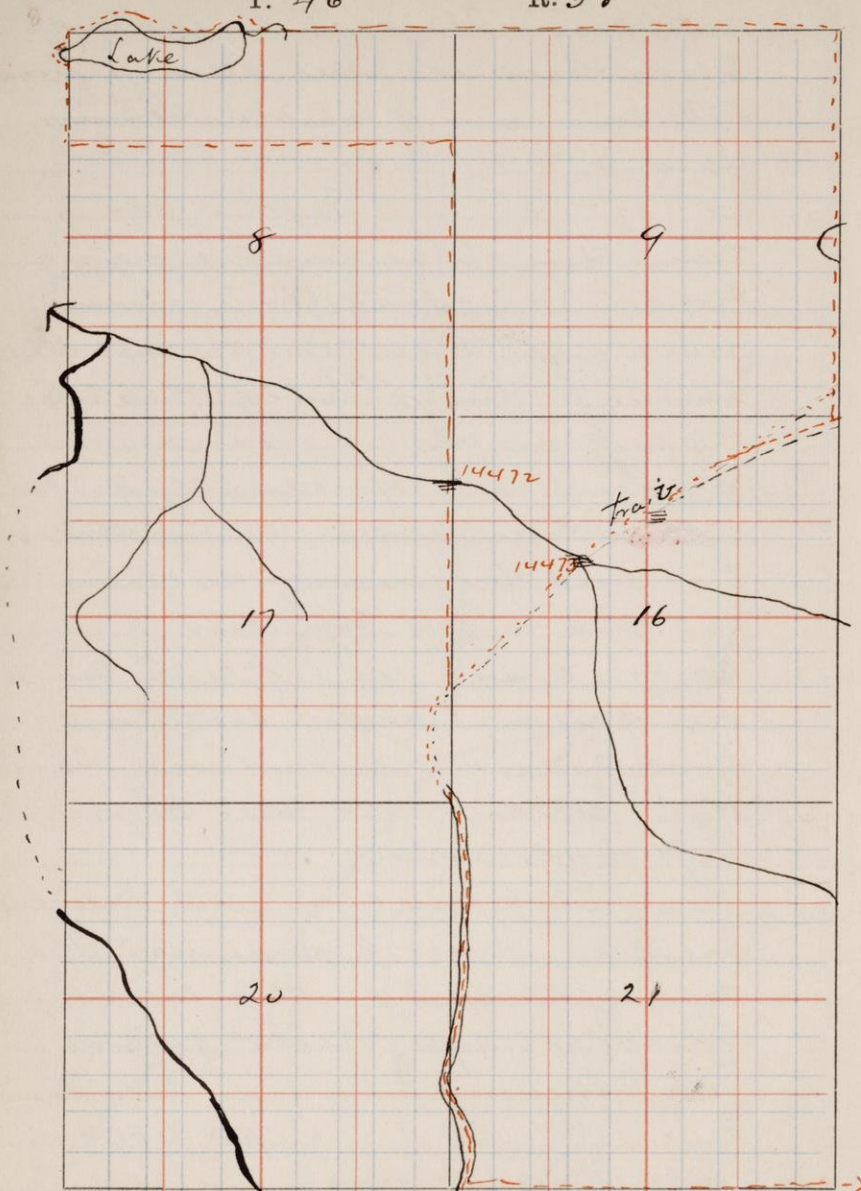
Returned to junction with Interior
road and went to Interior. The
Ontonagon river at this water
place has high banks of sand
and boulders.

Sept 6/89

Left Interior on road running
north along East line of Sec 20.

T. 46

R. 38



Tr 46 R. 38. and then on trail
 to line between Sec 16 & 17 near
 S.E. cor Sec 17 and north one
 mile to N.E. cor Sec 17.

14472

At 325 S. of N.E. cor Sec 17
 and a few paces East of line
 the stream crossed here falls
 over rapids which are caused by
 boulders from a ledge of slate^B
 dipping south and striking
 a very little (70-80, S of E.

Went 1500 paces N of N.E. cor
 Sec 17 then west to W. line
 Sec 8, north to N.W. cor this
 section, east two miles to N.E.
 cor Sec 9, south to S.E. cor of
 same section and 100 steps be-
 yond to trail, which followed
 back to camp.

The north line of Secs 8 and 9
 are over hills covered with
 scrubby pines. When reached
 the W. cor of Sec 9 struck
 steep hill covered with boulders
 of slate^B.

On trail crossed small ledge
 of slate striking E.W. at a-

14473 about 1400 U.E. of point 550 U. of
S.W. cr. Sec. 16 and 500 S. of
this ledge, another striking the
same way.

A little to the east this same
ledge crosses stream and produc-
es falls or a series of short falls.
Continued S.W. on trail to camp
over hills in which no rock was
exposed.

King and George went south on
line between Secs. 28 & 29 T. 46
R. 38 to S.W. cr. Sec 28, and
continued to S.W. cr. Sec 32, then
beyond to S.W. cr. Sec 4. T. 45.
R. 38, then east one mile and
north to U.E. cr. Sec 28 T. 46.
R. 38, then west to camp.

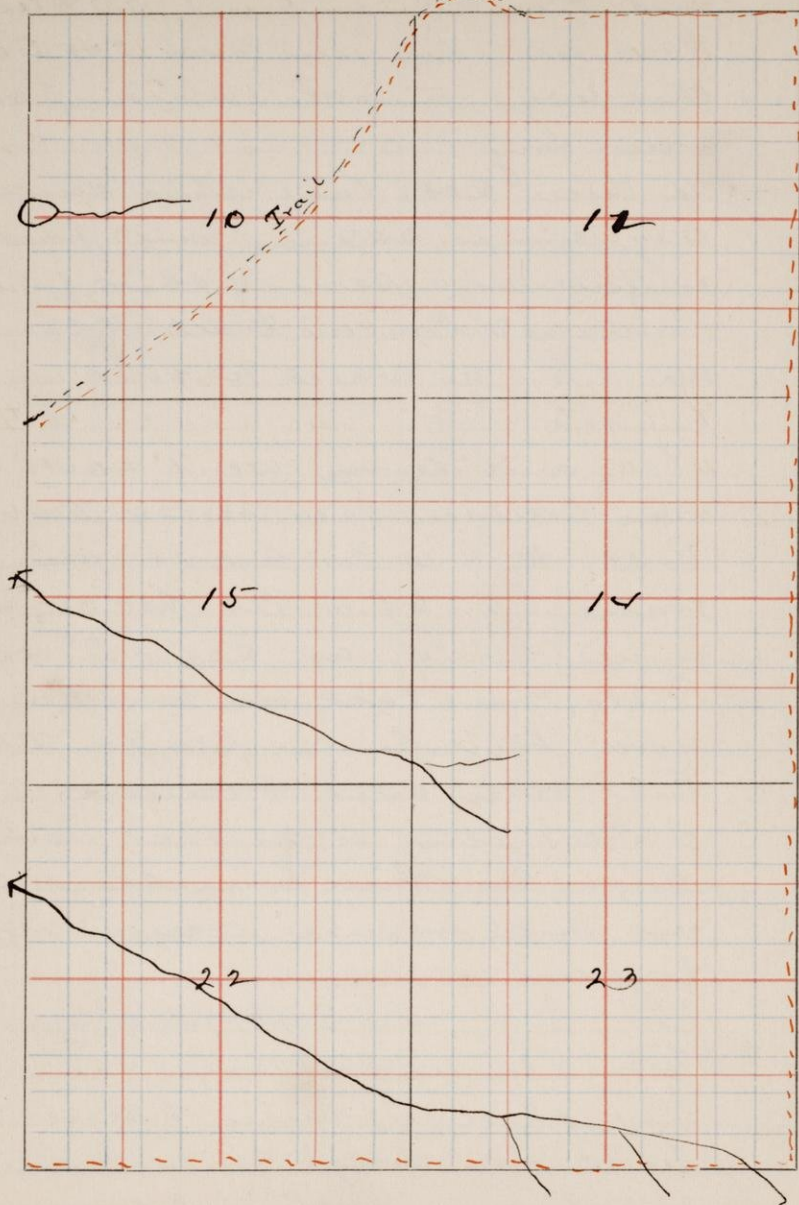
The country is covered with
grass. No ~~thickets~~ were seen ex-
cept such as were covered with
boulders.

Sept 7

Moved camp with boys, running
east three (3) miles to U.W. cr.
Sec 25, over rough boulder and
sand hills, and through swamps.

T. 46 N

R. 38 W.



On the same day King and Oley
 followed road and trail to S.W.
 Cor. Sec. 2 T 46 R. 38. Followed
 line from here East to S.W. Cor.
 Sec 1 and then went south
 to S.W. Cor Sec 24, to camp. The
 country was generally hilly, but
 no rocks were discovered.

Sept 8.

Ran N.E. through Sec 24 in T
 46 R. 38 and Sec 18 T 46 R. 37
 over hardwood, boulder hills, then
 north one mile, East 1350 paces,
 north 1250 paces and E. to East
 line Sec 5. Then ran south
 along the East line of Sec 5
 to N.E. Cor Sec 29, over swamps
 and scrubby pine hills for the
 first $1\frac{1}{2}$ miles and hardwood
 for the succeeding two miles.
 The hardwood hills are steep
 and high and are covered with
 boulders, among them granite,
 amygdaloidal trap and slate.
 The only rocks seen were in
 Sec 5. as follows.

T. 46

R. 37



14474 650 W and 1050 N of S. E. cor Sec
5. T 46 R. 37. Seal striking
EOW.

Other ledges at 1250 N and 620 W
and at 1250 N and 550 W.

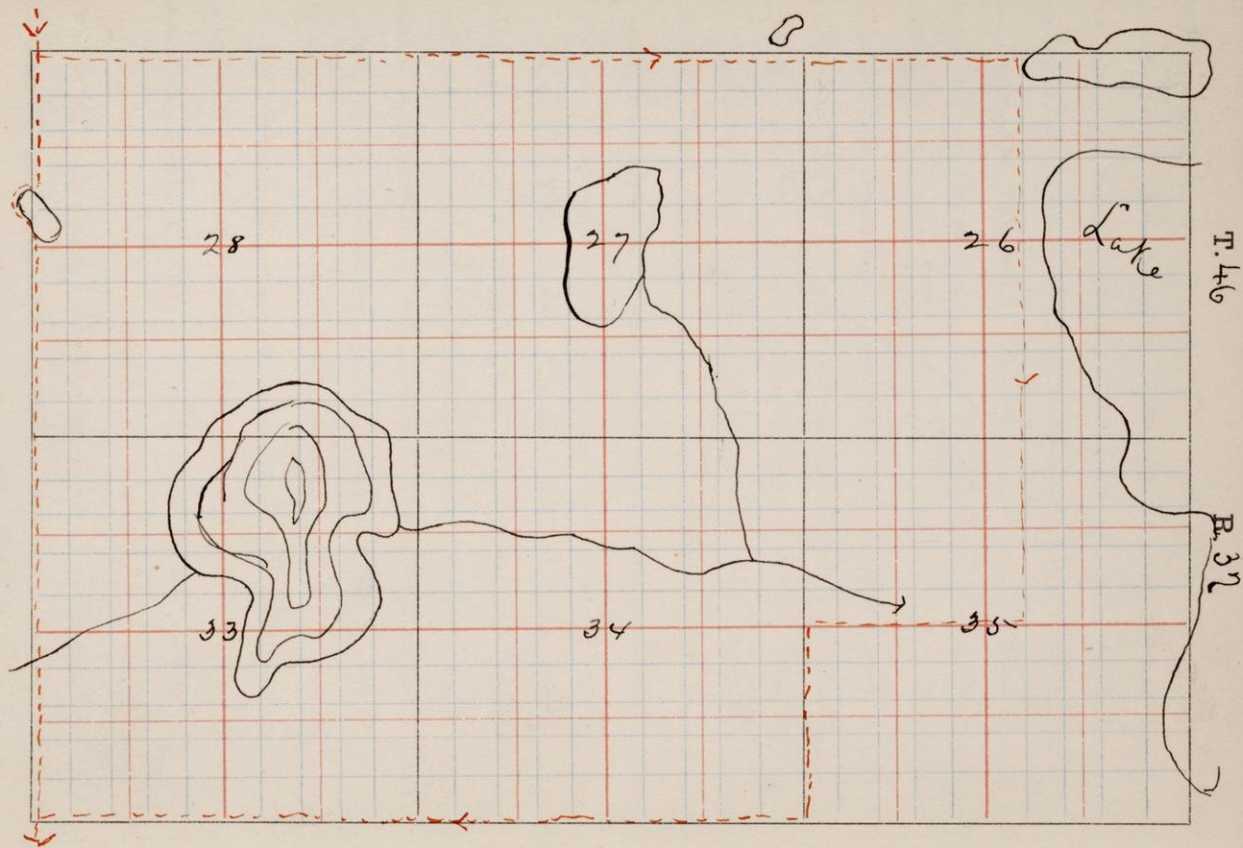
14475 " 1250 N " 400 W.

The boys moved camp along
the south line of Sec 24 T 46 R 38
and Secs 19 & 20 T 46 R 37 to
N. W. cor Sec 21 then south to
little lake between Secs 20 & 21,
seeing no rocks en route.

Sept 9.

From N. E. cor. Sec 29 T 46.
R. 37. ran east two (2) miles
and 1300 paces to lake via N. E.
 $\frac{1}{4}$ Sec 26, then S. along west
side of lake $1\frac{1}{2}$ miles and
west to west $\frac{1}{4}$ first Sec 35 -
south to corner and west to
S. E. cor Sec 32. then S. to small
lake on Sec line between Secs.
40 & 5 T 45 R. 37.

The boys moved camp along the
line 28 and 29 T 46 R 37, south
to lake between Sec 40 & 5.



The country consists of steep sand and boulder hills, and open spruce and tamarack swamps. No rocks!

Sept 10/89

Started from camp on lake between Secs 405 T 45 R 37 and ran ^{to} S.E. cor Sec 5, then S.W. to N.E. of Sec 10, west $\frac{1}{2}$ mile, and S.W. to railroad, and then took track to Watrous.

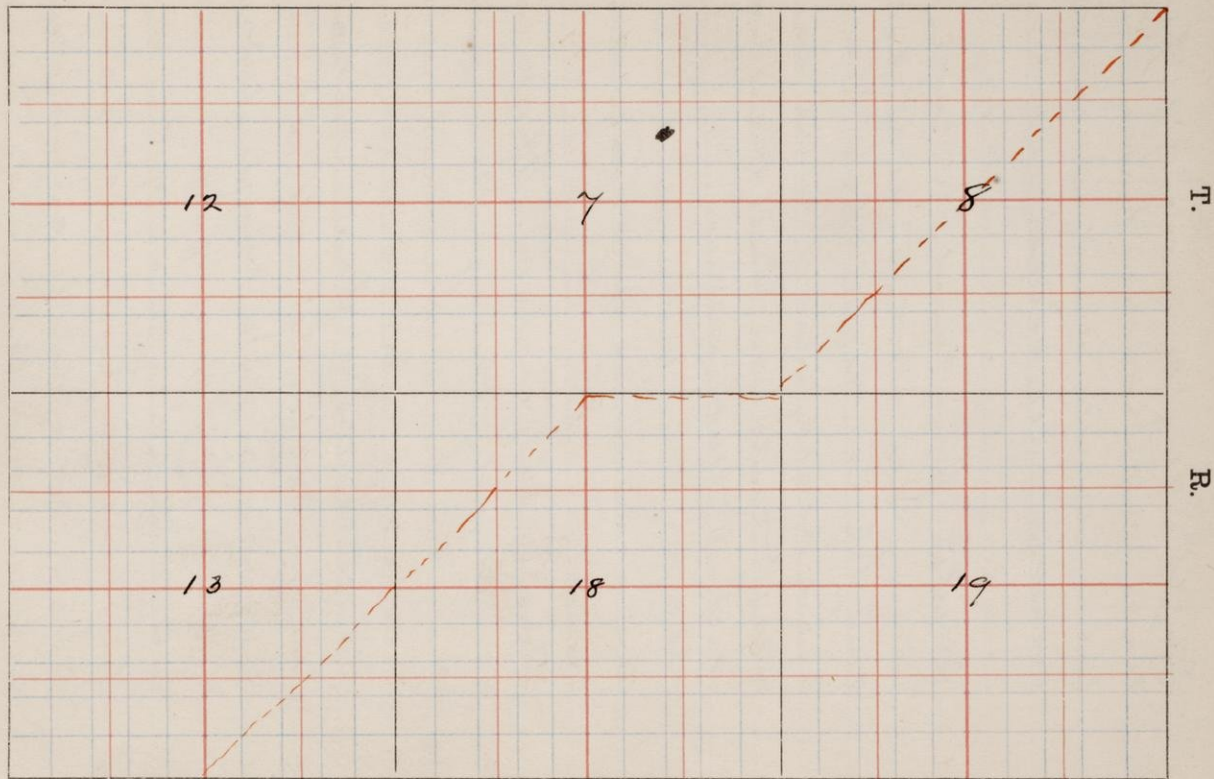
The country possesses same characteristics as that recently crossed.

Along the railroad the cuts are mostly through sand and gravel hills, under two of which rock ledges were observed, about $\frac{1}{2}$ mile west of Tamarack Station, in Sec 15, T 45, R. 38.

- 14476 The first ^{rock} is in a large ledge on the south side of the road, extending along side of the track for about 30 feet. It appears to be a hornblende gneiss. In it
- 14477 are curious lenticular masses, looking like encrustations of granitic

T 45 R. 38

T 45 R. 37



In the center there are very light colored, and around them are rims of a darker color containing large crystals of hornblende.

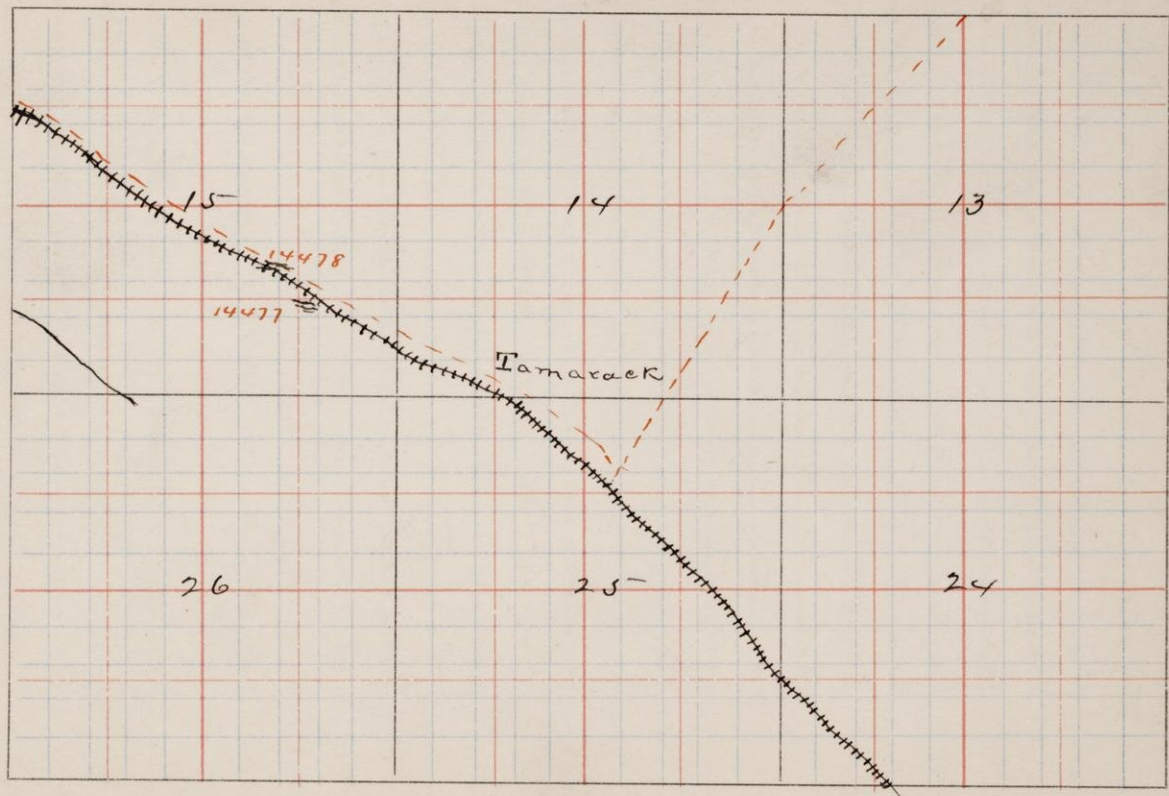
- 14478 a few paces west of this exposure, on the north side of the road is a smaller ledge of a soft green schistose rock containing shining crystals of chlorite or mica.

Sept 12/89

Went west on railroad from Hemlock Station in Sec 19.

T⁴⁴ R. 36. The road runs through swamp and sand hills. In cuts through the latter the sand and boulders are stratified.

- 14479 88 rails N of line between Sec 18 & 19 T⁴⁴ R. 36 is a ledge of dark quartzite or gray wacke, dipping almost vertical to the South. Its strike is about 10° N. of E. The ledge extends for the length of 6 rails, then a break of twelve rails and another ledge 11 rails in length of the



Same rock.

Sept 10-12

Oley & Less left the party on
Sept 10 at the N.E. cor. Sec 8
T 45 R. 37, ran two miles
east to N.E. cor Sec 10 then
south one mile and S.E. to
S.E. cor Sec 14.

14480

At 200 N and 240 W. of S.E.
cor Sec 14 on south side of
the river is a large ledge
of dark quartzite or gray-
wacke.

Another and smaller ledge
of the same rock occurs in
the river at 400 North of this
corner.

14481

At 440 E & 200 N of S.W. cor
Sec 13.

Ran east one half mile,
then south 200 paces and a-
gain east to ledge 800 N and

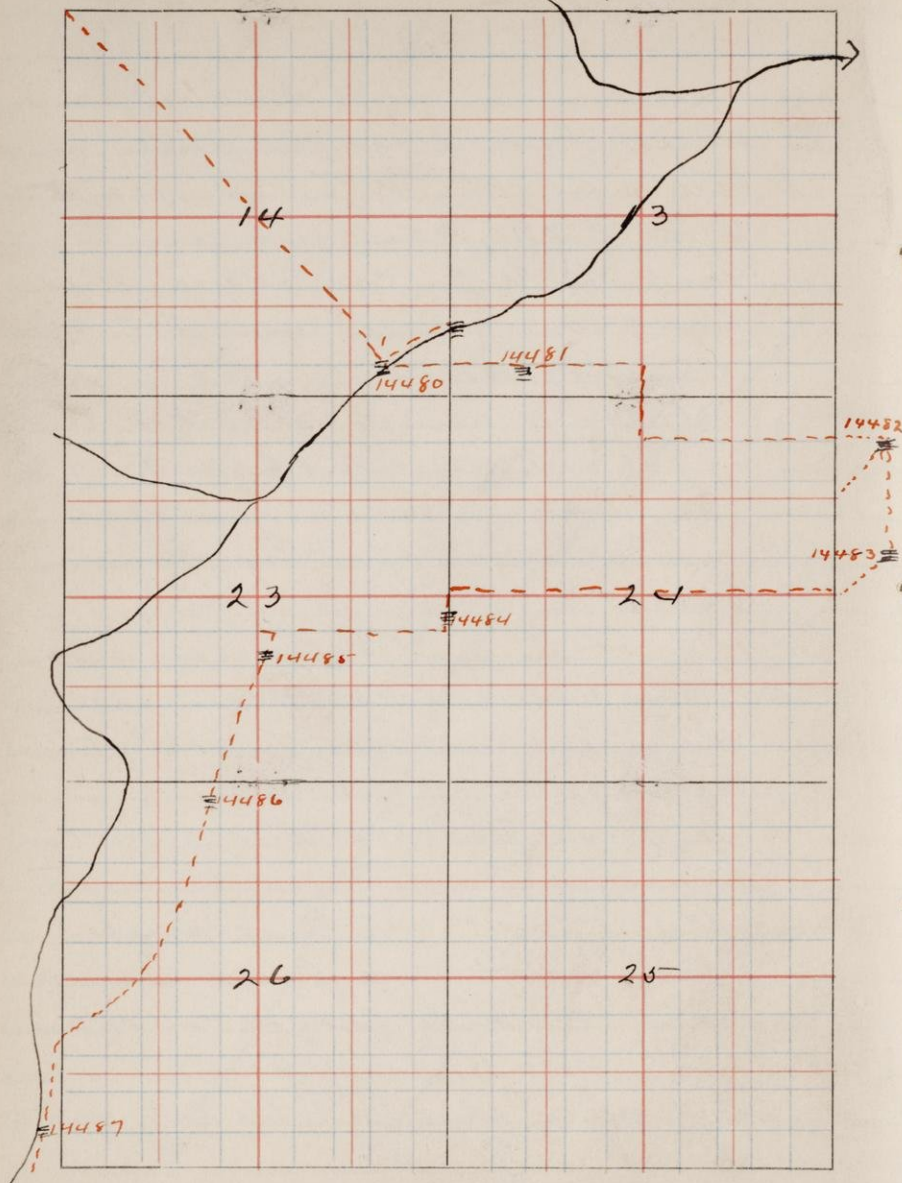
14482

240 E of E 1/4 first Sec 24, where
is a fine grained black quartz-
ite or graywacke.

From this point went south

T. 45

R. 37



500 paces, then S.W. to E $\frac{1}{4}$
 Just Sec 24

- 14483 At 300 N.E. of this $\frac{1}{4}$ post
 is a large ledge of a fine
 grained grayish black quartz-
 ite.

From this $\frac{1}{4}$ post went west
 one mile to west quarter post
 then south 200 paces and
 west to road indicated on
 maps.

- 14484 At 190 S of W $\frac{1}{4}$ post Sec
 24 is a fine grained, gray
 ochraceous rock, not very
 unlike 14478, though more
 quartzose.

- 14485 1000 N and 300 S of E $\frac{1}{4}$ post
 Sec 23 is a micaceous quartz-
 ite.

Went south on road to line
 between Secs 23 and 26, when
 went east to $\frac{1}{4}$ post between
 these sections, south 400 paces
 and west again to road.

- 14486 At 90 paces south of $\frac{1}{4}$ post
 between Sec 23 & 26 found
 ledge of

At 400 S of same $\frac{1}{4}$ pt.
and at 400 S and 400 west
are other ledges of the same
rock.

- 14487 At 200 N and 50 west of S. E.
C. Sec 27 is a ledge of the
same kind of rock as 14486.

- 14488 about $\frac{1}{4}$ mile East of Elmwood
on the river, on south bank,
and on south side of the road
is a rock resembling 14478.
It is schistose and contains
round specks of shining mica.
14489 Coarse hornblende schist with
same shining plates of mica.

Sept. 11.

In afternoon went East
on rail road from Hemlock a
distance of two miles. The
road runs through boulder and
sand hills, as it does west.

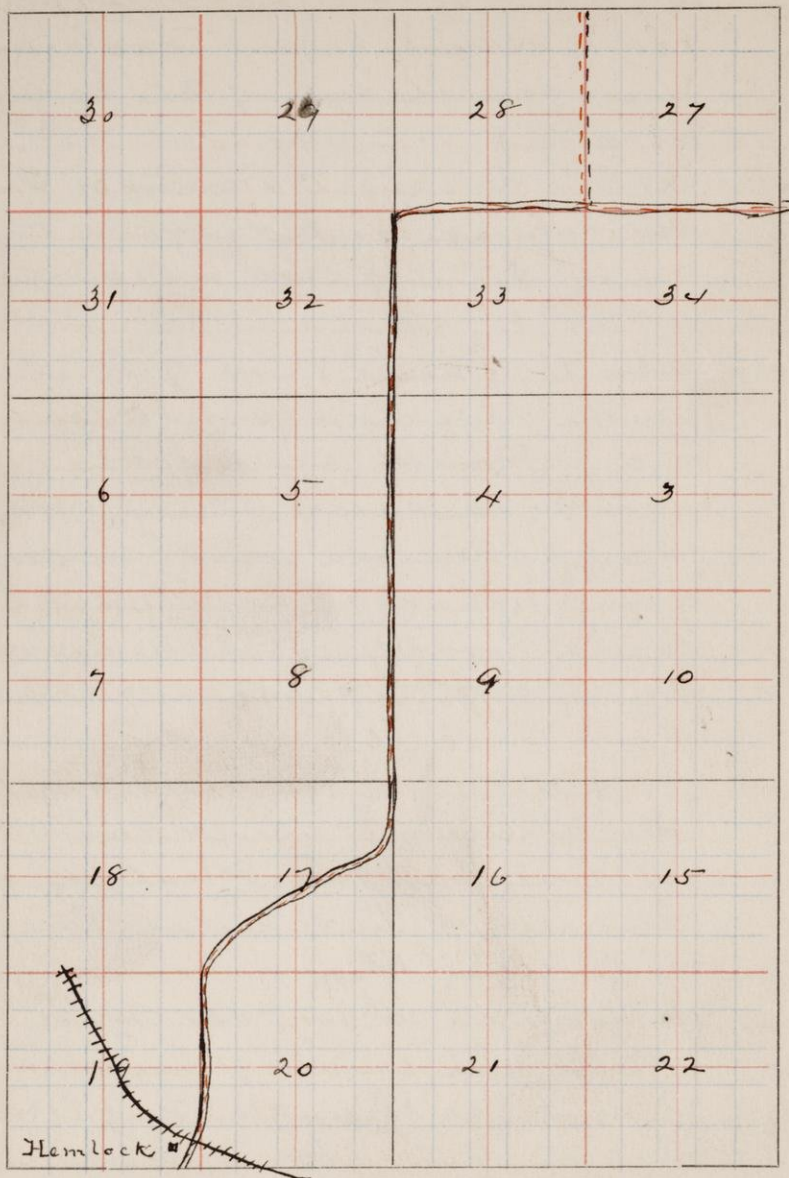
- 14490 The rock in center of Sec 28, ^{T44 R. 36} 20
a slate striking 10° N of E and
dipping N. It is quite a
large with smooth surface.

T.

R.

T 46 R. 36

T 45 R. 36



Sept 13/89

Left Steamlock on road running north near Section line between Secs. 19 & 20 to N.E. or Sec 32, in T 45 R. 36. The road passes over a series of hills, covered with boulders of slate. It generally keeps the high ground.

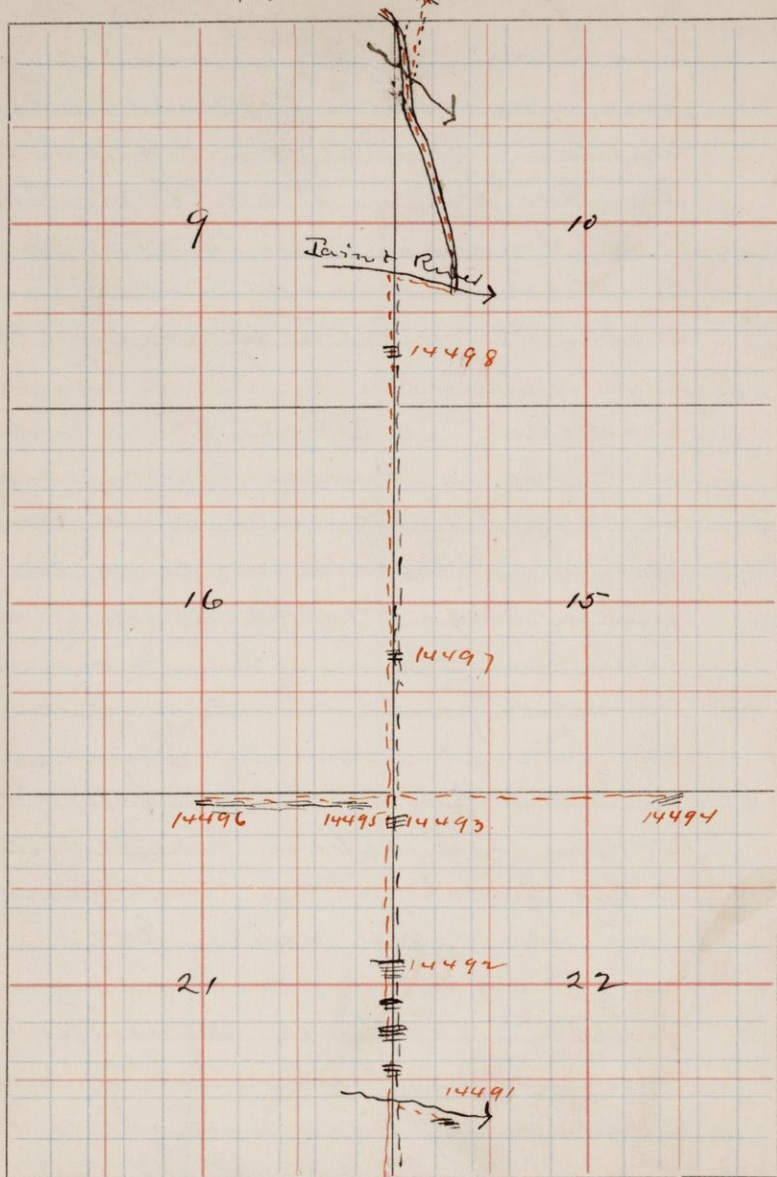
From N.E. or Sec 32 went ⁽²⁾ west three miles to river in Sec 26, and returned to trail running north on line between Secs 27 & 28 T 46 R. 36. Ran north in this trail to stream just north of N.E. or Sec 28. On the banks of this at 300 E and 1100 N of the corner are ledges of slate, dipping south at a high angle, and striking nearly E.W.

Sept 14

Continued north on trail running along center line of town, crossing three principal ledges. They are all slates striking 10° - 20° N of E and dipping

T. 45

R. 36



South at a high angle

The ledges are all sharp and bare, gray scales or gray waxes, striking in the same direction.

In running from quarter post between Secs 21 & 22 to North Corner of these two sections crossed numerous ledges of the same rock, striking as before 20° N of E.

14492 is from a small ledge about 100 paces north of $\frac{1}{4}$ post. It is a hard splintery slate with flakes of dark, graphitic looking particles.

14493 is a bluish gray graywacke from about 150 S. of corner.

When reached the S.E. cor Sec 26, ran East 1400 steps over scales etc, to ledge marked greenstone in plat. This is a gray scale striking a little N of E (15° - 20°) and dipping south, like the other ledges.

14494

King and George went west from same corner to ledge marked greenstone at the

S. quarter part of Sec 16. Ledges
all the way from corner to quar-
ter part.

14495 was taken from 322 west of
corner. Gray slate.

14496 From ledge at quarter part.
Continued north from S.E.
cor Sec 16 to Paint River
crossing line between Secs.
9 & 10. The rocks met appear
to strike more nearly E.W. than
those discovered south. The ledges
are in great abundance, and
all seem to be of the same
kind of rock.

Specimens were taken from
just two of the ledges viz:

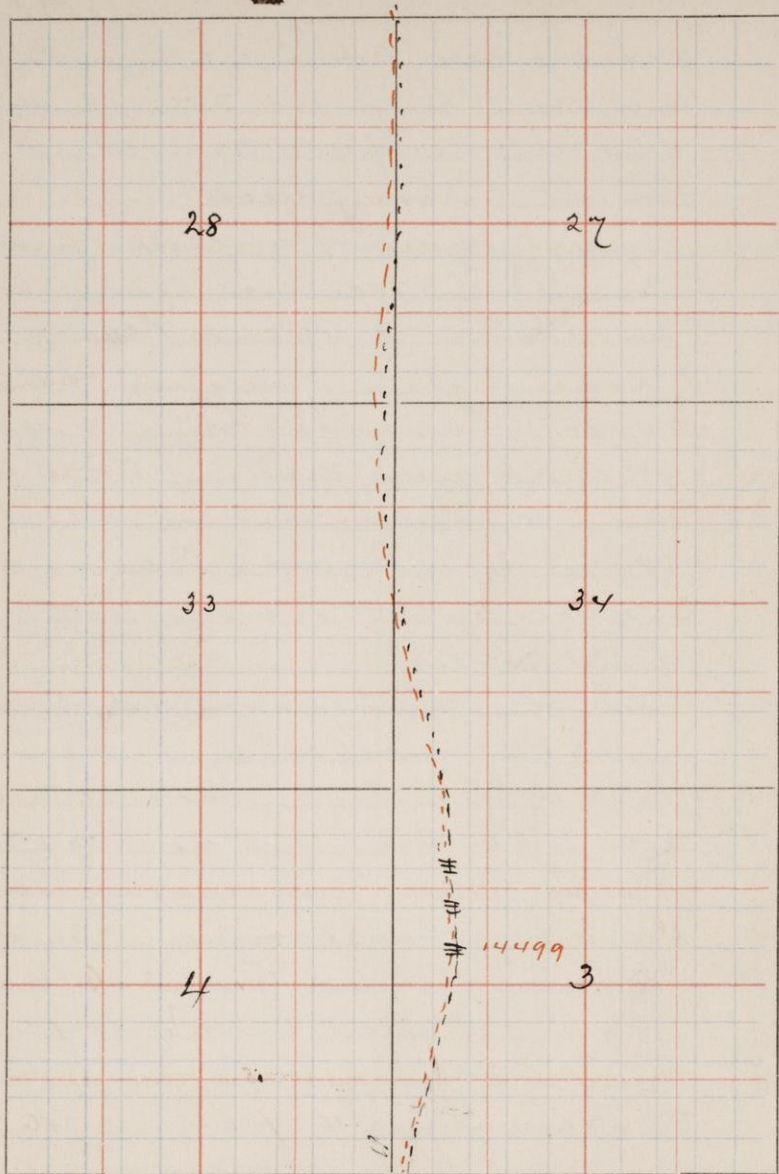
14497 750 N. of S.E. cor Sec. 16 &

14498 300 N. of S.E. cor Sec 9
Paint River was crossed at
800 N. of this corner.

Crossed Paint River in a
trail a little east of line,
ran north on road until
reached point 250 S. of N.W. cor.
Sec 10, when took old, well beat-
en trail running a little E.

T. 4

R. 36



T 45

R 36

of north, crossing middle line
of Sec 3 at 314 E of $\frac{1}{4}$ post.
and town line at 275 E of
N.W. cor. Sec. 3.

For the first half mile after
crossing river travelled through
swamp, until reached center
line of Sec 3. Here ledges
of slate again begin, the slate
striking about E.W.

14429

At 800 S and 300 E of N.W. cor
Sec 3, took specimen.

Other ledges are at 550 and
350 S. of same corner.

For the first mile above town
line the trail is over a sand
and boulder plain and small
ridges of boulders. For the next
mile it is through an open
swamp, and over ridges of sand.

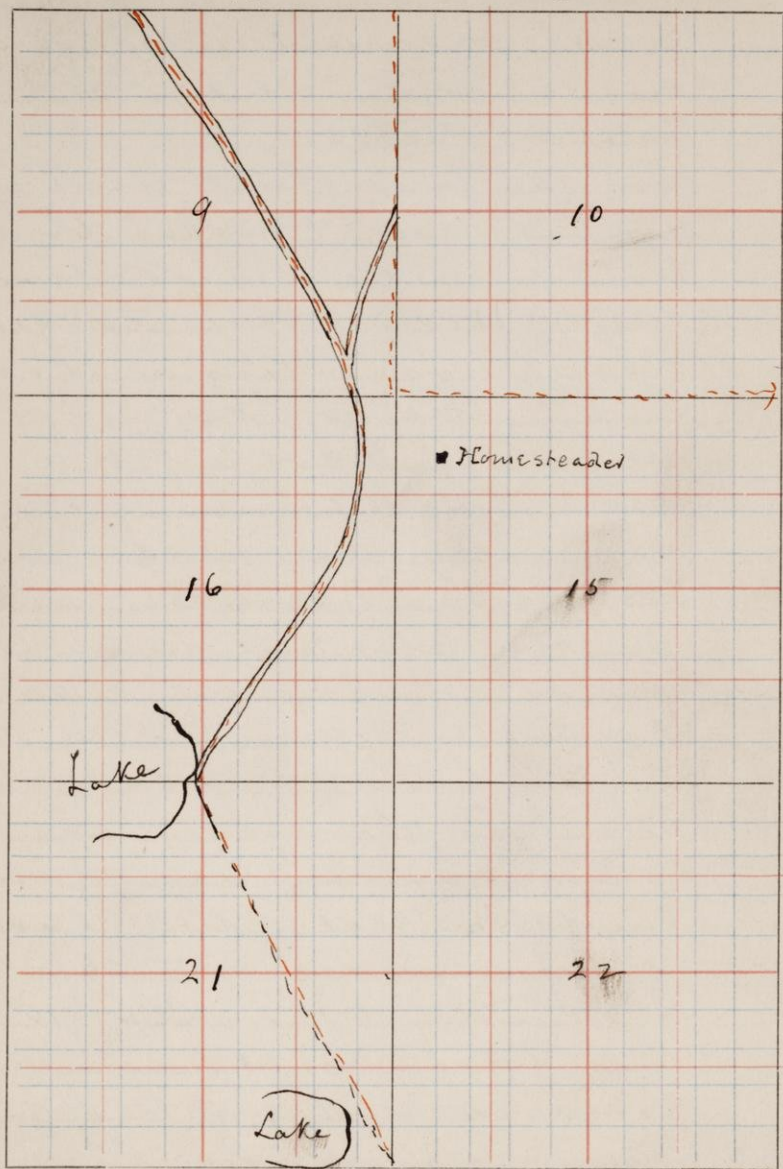
Camped on side of little lake
at S.E. cor Sec 21 T 46 R. 36

Sept 15.

From S.E. cor Sec 20 ran on trail
to lake at S. $\frac{1}{4}$ post Sec 16,
then on logging road to

T. 46

R. 36



near the S.E. cor Sec 9 and
N.W. to north line of Sec 9,
near logging camp, where
pitched tent.

Sept 16 -

Ran from camp on logging
road in Sec 9 to E ^{line of} Sec 5,
then S 1200 steps, west one
mile, N.W. to N $\frac{1}{4}$ part Sec 7,
and west 600 steps.

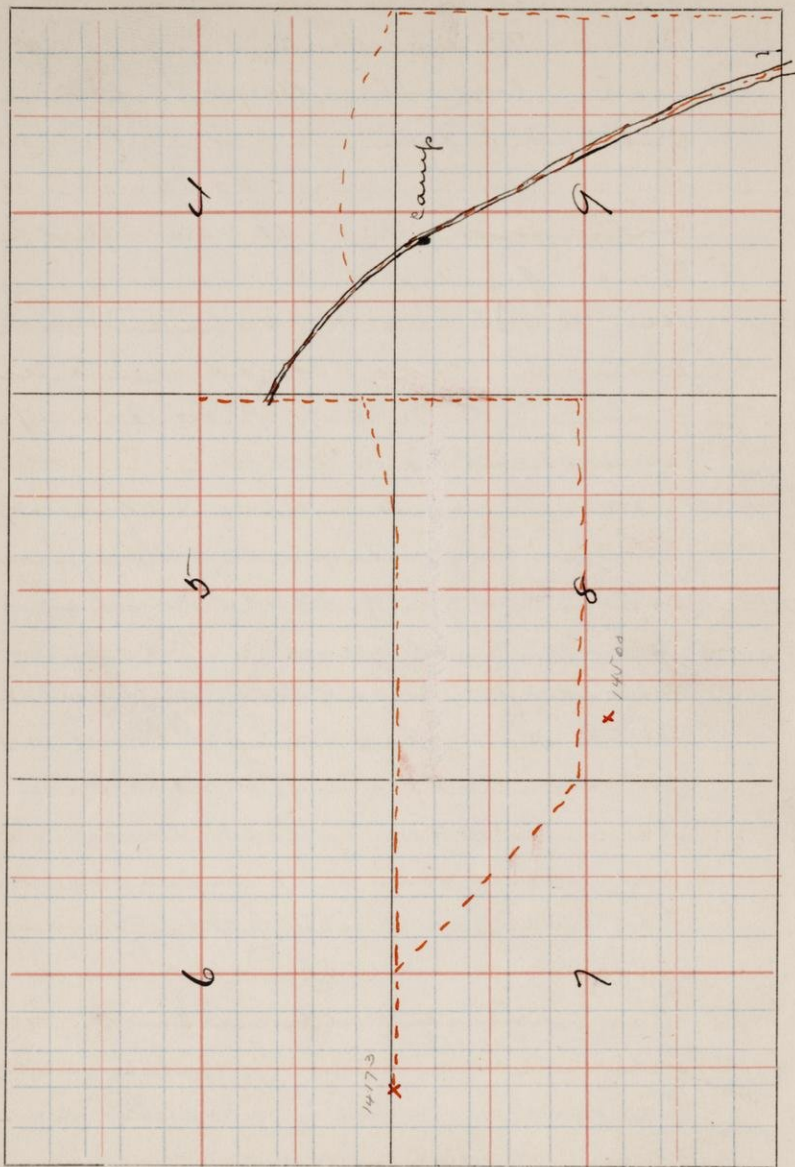
At 240 E and 100 S of E $\frac{1}{4}$
part Sec 7 T 46 R. 36 found
large ledge of slate on east
bank of stream. Rock very
schistose, striking a little
S of E and dipping E.

At 600 W. of N $\frac{1}{4}$ part Sec 7
is a ledge of rock said to be
by uprooting of a large pine
the rock is slate with the normal
strike and dip.

The country to the west of E
line of Sec 5 is principally a
hardwood country, interspersed
with rough, ragged hills of
boulders.

T. 46

R. 36



From camp went to N E cor
Sec 9 T 46 R 36, then S to
N. E. cor Sec 16, and then
east one and a half ($1\frac{1}{2}$) miles.
Found ledge at 580-650 E of
^{S.W. cor} ~~Sec 11~~ Sec 11, on south
side of line.

At 1040 East of same corner is
a large ledge of slate to north
of line. The rock here dips
S, and strikes 20° S of E. The
bedding and slaty cleavage
do not correspond, the former
is contorted.

Sept 17.

Went to logging camps in Sec.
4 T 46 R. 36 and took road
to Kitchie, and railroad to
Hill Creek.

Sept 18.

At Hill Creek found tele-
gram instructing party to
go to Hurley Wisconsin to get
low specimens of gray wacke.

Sept 19-20

Went to Hurley as instructed
and collected specimens

19/74
Hill Creek

they collected Specimen of
red sandstone from ledges in
Sec. 22, T 50 R. 36.

He left Ontonagon on County
road to Hooke Corner just be-
tween Secs 405- T 50 R. 36
and went south two miles,
thence S.E. to the N.W. cor Sec
22, and then drives.

11197
16000

The ledge is a red sandstone. It
occurs in the falls of the river,
which are 5 ft. in height.

Interstratified with this is
a yellow sandstone of which
specimen was also taken.

11198
16005

The location of Specimen is
300 E and 100 S of N.W. cor.
near Sec 22. T 50 R. 36.

About 100 paces north of these
falls is another, 70 paces
west of same corner. This fall
is ten ft. in height.

Between the two falls the
bed of the river is composed
entirely of sandstone.

