



LIBRARIES

UNIVERSITY OF WISCONSIN-MADISON

T. 50 n, r 29 w Michigan, D S. S. + A. R. R, between Michigamme + L'Anse: [specimens] 13664-13758. No. 65 September, 1887

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], September, 1887

<https://digital.library.wisc.edu/1711.dl/GHODYS7L6QPSW8C>

<http://rightsstatements.org/vocab/InC/1.0/>

For information on re-use see:

<http://digital.library.wisc.edu/1711.dl/Copyright>

The libraries provide public access to a wide range of material, including online exhibits, digitized collections, archival finding aids, our catalog, online articles, and a growing range of materials in many media.

When possible, we provide rights information in catalog records, finding aids, and other metadata that accompanies collections or items. However, it is always the user's obligation to evaluate copyright and rights issues in light of their own use.

U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 65.

September, 1887.

T. 50 N., R. 29 E. Mich., D. S. & N.
A. R. R., between Michigan & La. Ave.

St. S. Bayley.

13664 - 13758

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

6. Forward this note book, as soon as filled, as registered mail matter, to R. D. IRVING, U. S. Geologist, Madison, Wis.

#65

13700-13732 inclusive in
Marquette district, 748-R31
pp. 8-27

All the strikes recorded in this book are calculated from the magnetic meridian (variation $2^{\circ}-3^{\circ}$ to the east) and are besides the strikes of the cleavage planes in the slates, except where otherwise stated.

Howie's Trip-

T 50. R 29.

Howie went north on line
between Decs. 33 & 34 in T 50
R 29 to U. E. cr. Dec 28 in
same town, then W. to range
line and South to D. W. cr.
Dec 31.

13664 25 E. of S. E. cr Dec 33

Grayish green chloritic gneiss
or greenstone from ledge on
side of swamp.

13665 500 N. of D. E. cr. Dec 33.

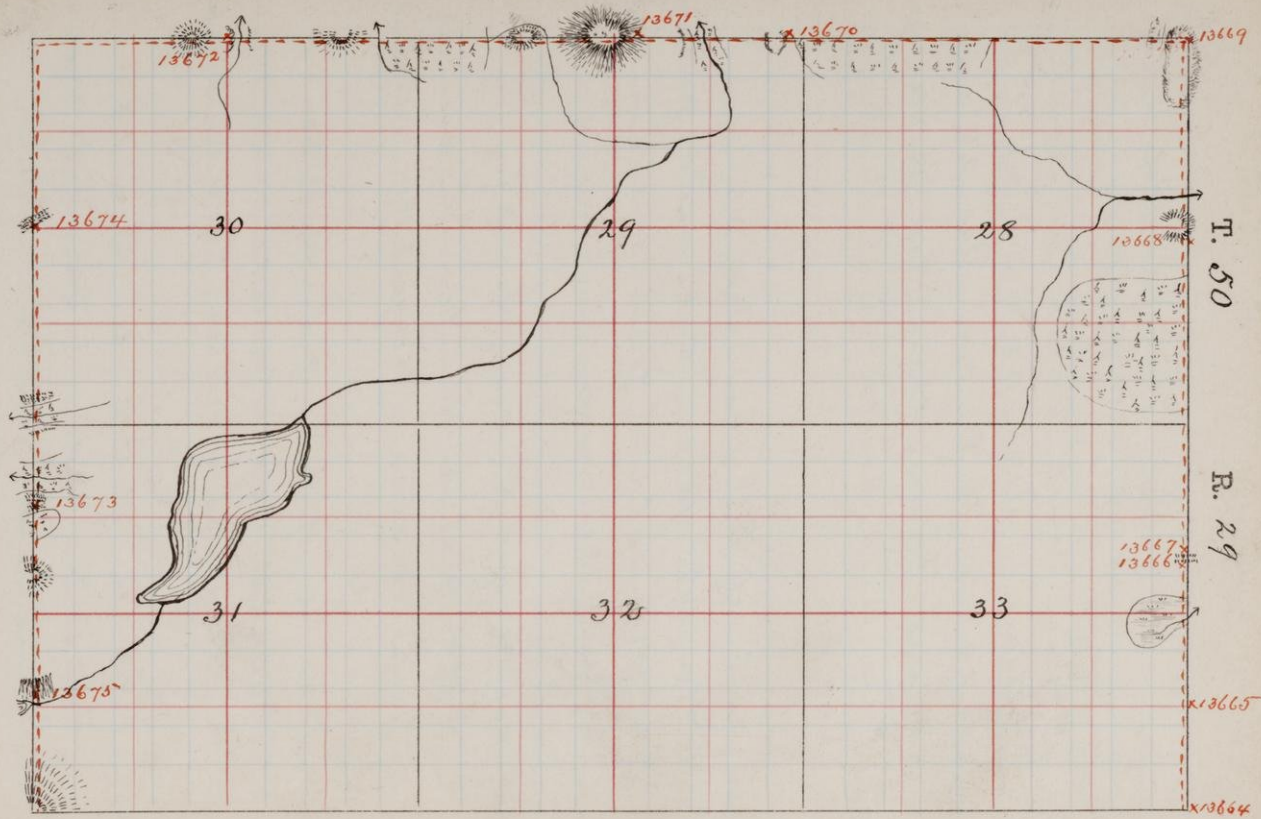
Soft greenstone - from a small
perpendicular ledge 6 ft. in height.

13666 1250 N. of S. E. cr. Dec 33

Coarse horn blende rock, from
a ledge 20 or more feet in height.

13667 1275 N. of D. E. cr Dec 33

From N. side of same ledge -
Same rock, but less fresh.



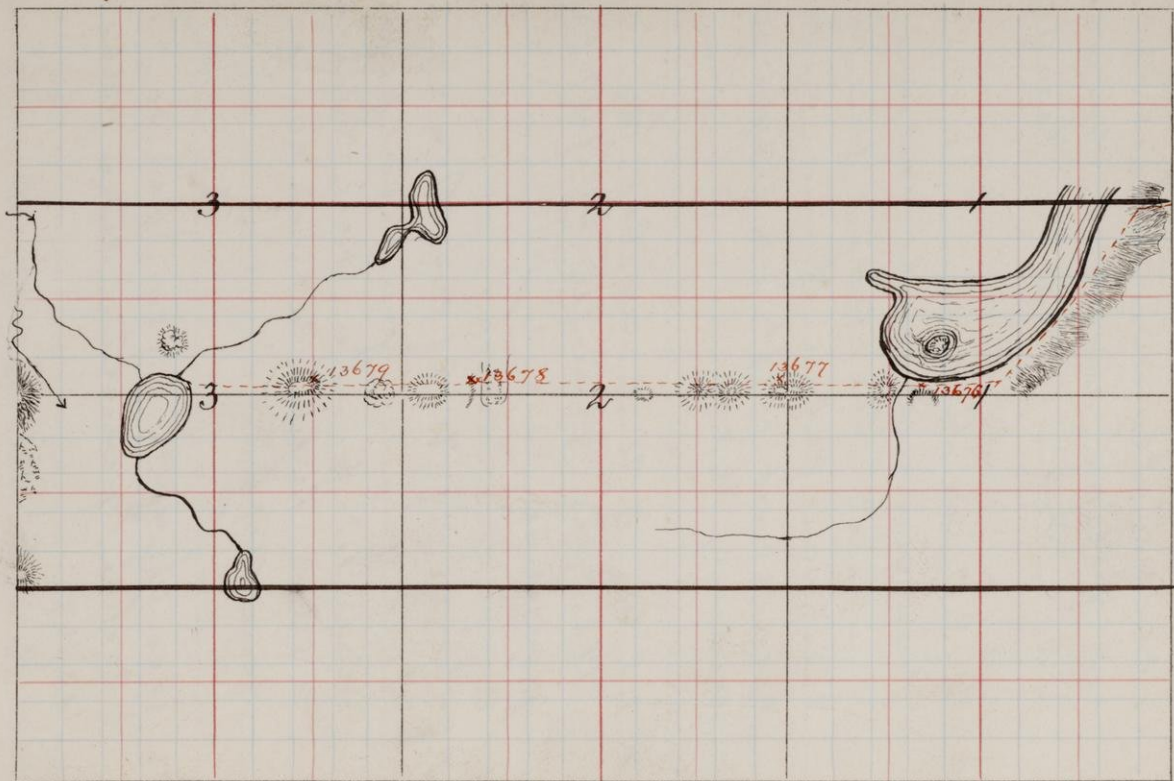
T. 50

R. 29

- 13668 925 N. of S.E. cor Dec 28
Coarse chloritic gneiss with
red feldspar; weathers bright
red. Iron ledge in swamp.
- 13669 N.E. cor Dec 28.
Fine grained light colored
granite. The ledge from which
this was taken forms a little
hill about 25 ft. in height and
running N & S.
- 13670 75 W. of N.E. cor Dec. 29
Chloritic granite or feldspathic
greenstone.
- 13671 960 W. of N.E. cor. Dec 29
Fine grained grayish pink
granite from a hill trending
N & S. Ledges exposed every
few steps.
- 13672 1000 W. of N.E. cor. Dec 30
Coarse greenstone like 13666 &
13667

T. 49

R. 30



13674 1000 N. of S. W. cor Dec 30.
 Very fine grained diabase, containing a little pyrite.

13673 1545 N. of S. W. cor Dec 31.
 Greenstone, with considerable quartz on weathered surface. Large perpendicular ledge in swamp.

13675 550 N. of S. W. cor. Dec 31.
 Gneiss from large exposure on the N. side of marsh.

From S. W. cor Dec 31 T 50 R 29
 ran S. W. to center of Dec 1.
 T 49 R 30 then west $2\frac{1}{2}$
 miles to W. line Dec. 3.

13676 900 S and 1300 W. of N. E. cor.
 Dec. 1.

Chloritic gneiss from perpendicular ledge on edge of Lake. This lake is surrounded by high hills, which are especially noticeable on its E & S. sides.

T.

R.

From w. quarter-part of Sec 3, run
S. to w. quarter part Sec 15, then
D. E. to S. quarter part of the same
section, E to S.E. cor Sec 15 and
north to the East quarter part of
Sec 10, and from here NW to
w. quarter part of Sec 3.

13677 900 S. 15 W. of N.E. cor. Sec. 2.

Coarse chloritic gneiss with large crystals of red feldspar.

13678 900 S and 1700 W. of N.E. Cor. Sec 2.

Very coarse pegmatitic veins, with much red feldspar and big bunches of chlorite.

13679 900 S and 500 W of N.E. Cor. Sec 3.

Schistose fresh hornblende-rock (?) with plagioclase altered to epidote.

13680 ~~1000~~ N of D. W. cor Dec 10.

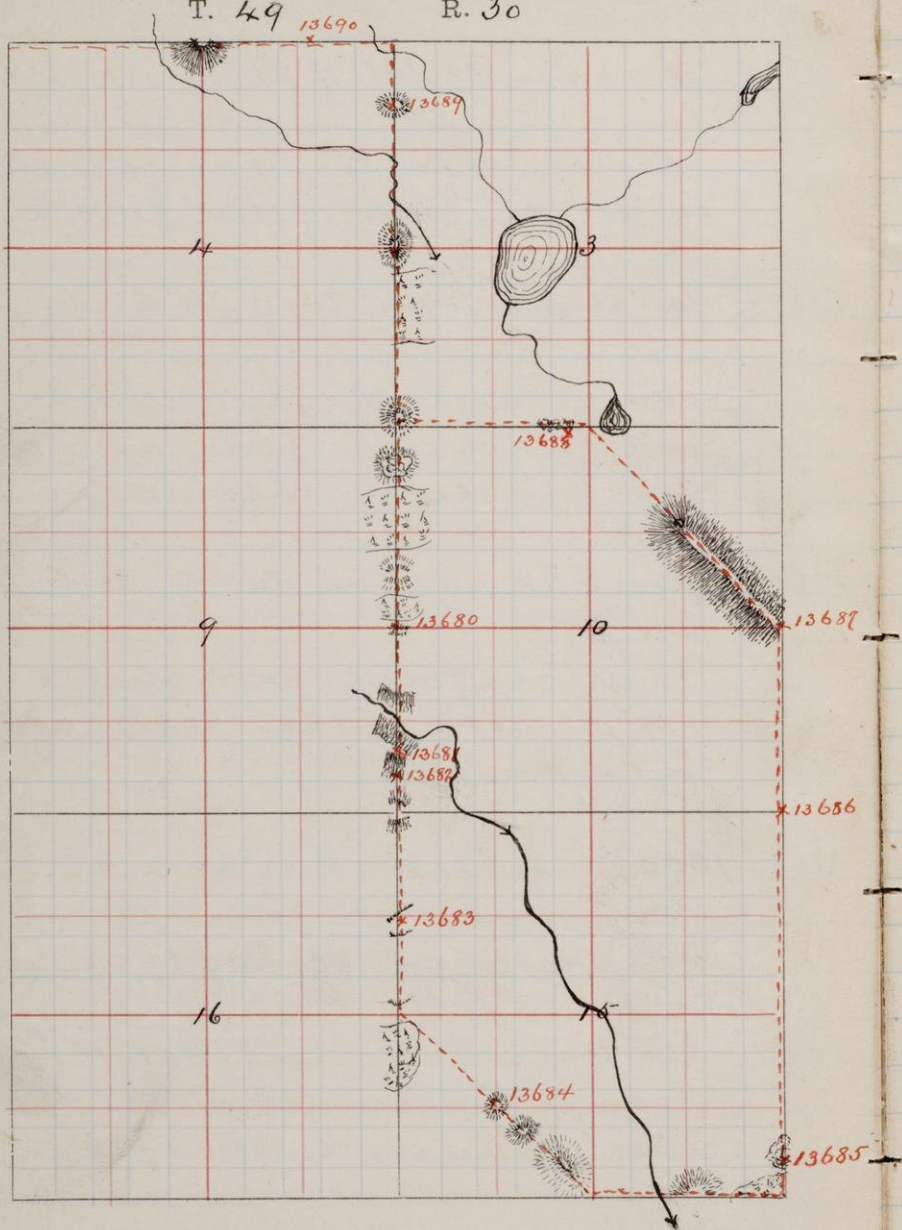
Gray granite?, from perpendicular ledge 25 ft. high, running E & W.

13681 350 N. of D. W. cor. Dec 10

Coarse hornblende rock - apparently similar to 13666 & 13667 though no so coarse grained.

T. 49

R. 30



13682 200 N. of D. W. cor. Dec 10.
 S. side of ledge from which
 13681 was taken. Gray gneiss.

13683 1475 N. of D. W. cor. Dec 15
 Coarse grained grayish green
 schistose rock, from perpendicular
 near ledge running N.E.

13684 600 S.E. from W. quarter
 part of Dec. 15.
 Feldspathic greenstone.

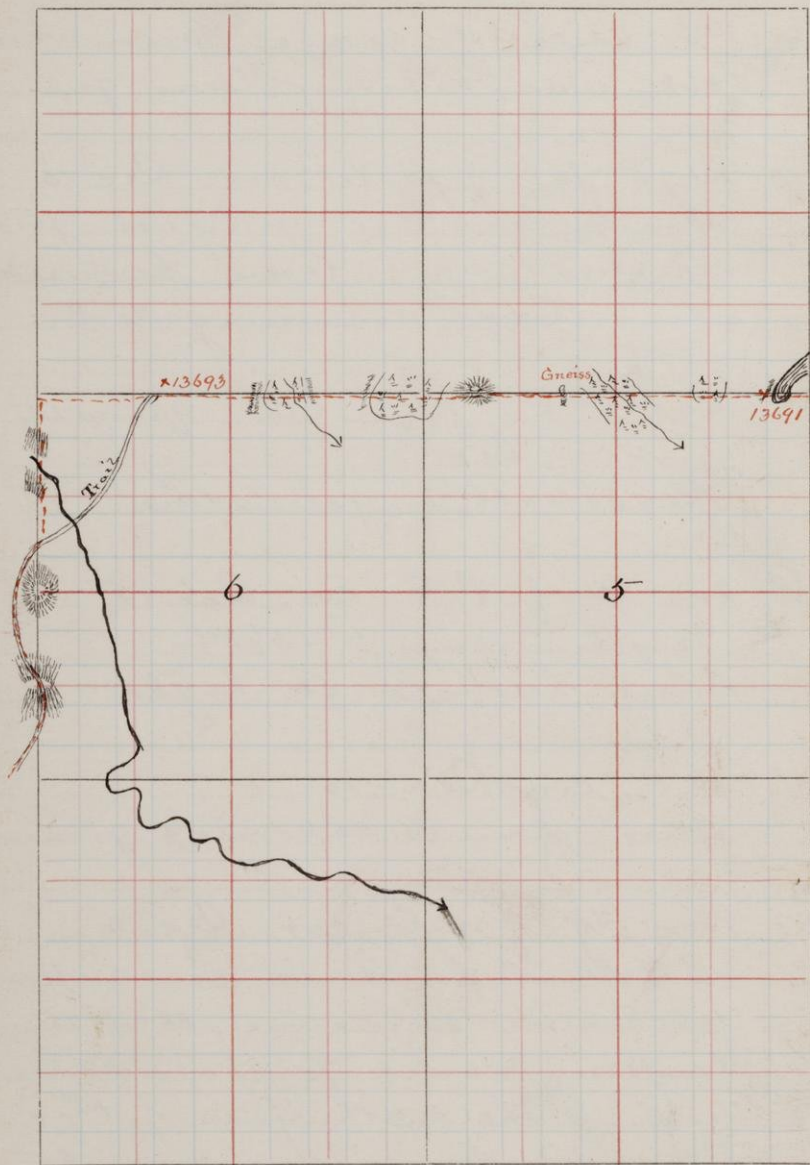
13685 200 N. of D. E. cor. Dec 15.
 Very similar to 13684 -
 from hill 100 ft. high.

13686 N.E. cor. Dec. 15
 Fine grained chloritic granite

13687 1000 N. of D. E. cor. Dec 10.
 At this point is an exposure
 of schistose greenstone, etc, ex-
 tending about 700 paces to the
 N.W. The south face of this
 bluff is perpendicular, its
 trend being E & W.

T. 49

R. 30



13688 900 E. + 35 N. of D. W. cor Dec 3
From a large exposure of porphyritic granite - gray and mica bearing.

From W. quarter part of Dec 3. ran N to N. E cor Dec 4, then west to the N. W. cor. Dec 6.

13689 300 S of N. E. cor Dec 4.
Fine and coarse grained granite, from small hill running E. W.

13690 420 W. of N. E. cor Dec 4.
A perpendicular ledge of hornblende schist.

13691 220 W. of N. E. cor. Dec. 5
Chloritic gneiss, very coarse and rich in quartz, from large ledge running N. E., on edge of marsh.
May probably be pegmatitic vein.

13693 625 E + 15 N of N. W. cor.
Dec. 6.

Fine grained banded gneiss.

13692 1500 S and 100 W. of N. W. cor.
Dec 6.

Greenstone with bright crystals
of very fresh plagioclase.

The appearance of the hand
specimen is very much as if
it were taken from a vein.

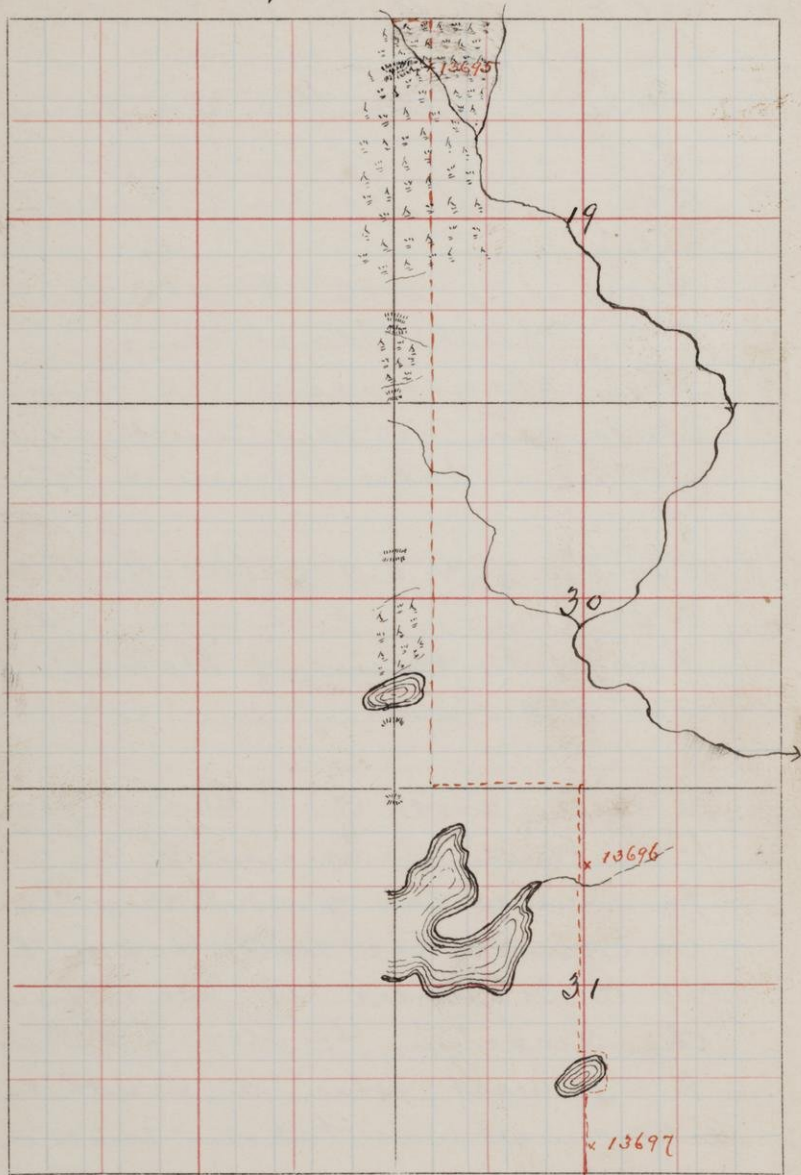
13694 1550 N. of S. E. cor. Dec 11. T 49.
R 31.

Large exposure of Diorite on
edge of Swamp.

A little north of S. W. cor Dec. 6
took trail running S. W. as
provisions. Had grown very scarce
Followed this into Dec 11. T
49 R. 31, until it was found
the direction tended too much
to the west, when a South East-
erly course was taken until
the N. W. corner of Dec 19 T 49,
R. 30 was reached, and then

T. 49

R. 30



ran south in a line which was afterwards found to be 200 paces E of the range line, as far as the N. line of Sec 31.

At this point turned east and went as far as 1/4 quarter part of this section when ran south to south quarter part.

At this point found an old road which was followed in to Michigamme.

13695 200 E & 230 S of N.W. cor. Sec 19. T 49 R 30.

Mica Gneiss from a perpendicular ledge on the south side of a stream.

13696 1600 N. 1000 W. of S.E. cor Sec 31 T 49 R 30.

Seriate schist

13697 175 N. 1000 W. of S.E. cor Sec 31.

Coarse grained mica gneiss, which seems to be the prevailing rock in this region.

13698

13699

} No specimens taken.

Aug

Went west on R. R. (D. S. S. and A) from point where E. range line of T 48. R 31 crosses it.

At the place where it was supposed that the line between Sec 23 & 24 crossed the road, went north to find the quarter post.

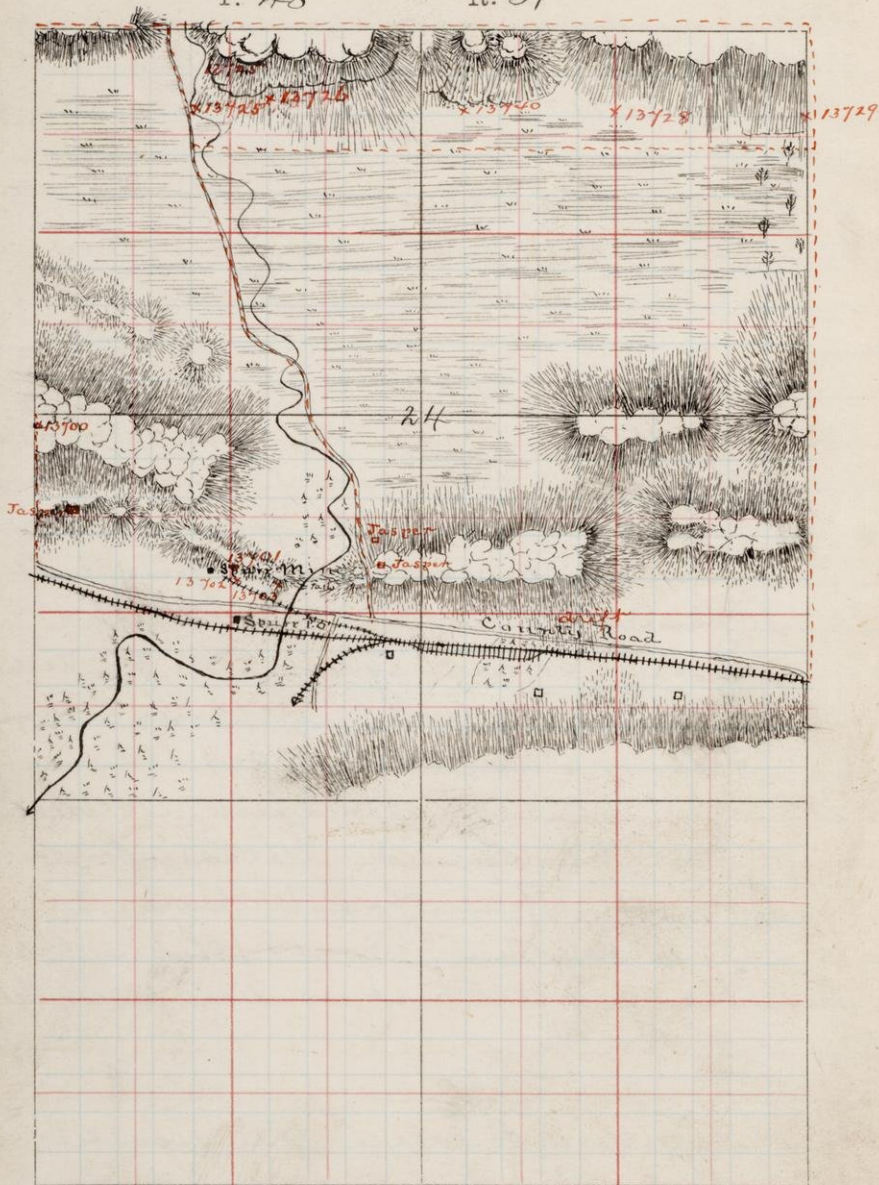
The line was easily found. It passes through a large dead pine standing on the N. side of the rail road. Although some time was spent searching for the quarter post, it could not be found. Measurements made from the N. line of the section would show that the quarter post is 400 paces N. of R. R.

13700

Very close to where the quarter post should be is a bluff of coarse brown blende rock.

T. 48

R. 31



This rock is very fresh, black and filled with shiny crystals of hornblende in a black fine grained groundmass. This rock extends E & W as will be seen later, and forms the good ridge of hill flanking the R. R. in the north.

Another bluff on the north of the R. R. and a little east of the line is composed of roughly banded gaspers and hematite, dipping 90° toward and striking 5° N of W (true)

At the Sparr Mine (see map) the same banded rocks dip $60-65^\circ$ W S. and strike 10° S of W (true).

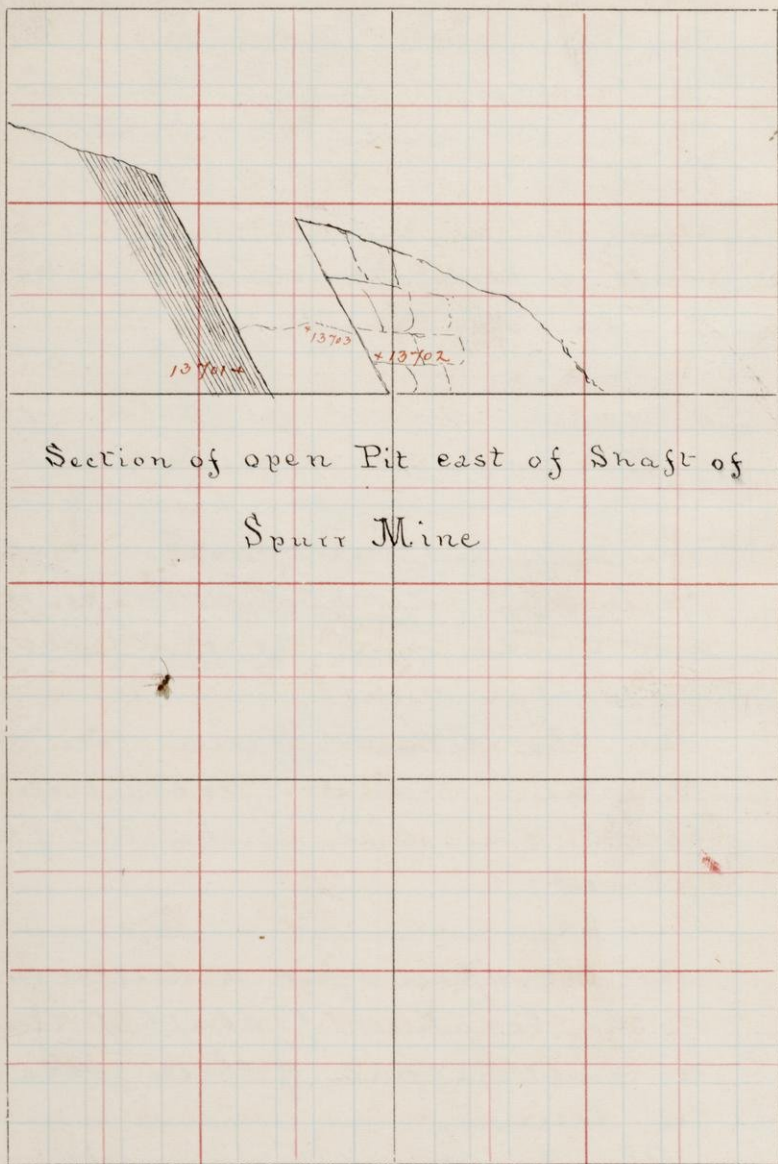
At the open pit a little east of the location of shaft of mine a good section of these rocks can be seen.

13701

The banded gaspers in the

T.

R.



north of the open space dip to the South. The open space inclines to the South. It probably represents the former occurrence of a bed of ore. It is about 15 ft. in width. To the South of this again is a coarse grained quartzite in which the pieces of quartz and feldspar sometimes become so large as to form a conglomerate.

In certain places just East of this open pit, sharp pieces of a slaty looking rock accompany the quartz and feldspar. Here the various rocks are contorted and so lose their normal strike and dip.

To the east of the Section showing the open pit, are outcrops of soft green chlorite rock like that obtained from the mine, - the gangue of the altered garnet crystals.

This rock is on the strike

of the ^{vacant} 'space' in the pit.

Immediately north of the Railroad is a low ridge of hills composed of gneiss and iron ore. Back of these are higher ridges composed of the trap rock 13700-

Beyond this is a Swamp measuring about 500-700 paces in width and beyond this again is a high ridge of granite and gneiss. This granitic ridge presents an almost perpendicular face to the South - and is itself on the north line of the Section.

These characteristics continue west into Sec 23, as will be seen by the map opposite.

The granite range was crossed only in a few places, and consequently its position is not indicated on all the maps, as only that portion of the country actually seen, is indicated.

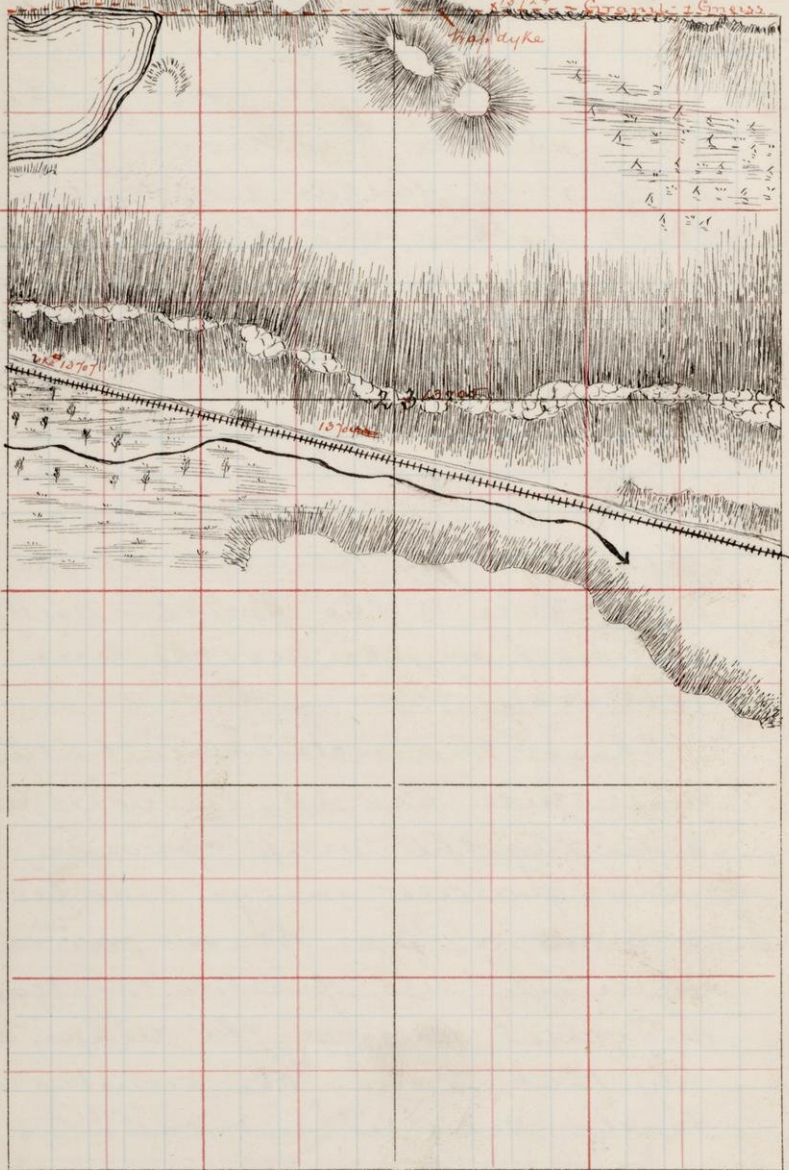
T 48 Gneiss

R. 31

x 13724

Granite & Gneiss

Walden



13704 About 100 paces N of the R. R. and 1000 E of W. line of Sec. 23 is an outcrop on the side of a hill. It consists of a very coarse actinolitic or anorthophyllitic rock, with a very distinct strike. In the hand-specimen it is very heavy and much weathered, presenting a bronzy lustre, with long fibres of a white mineral scattered throughout its mass.

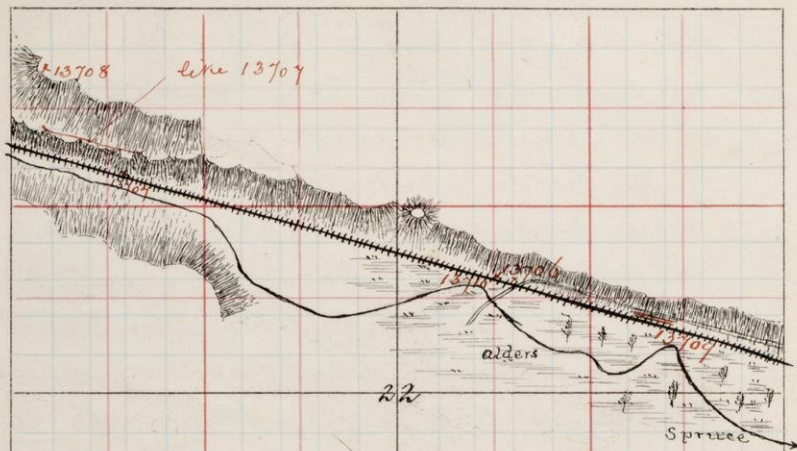
The strike is 10° N of W (true) and dip about 60° & 65° W S.

13705 The ridge of hills beyond this is composed of a coarse homblende rock very similar to 13700.

The location of the specimen is 100 E & 50 N of 13704

It would seem probable that 13704 is merely an altered form of 13705.

Both of these rocks extend with great persistence throughout



The intersection of the R.R. with the west line of Dec 22 may be only about 125 paces S of corner of Dec, instead of 350 paces as indicated in map 22.

In the following map the position of the R.R. is drawn as in former position.

the entire section in parallel ridges - the so-called altered zone producing the low hills beyond which the black fresh rock gives rise to a higher ridge.

In Dec. 22. the very high almost perpendicular bluffs of coarse crystalline trap approach very close to the railroad, on south side of which is a swamp.

13706 is at the intersection of the railroad and county road.

675 paces W. of E. line of Dec. 22 and directly on the road.

Coarse grained trap like 13700 and 13705.

13707 From Southern ridge of hills directly upon the railroad. This rock seems very similar to the other traps described except that it is rather more decomposed and slightly finer grained.

13708 100 E of W. line of Sec 22 and about 175 S of the U. line.

Coarse crystalline trap like 13700, 13705-6-7 etc.

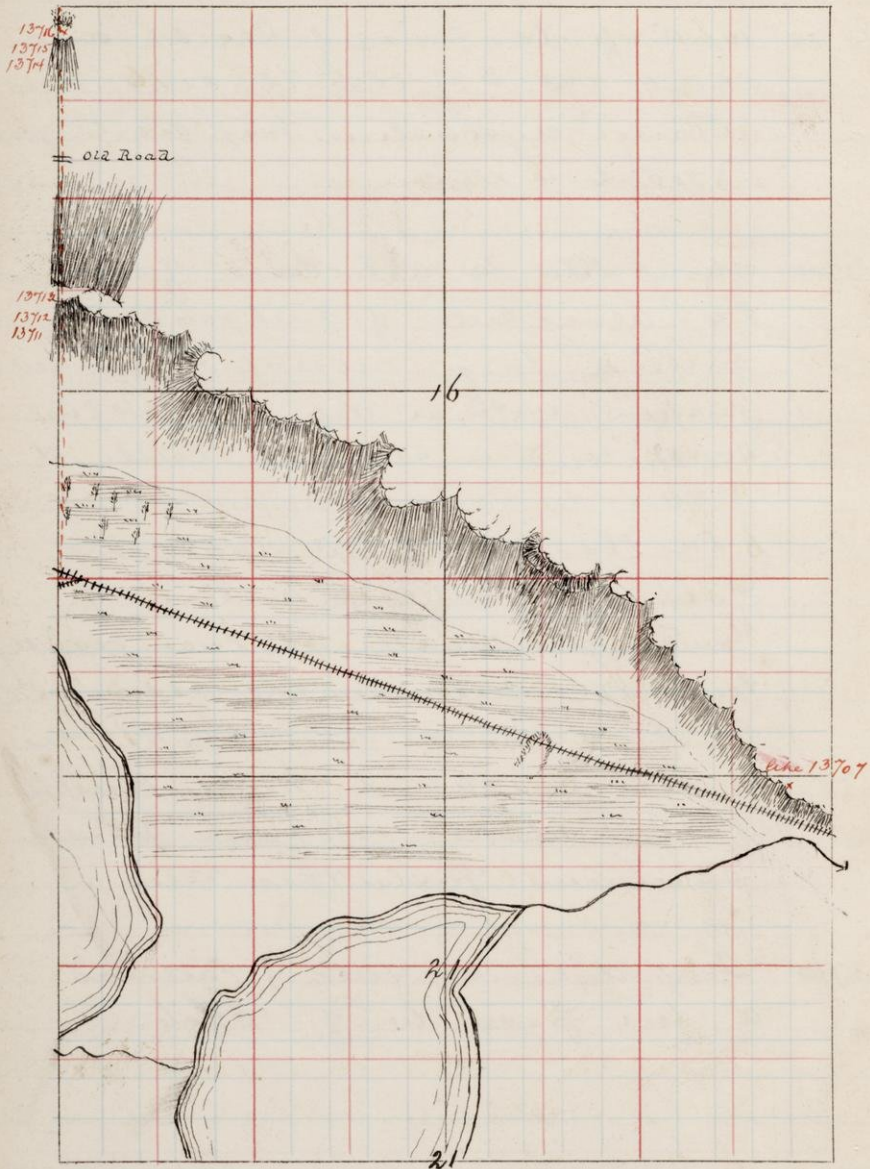
13709 About 550 W of E. line of Sec 22 - along side of railroad is quite a large outcrop of banded gneiss with a dip of 45° to the South and a strike a little N of W.

On the weathered upper surface of the outcrop a vein of brecciated material can readily be seen cutting the alternating bands of iron ore and gneiss in a direction about perpendicular to their strike. 13709 is a small specimen from this vein.

13710 Trap dyke on side of railroad a few paces W. of 13706.

T. 48

R. 31



The same ridge of hills extends N. W. through Sections 21 & 16. But approach the railroad closely enough to examine only in the eastern portion of Sec 21, where the same character of rock prevails.

When reached the west line of Sec 16 ran north to the N. W. Cor. of the Section and beyond to within 500 paces of the N. W. Cor Sec 9.

The ridge of hills, which further to the east approaches so close to the railroad, crosses the west section line of Sec 16 at 80 - 500 paces N of the quarter post.

The south slope is almost perpendicular in many places. It contains a narrow facing of well bedded fine grained quartzite or chert, dipping 50° to the south and striking a little N of W.

13711 1090 N. of S. W. Cor Sec 16.

Fine grained cherty rock.
A few paces north of where
we reach the black Trappese
rock which makes up the
body of the ridge

13712 Trappese rock - like 13700 etc.

The crest of the hill, at this
point about 125 ft. above the
railroad track is but 25-30
paces in width. The descend-
ing slope is much more
gradual than the southern
one. Its contour seems to be
due to the accumulation of
drift material. A pit dug
on this slope about 400 paces
N of the quarter post reveals
only drift material at a depth
of about 20 ft.

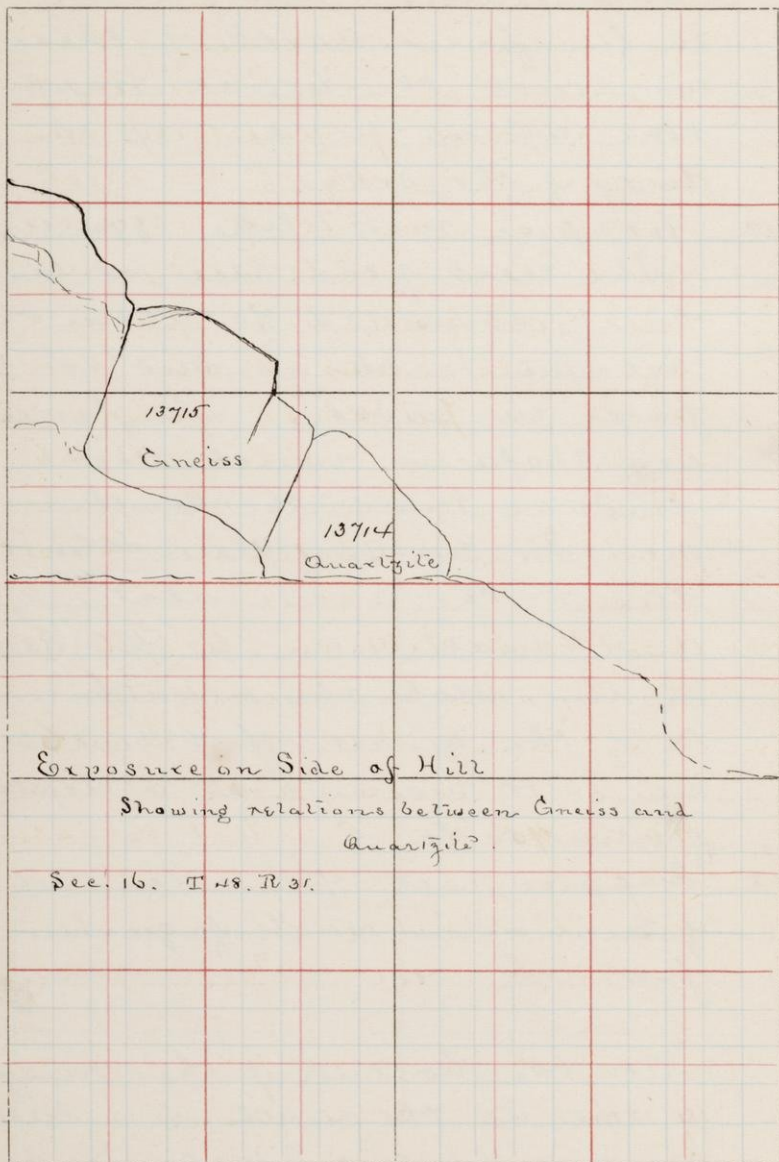
13713 Trappese rock from near top
of hill - about 150 ft of quarter
post.

At the foot of this range
of hills on the north is a little
creek - 1640 ft of D.W. on Dec 16.

This creek makes approximate

T.

R.



Exposure on Side of Hill

Showing relations between Gneiss and
Quartzite

Sec. 16. T. 48. R. 31.

by the contact between the
the older Archaean gneisses
etc., and the iron bearing beds.

One outcrop of quartzite was
discovered north of the creek.

At 1800 - 1900 ft of D.W. cr.
Sec 16 is a little ridge of
hills composed principally of
gneiss etc. - associated with
which is purplish gray quartzite
or graywacke. This rock ap-
parently underlies the gneiss
as shown in sketch on opposite
page.

13714 1830 ft of D.W. cr. Sec 16 -

Graywacke or quartzite

13715 1875 ft. of D.W. cr. Sec 16

Coarse gneiss, with strike
about 70° N of E. (Not reliable).

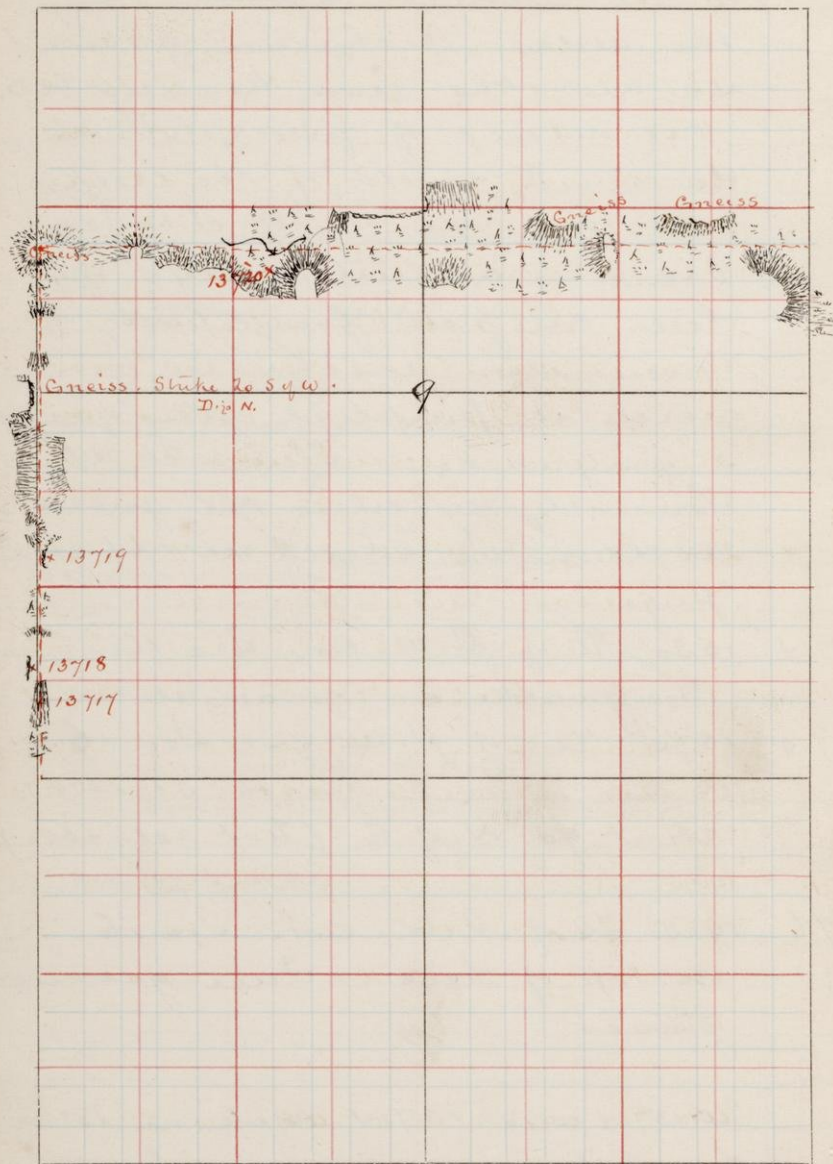
13716 1925 ft of D.W. cr. Sec 16

on top of hill. Fine grained
gneiss

No. 13714 and 13716 appear to
be separated by no sharp
line of demarcation, although

T. 48

R. 31



so different in character.

The country from the S.W. cor
of Sec 9 as far north as the
point where turned east viz.
1400 ft of S.W. cor Sec 9, is
covered with numerous rough
little hills, separated by small
cedar swamps. The exposures
are all of gneiss or gneissoid
granite. Perpendicular cliffs
abund.

13714 200 ft of S.W. cor. Sec 9.
Gneissoid mica granite.

13718 From a perpendicular on west
of line, about 50 paces N of 13717.
Little more gneissoid than 13717.

13719 600 ft. of S.W. cor. Sec 9.
Gneissoid granite from per-
pendicular ledge on east of
line.

At the quarter post on this
line is a ledge in which the

Schistosity is well enough marked to enable strike to be taken. Dips N. Strike $20^{\circ} S$ of W.

13720 1400 N. 650 E of S. W. cor Sec 9 - Gneiss like those described above.

At 1400 N of Cor. ran East two miles to E. line of Sec 10 then South

The country traversed along this course is broken by hills of gneiss and granite, interrupted by little swamps.

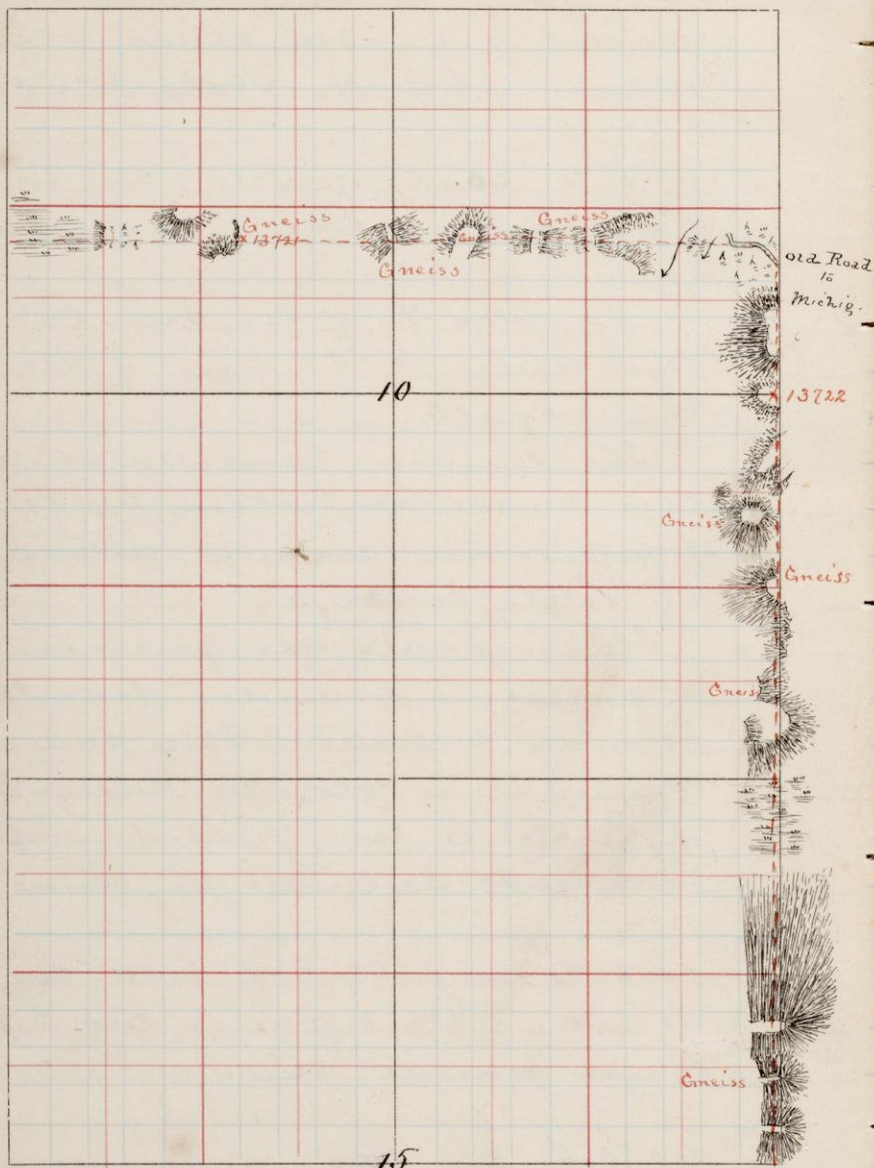
The rocks are all gneisses or gneissoid granites like those already collected. They vary somewhat in color in consequence of greater or less proportions of hornblende contained in them.

13721 1400 N and 650 E of S. W. cor. Sec. 10. Dark gneiss cut by coarse granite vein.

At N. E. cor Sec 10 turned and ran South.

T. 48

R. 31



The country along the east line of Sec 10 - is similar in characteristics to that on the side of same section.

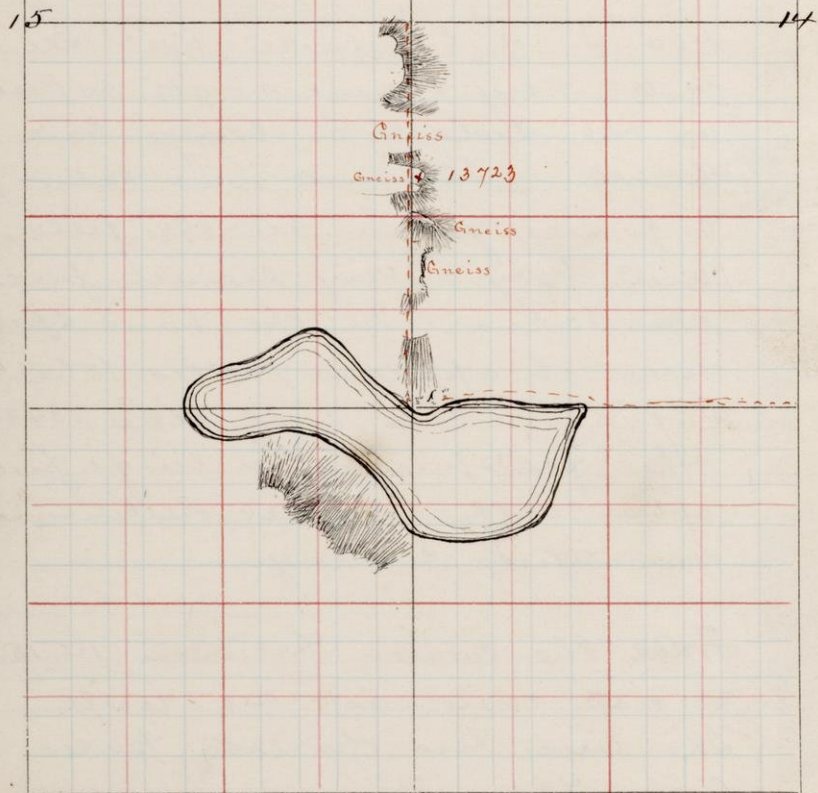
13722 1000 ft of S. E. cor. Sec 10 -

Dark banded Hornblende gneiss

13723 400 S. of E quarter post Sec 15 is a very coarse rock exposed on the side of a large bare bluff. The rock was taken for a coarse gneiss in the field, and only a very small piece was taken. In the hand specimen it appears rather like a coarse vein rock like 13433.

The feldspar is in large pieces, often with rounded outlines and beautiful cleavage.

From the corner between 14, 15, 22 & 23 ran east one mile. The line here for 1250 paces East passes over rising ridges of gneiss or gneissoid granite.



13724 1250 E of N. W. cor Sec 23.

From here east to the N. E. corner of the Sec. the line runs along the edge of a perpendicular ledge of granite and gneiss bluffs some 125 ft. in height.

Between this range of hills and bluffs and the range of trap hills to the south is a low valley, which extends from about the N. quarter foot of Sec 23, S. E. easterly to Michigan me.

For map see page 12.

Aug 29

Went north from Spur on road (Map. p. 9) to granite cliffs noted above, on N. line of Sec 24.

Travelled east along the south foot of these cliffs 275 paces south of north line.

The cliffs throughout the entire distance are composed principally

of gneiss. At certain points however the south face is lined with a narrow band of quartzite; conglomerate, etc.

13725 400 E + 200 S of N. W. cor Dec 24
White quartzite facing the southern slope of the cliffs

Further up the cliffs the gneiss appears, backing the quartzite which is evidently merely a thin layer left upon the rough edge of the older rocks. The junction of this rock with the gneiss is well exposed, but no clear line of contact could be discerned.

13726 Reddish gray fragmental rock
600 E + 200 S of N. W. cor Dec 24.

Like the quartzite above mentioned, this rock forms a lining to the cliffs, which above it and beyond consist of gneiss.

13727 This fragmental rock is exposed for 200 paces along the face of the cliff.

at

13740

1100 E + 200 S of N. W. Cor. Sec 24, the face of the cliff is composed principally of a rock like 13726 in which are good sized pebbles of quartz and trap, but none of granite. Some of the pebbles are large enough to be seen distinctly at a distance of 500-600 paces.

13728

At 1500 E + 200 S is a hill composed of a black rock, looking very much like quartzite, but which may be a diabase.

To the east of this hill the gneiss resumes its place and continues to make up the body of the ridge, which continues east.

As the N. E. cor of the Sec. turned S. and followed line to R. R.

13729

200 S of NE cor Sec 24.

Gneiss, like that in the range along the north line of the Sec.

The hill at the east quarter
 post of the Section consists mainly
 of the same rock as that in
 the hills ~~at~~ the west quarter
 post (13700). Just a little
 west of this point this range
 breaks and resumes its gen-
 eral character again a
 little to the east of the west
 quarter post.

13730 1050 N of S. E. cor. Sec. 24

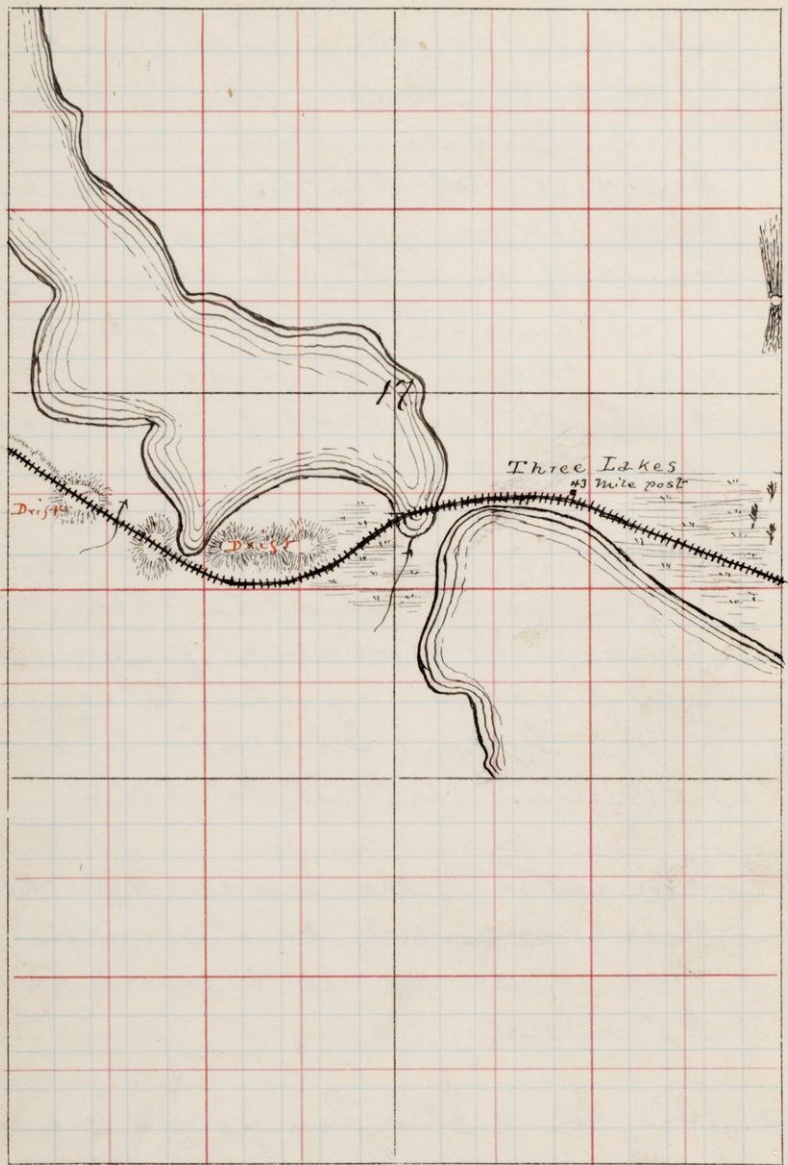
Here is a schistose rock, dark
 gray and probably fragmental,
 which occurs on the N slope
 of the hills. Its strike is about
 E & W and its dip 80° to N.

Variation of the needle in the
 neighborhood of this quarter
 post is away up between $50-110^{\circ}$
 to the East.

13731 The top of this range as men-
 tioned above is made up of
 the fresh black trap rock be-

T. 48

R. 31



fine noticed. Here it is
much finer ^{grained} than any of the
exposures heretofore noticed.

The line of hills to the south
of this trap range is covered,
so far as was seen, by loose
boulders and drift material.

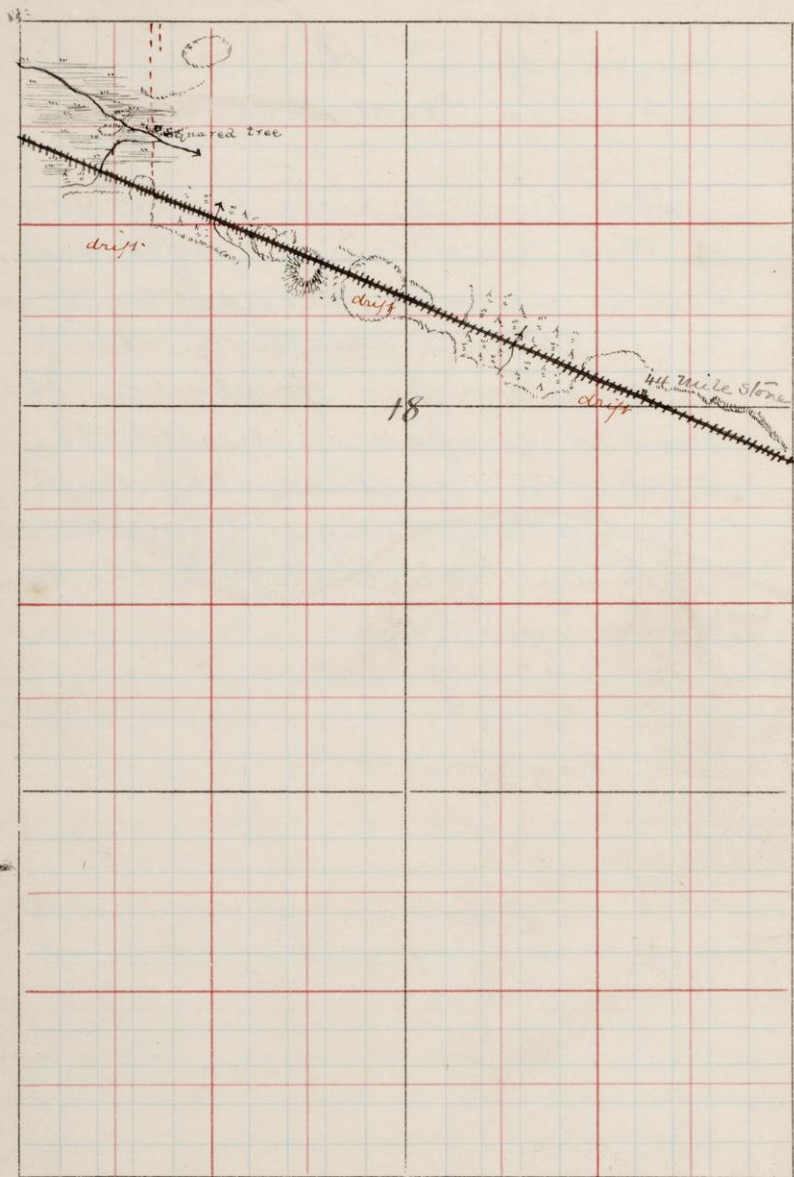
Their base is probably the
banded gneiss noticed to the
east and west of the line.

Many very large boulders of
this are scattered over the sur-
face.

11732 See page

T. 48

R. 31



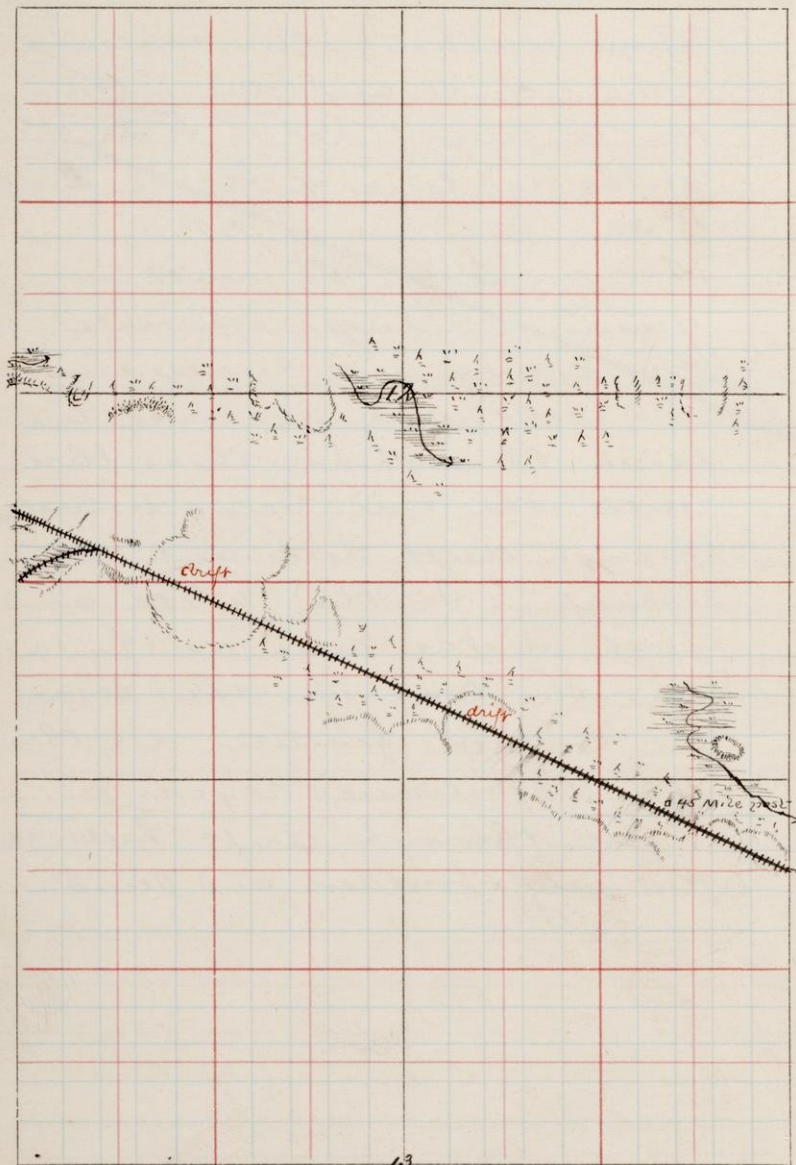
24

Upon reaching the railroad again, continued west from the w. line of Sec 16 T 48 R 31 to the w. line of Sec 12 T 48 R 32.

The course of the road is given on pages opposite, preceding and succeeding.

No rocks were observed in place throughout these three miles the road being entirely through drift hills and over swamps. To the north and south of the road, as far as can be seen for the trees, the surface features are those of a drift covered region.

Cut through drift hills reveal only boulders and sand.



Trip North into
T 49 R 32. etc.

Started north from R. R
at a point 650 paces E of the
45" mile post - which was
afterward found to be 312 paces
west of line between Sec 18
in T 48 R 32 and Sec 18 T 48.
R. 31.

The line then was 348 paces
east of range line.

Ran north on this line to
an old squared tree, which was
supposed to be on the U.S. line,
but was afterward found to be
on a boundary of a 40 acre
lot. Continued north from
this 1325 paces. There a lake
was found which is not given
in the land office plat. To
get around this, went west-
150 paces then north to 2000
paces from squared tree.

at 2250 paces from squared
tree found north line of sec-

T. 48

R. 32

Gneiss

13751A

13733

13750

Plains

45 mile pt

Squared Tree

T
48
R
32

T
48
R
31

12

18

18

1321

tion 12 - which followed west
to corner between Secs 7 & 10
in T 48 R 31 and Secs 12 & 13
in T 48 R 32.

1473. At 600 paces S of N. line of Sec
12 begins a hill of granite and
gneiss. This hill seems to be
part of a chain running a little
N of W. It marks the southern
most limit of the Archaean in
this locality.

13733 325 S and 300 East of N. W. cor.
Sec 7 T 48 R. 31.

Coarse grained gneiss

From this point north to the N.
line of the Section the entire sur-
face of the hill is bare. The materi-
al consists entirely of gneiss.

From the N. W. cor. of Sec
7 continued north to the N. W.
cor. Sec. 19, T. 48. R 31.

Between S. S. W. cor Sec 6

T.

R.

36

31

T. 48

R

32

T

48

R

31

13724

C 242255

Old Road

C 242255

Old Road

1

6

T
48

R

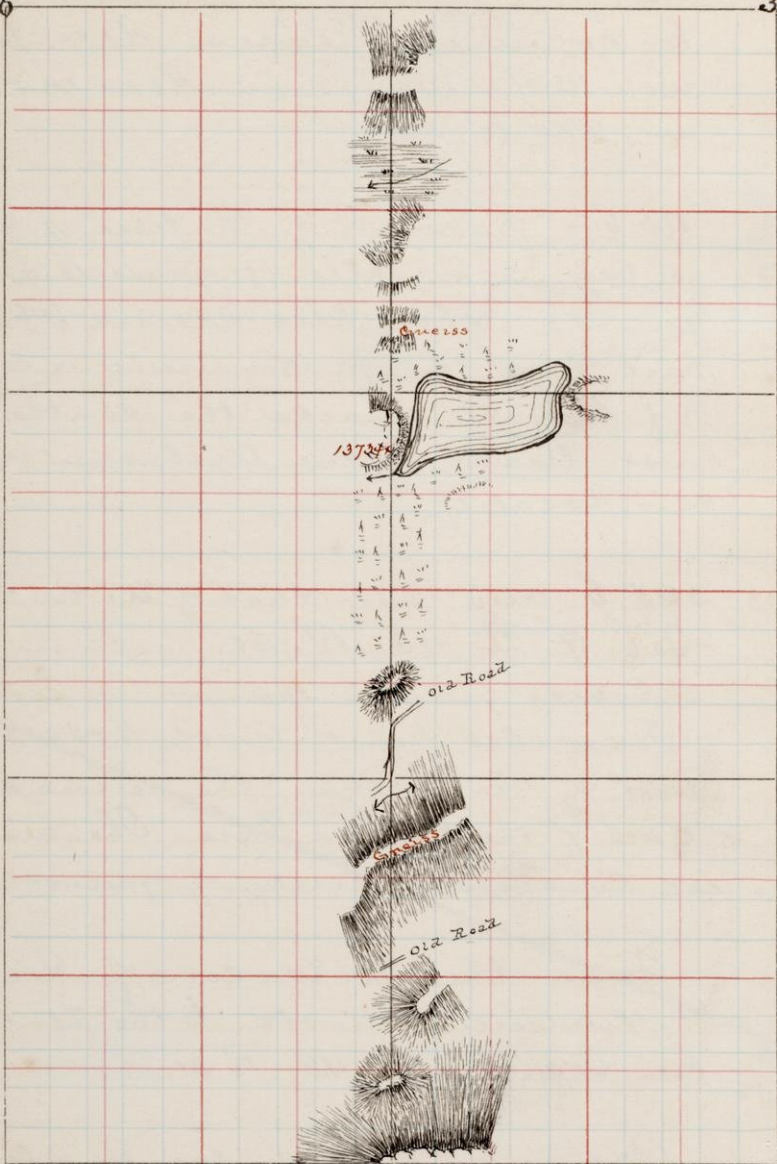
32

T

48

R

31



T 48 R 31, and the quarter post are several ridges of gneiss and granite affording good exposures.

At the west end of the little lake in N.W. Cor. Sec. 13734 6. is a high bluff of Hornblende Schist, so burned over and stained that its strike could not be determined.

The mile north, between sections 31 & 36 is similar in its surface features to that south. Broken ridges and hills are separated by swamps of cedar, spruce, etc.

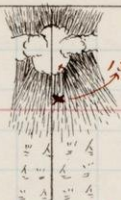
In most of these hills exposures of gneiss are abundant.

Where the rocks can not be seen they are covered merely by a thin coating of moss.

At 680 paces N of S.W. Cor Sec 30 quite large stream was

T.

R.



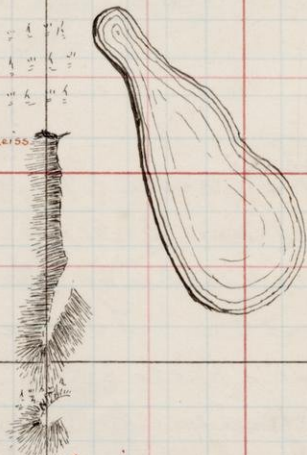
Gneiss and Hornblende Schist.



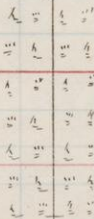
T
49
R
32.25

T
49
R
31

Gneiss



Gneiss



Gneiss

36

31

crossed. Its position is not given on plat.

This character of country extends north. The surface becomes rather more rough and rugged, but the rocks remain in general the same.

Occasionally ledges of Lorraine Schist are noted.

13735 1775 N of O. W. cr. Sec 30.

Dark rock resembling diorite. It forms the greater mass of the hill in the N. W. quarter of the section.

In the S. W. quarter of the section is a lake, the general shape of which is not recorded, but whose position is given on map, page opposite.

Its location is marked on plat as a small pond.

T.

R.

13

18

T
49

R

32

T
49R
31

24

19



Continuing through Decs 19 and 24 the hills are somewhat larger, but are similarly divided from each other by swamps.

The rocks exposed are gneisses with occasional veins of granite.

13736 1000 N of D.W. Cr Dec 19 T 49 R. 31.

Gneiss from a perpendicular wall about 30 ft high and 10-200 paces long

The strike is a little S. of W.

At the U. W. cr Dec 19, turned east, following the line between Decs. 18 & 19 in T 49, R 31.

On the western half of these sections we find the continuation of the hills crossed while travelling north. These hills trending N. E. cross both the west and the north lines of Dec 19 as indicated on map.

18

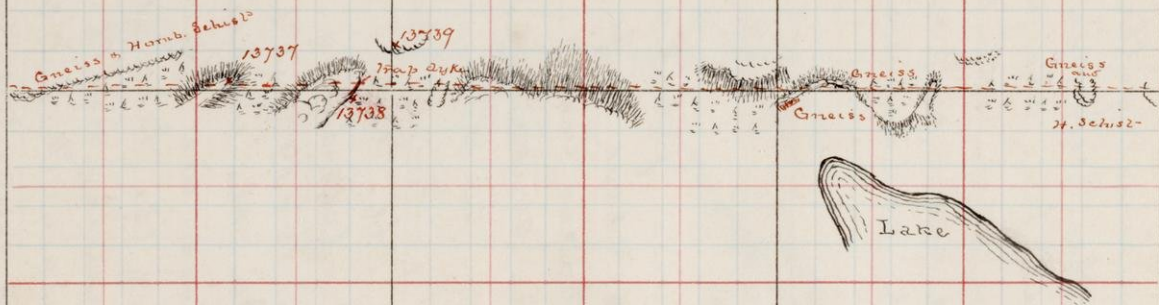
17

T. 49

R. 31

19

20



East of the quarter post between Secs 18 and 19 is a continuation of alternating swamps and hills.

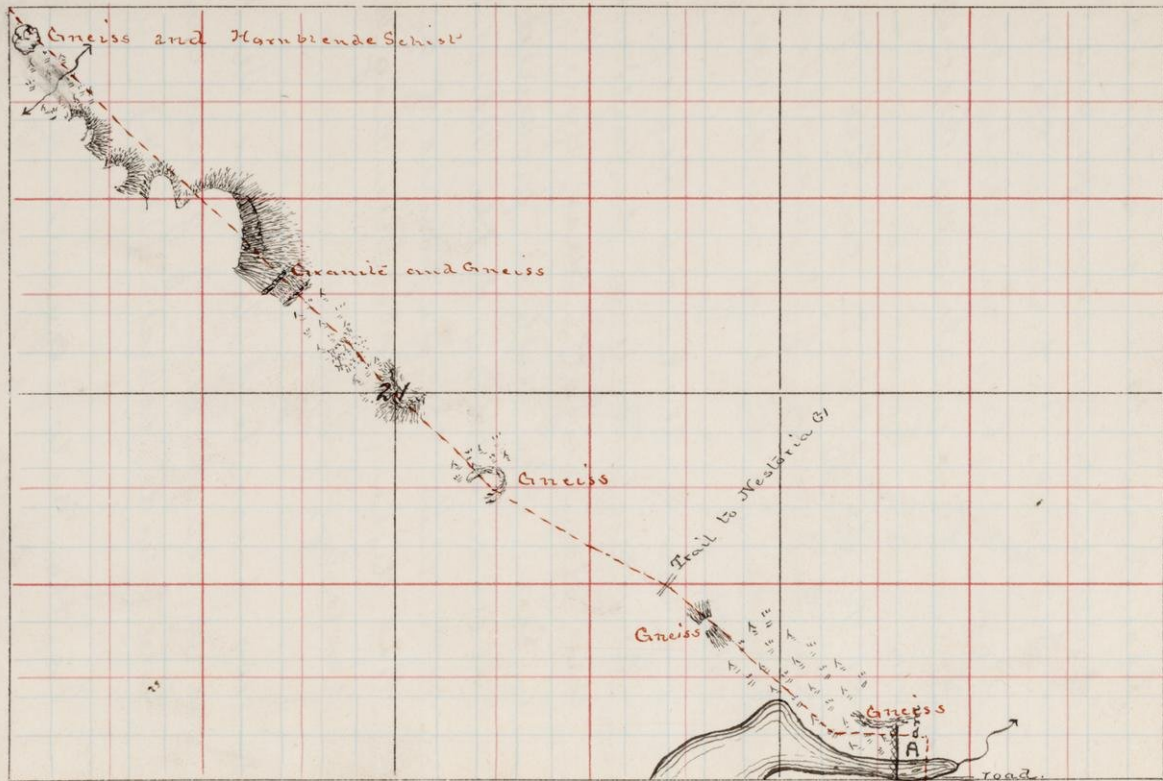
The rocks exposed in the hills differ slightly in character from those already described.

13737 At 100 W. of U. E. cor Sec 19 is an exposure of coarse hornblende rock, very much like 13644.

13738 100 W. of U. E. cor Sec 19. At this point is a perpendicular wall forming the east face of a hill. The cliff is produced by weathering away of the schistose rock and the exposure of a trap dyke (13738) trending North easterly.

13739 100 paces N. of U. E. cor Sec 19 is a rough hill of gneiss and hornblende schist. (13739).

In the N. W. quarter of Sec 20 is a large lake not marked on maps. Its position is indicated



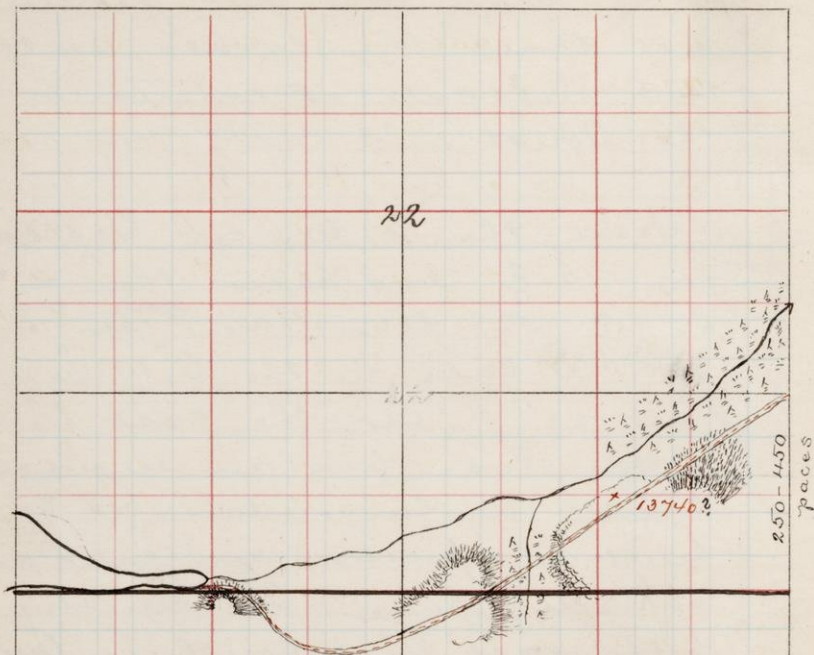
T. 49

22 R. 31

tes on map. Did not get closer to it than the corner, so can not indicate its extension to the South and east.

From the N. W. cor Dec 21 ran S. E 2000 paces then 30° S. of E 500 paces. then ^{again} 500 S. E., to the lake in the N. W $\frac{1}{4}$ of Dec 22. At the east end of the lake was an engineer's camp. A large dam is being built in position indicated on opposite page. The country to the east and south is pretty well cut up with roads.

With the exception of numerous perpendicular cliffs of gneiss and granite, the country traversed on this line is not essentially different from that to the west.



The point at which the road crosses the east line of Sec. 22, is probably nearer 250 than 500 paces - The general course of the road however is as indicated in this and the preceding page.

27

27

From Engineer's camp went
east on road to E line Sec 22
T 49 R 31..

The road follows a generally
N. E. direction through portions
of Secs. 24 and 22. It follows
the tops of the hills on the south
of the creek emptying the lake
in S. W. of Sec 22.

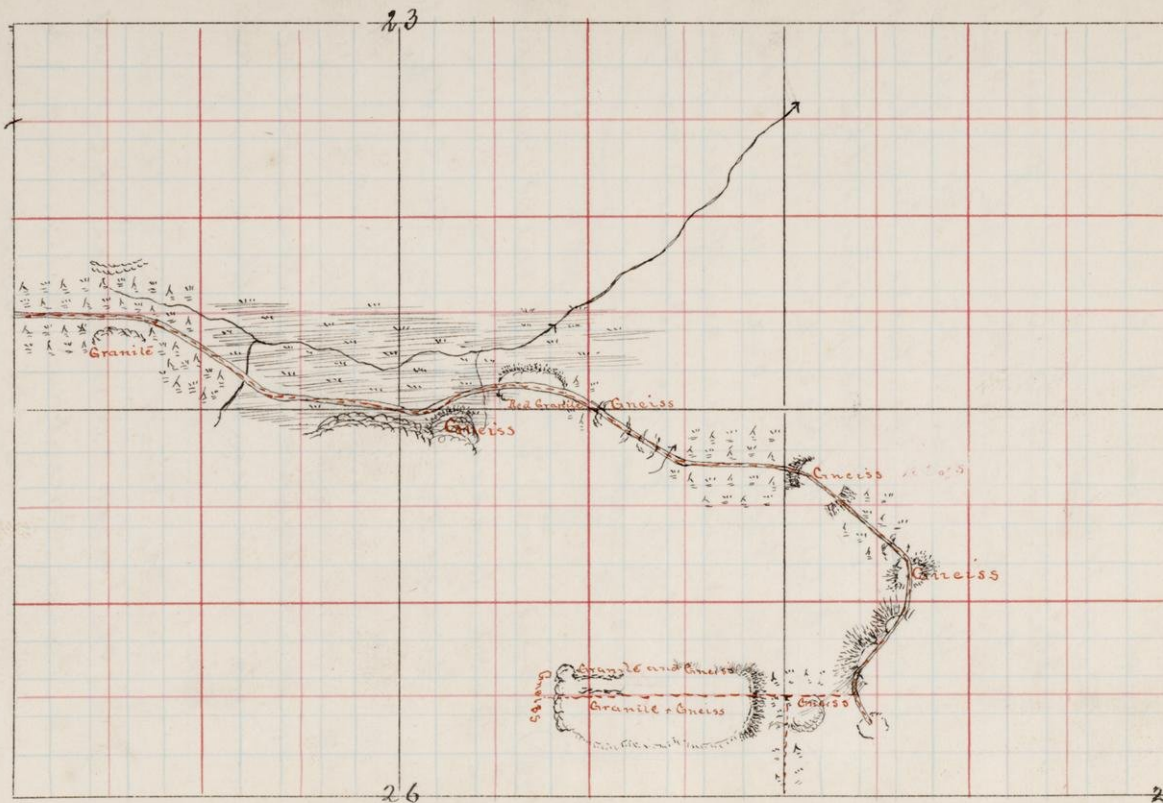
The bluffs over which the
road runs are composed prin-
cipally of gneiss, covered in many
places with drift.

13740(2) ^{wrong No.} About 500 N. E. of creek over which
road passes.

Gneiss outcrop on N side of
road.

Continued on road which
here runs in a south. of east direc-
tion.

On the north side of the road
is the creek marked in plat and
a large meadow running about
E + W. On the south it is
fringed with hills of coarse chertic



granite and gneiss, and the fine grained red granite so characteristic of dykes.

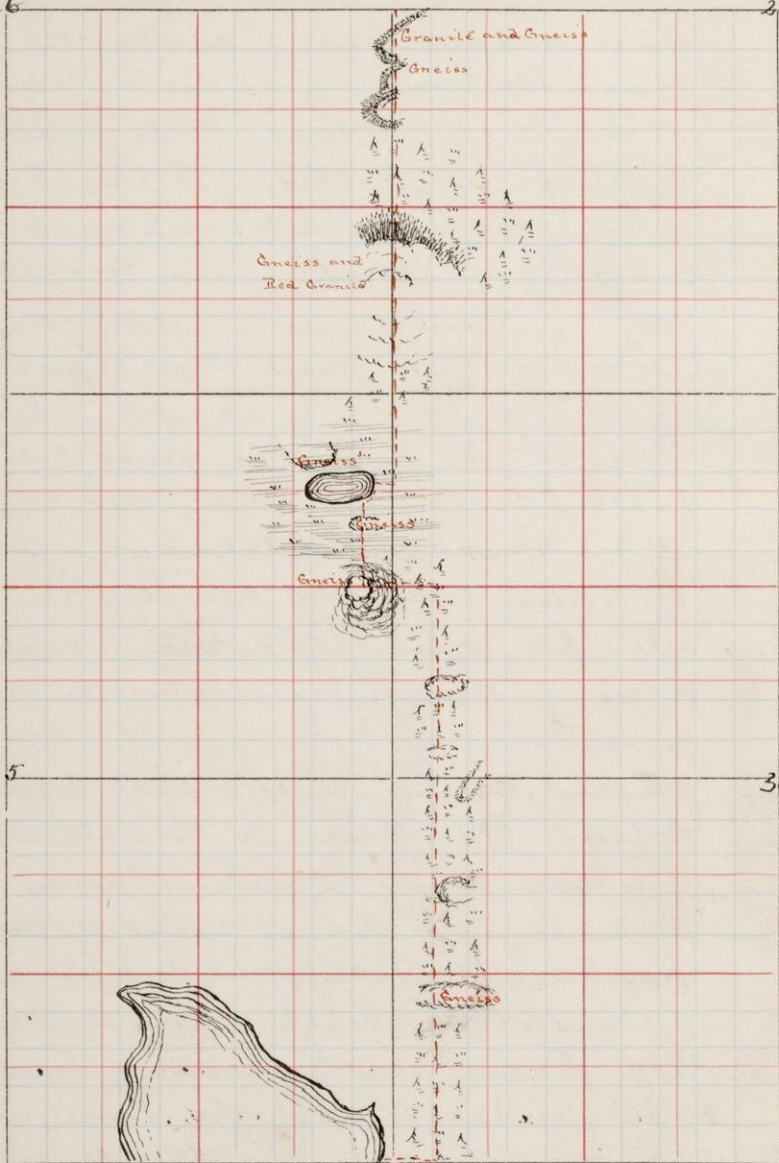
Several of these hills present perpendicular cliffs to the road but traps are indicated on accompanying map.

Followed the road 3200 paces from W. line of Sec. 23, where I left it to find the west line of Sec 25.

In travelling backward and forward over the country in attempts to find the line, many ridges of gneiss and granite were crossed.

After many ineffectual attempts to find the line, a birch was finally seen standing in a swamp 200 paces west of road on trail marked on map.

From this birch ran south 1800 paces with beeding and other indications of the line, and without discovering the cross line bounding the S. side



of Dec 25

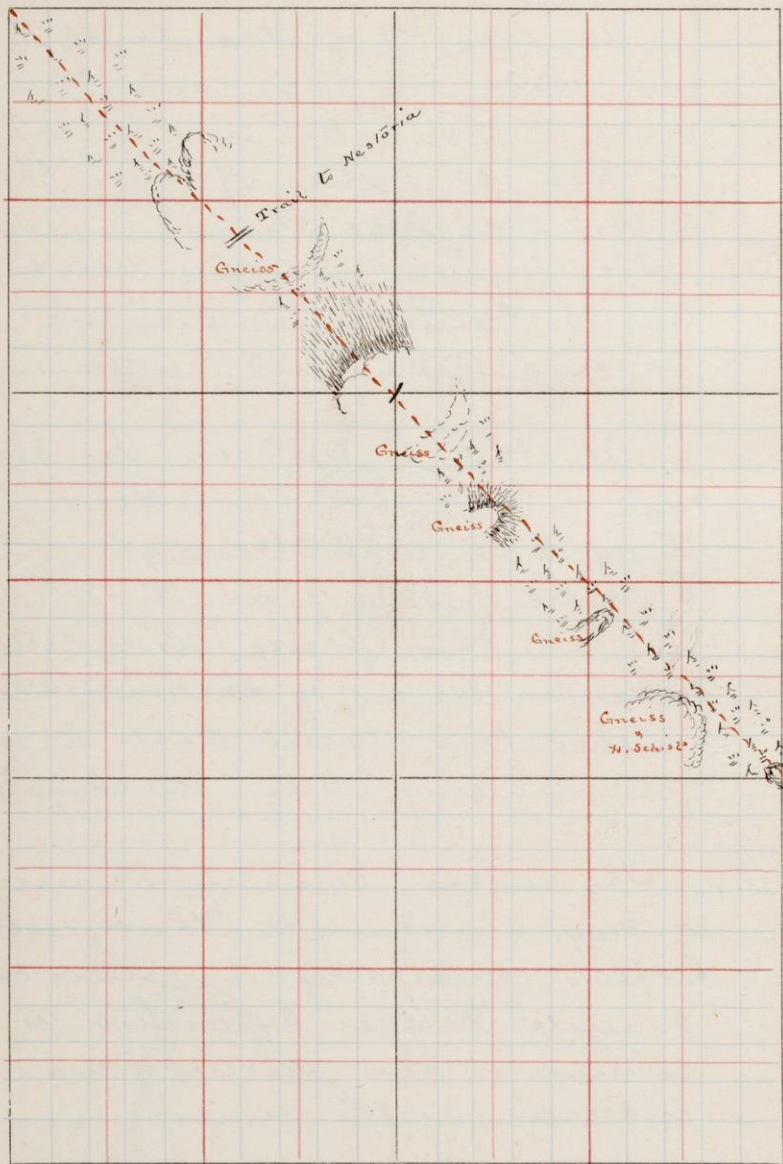
At 1800 S of the Birch
ran west 100 paces and then
South to the lake in the S. E.
1/4 Sec. 35, where found the
S. W. cor. Sec 36.

The country in this neighbor-
hood is burned and only one
bearing tree could be found.

At the S. W. cor. Sec 36
ran S. E. to S. E. cor. Sec 1
T 49 R 31 and through S. E.
to center of Sec 7 in T 48 R 30.

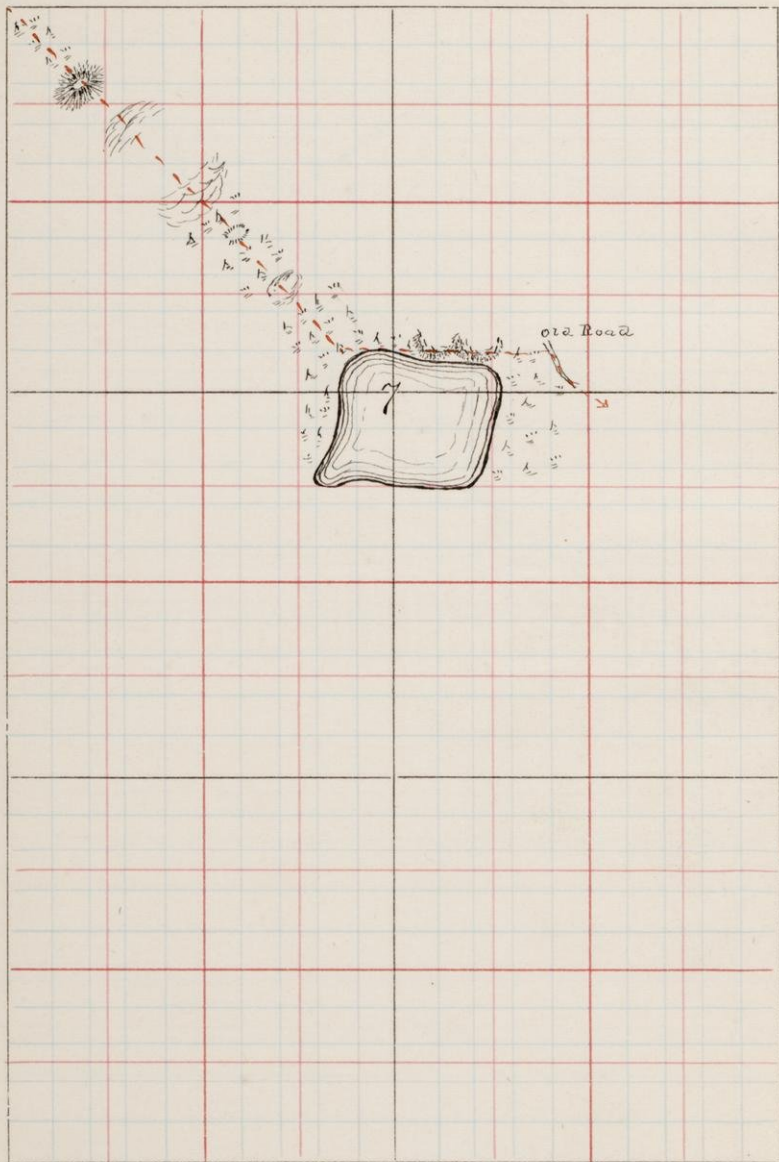
At this place is a little
lake in center of section. When
reached this went east to
road leading into Michigan.

The entire country traversed
is very similar to that described
hitherto, consisting of gneiss and
granite ridges separated by
swamps. The outcrops are
indicated on the maps.



T. 48

R. 30



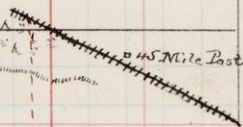
T. 48

R. 32

12



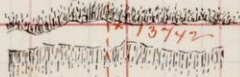
13741



45 Mile Post

13

drift



13742

13743



39

Trip S. from R. R.
into Sec 13. T 48. R. 32

Ran south on a line which was afterward found to be 525 paces west of range line on East side of Sec 13.

South of the railroad the country is generally rolling, with very slight inclinations.

At 350 paces S. of railroad and 925 west of range line is a round knoll of trap.

13741

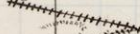
The rock is very well exposed on the East side of the hill.

Continuing south the grade rises gently.

At 1278 paces south of the railroad is quite a high ridge of drift (?). The boulders on top of this hill consist principally of gneiss, trap etc.

At 1600 S. of railroad is a ridge running E.W. On its north side are well exposed

45 Mile post



drift

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

POLLARD

13742 large pieces of slate in such position as to appear in situ. Their dip is to the South and strike about E.W.

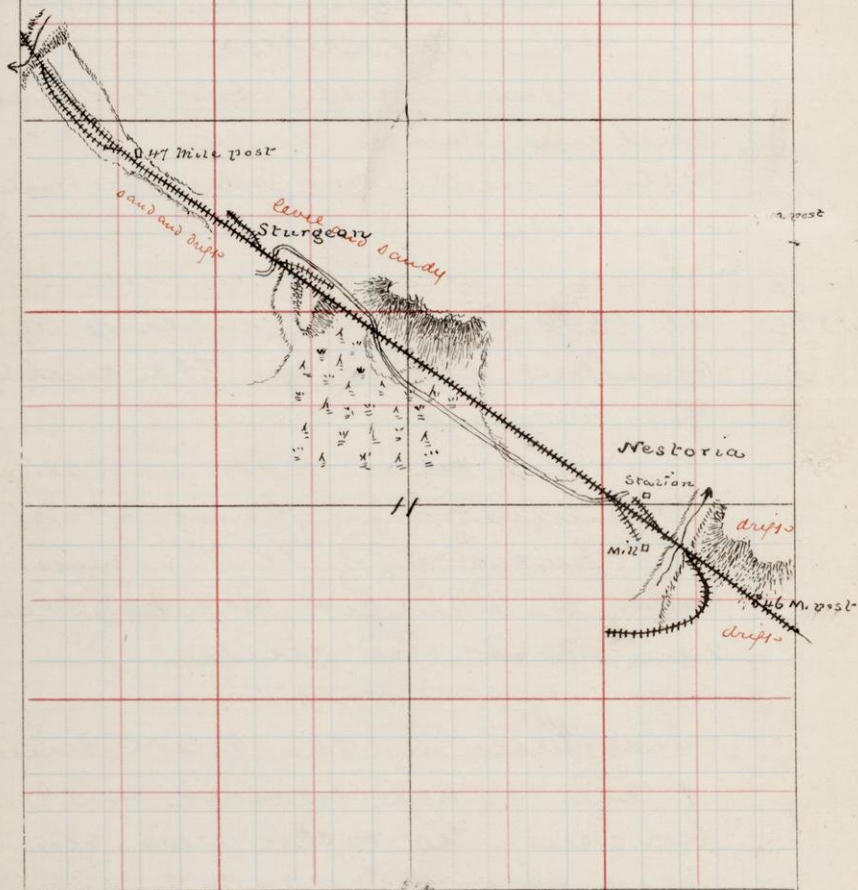
In certain of these blocks are concretions, very similar to those found so frequently in slates in other localities.

The slate itself apparently contains much mica. The concretion is darker and contains very little.

13743 At 1850 I is an outcrop of similar slates in the center of a swamp.

When reached point about 2100 paces S. of R. R. ran east to D. E. cor Sec 13, then ran west one mile.

The hills on the south line of Sec 13 are covered with boulders. No rocks were seen which ~~were~~ thought to be in position.



At D. W. cor Sec 13 ran north, crossing hills and swamps as before. Here also no rock exposures were seen.

Sept 7

From 46" mile stone went west on R. R. Track

At 450 paces west of 47" mile stone the road crosses the west line of Sec 2.

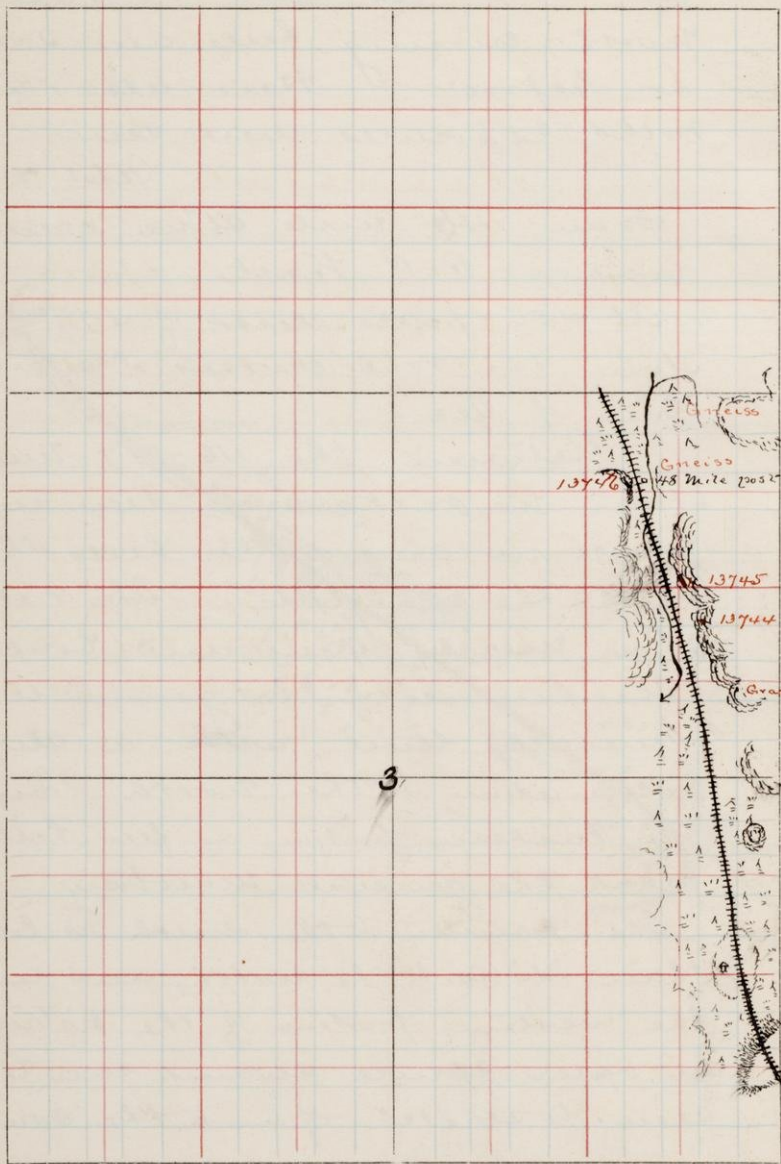
Between the 46-47 mile stones no rocks were seen in place in any of the hills through which the road cuts. The cuts show merely sand and boulders.

The surface of the ground is generally level, ~~with~~ a slight inclination to the north. In the eastern portion a few hill break the general monotony.

The country to the south is lower than it is to the north, and in the western portion of the district an open spruce swamp can be seen to stretch far to the south.

T. 48

R. 32



West of the 47" mile stone the road runs through drift-hills and Swamp, until a point about opposite the east quarter part of Sec 3 is reached, when rocks again appear (see map opposite). West of this point the cuts are all through the pre-Terrace rocks.

- 13744 At 1600 ft of the 47" mile post the gneiss cliffs, noticed on the East side of the road for some distance back, finally reach it, and cross over to the west side.

Cutting this gneiss a few paces further on is a dark Trappean looking rock which runs in a N. E. direction. It is probably a dyke.

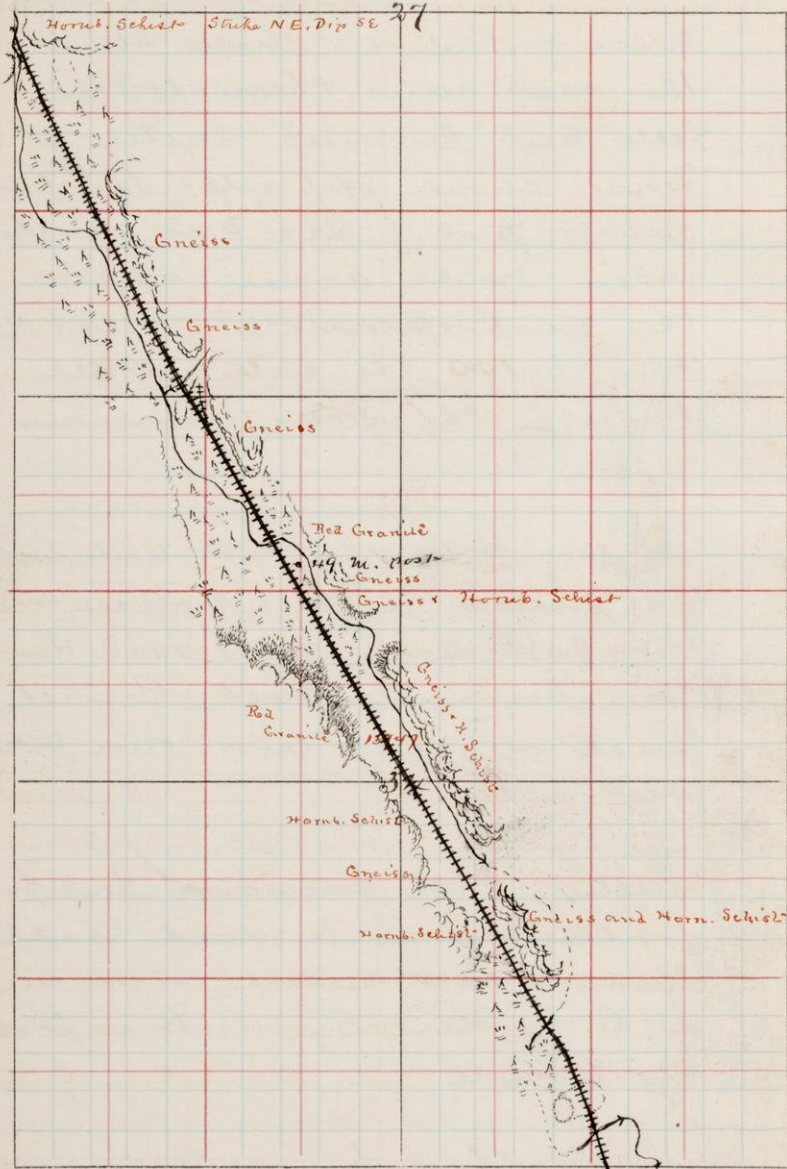
13745

From this point N and W. the road runs between gneiss

T. 49

R. 32

27



bluffs, which afford fine exposures. This gneiss is intimately intermingled with Hornblende schist, the two being cut by numerous red granite dykes and veins.

- 13746 Hornblende schist from west side of R.R. 100 paces W. of 48" mile stone. Strike 10 S of W.

The road from this point to the 49" mile post continues to run between hills of Hornblende schist banded with gneiss and cut by granite veins.

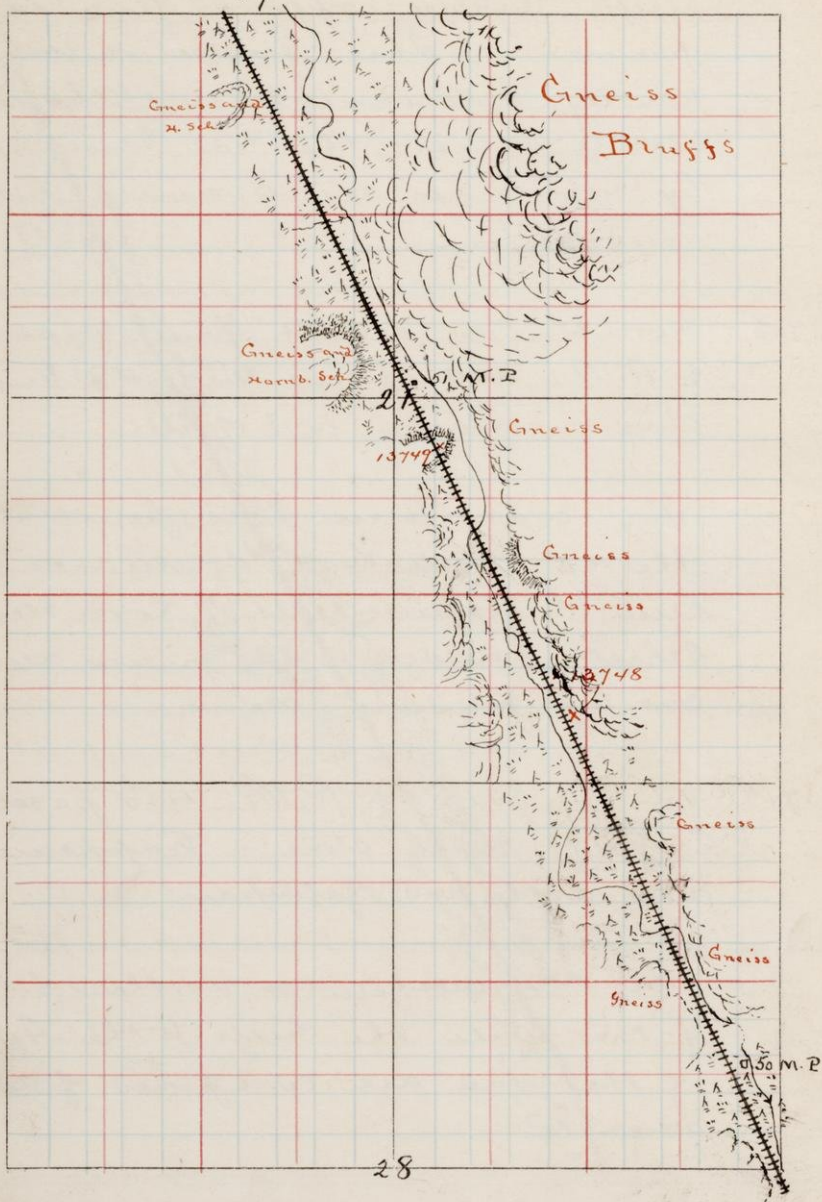
- 13747 on S. side of R.R. 450 paces E of 49" mile stone - Trappean rock with red feldspar.

In the western or northern portion of the mile the hills to the S.W. of the road are composed of red granite?

About 400 E of 50" mile post.

T. 49

R. 32



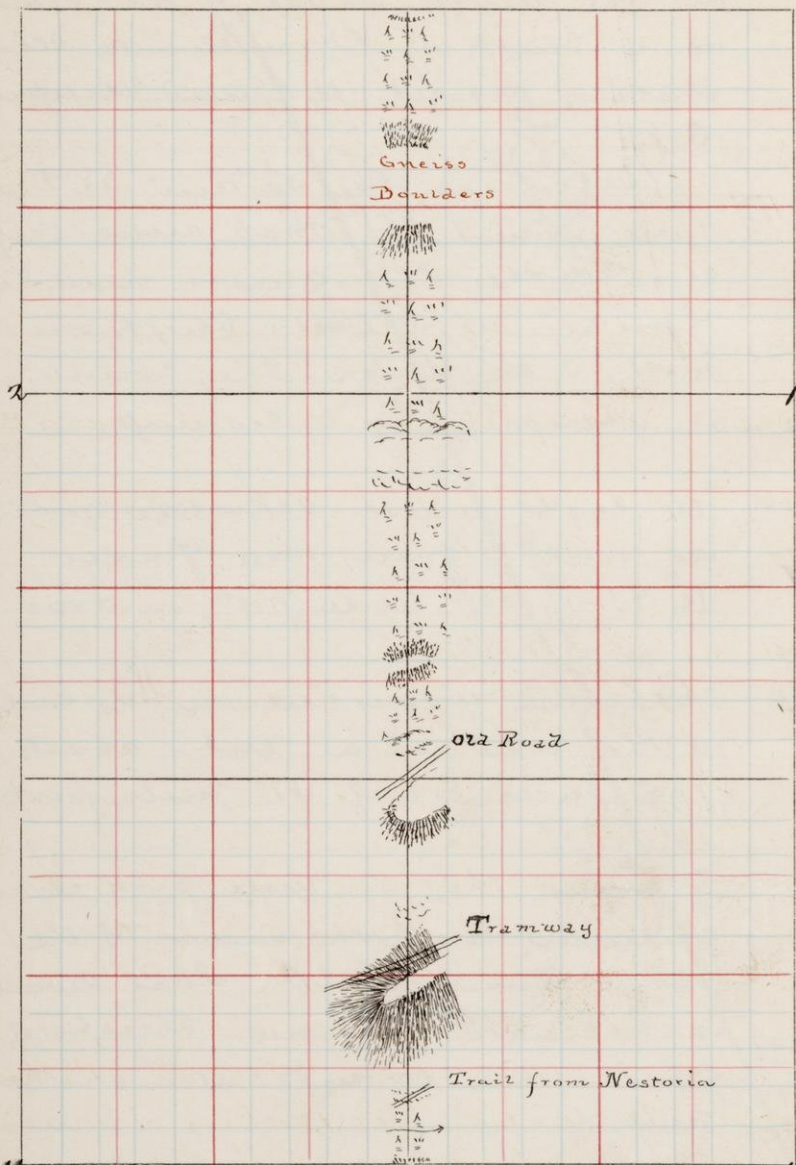
on the north side of the road
is a bluff of hornblende schist
striking about N.E and dipping
S.E.

Between the 50th and 51st
mile stones the road runs very
close to the the gneiss and
hornblende schist bluffs on the
north. To the south the country
is occupied by a swamp.

13748 A light green schistose quartz-
ite rock from 1000 paces
N. W. of 50th mile post, on road.

13749 Schistose greenstone on S. side
of the road in a cut - about
125 paces S.E of 51st mile post.

Beyond the 51st mile post swamps
continue on both sides of the
road, within Sec 21. This swamp
is included between bluffs of
gneiss etc., as indicated on the
map.



Trip into Dec 12. T48 R 32.

Went east from W. quarter part of Dec 12 over hills and through swamps to E quarter part of same section (See map p. 27)

Then ran north to gneiss bluffs and returned and went S. to R.R.

13750 a few paces N. of E quarter part of Dec 12.

Black schistose rock, very similar to 13742.

13751 is a gneiss (?) from high perpendicular ledge two paces N. of E quarter part Dec 12.

In field regarded as gneiss. It now appears to be a fragmental - recombined (?) rock.

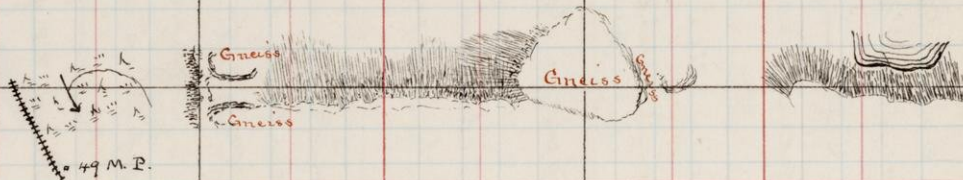
(Reepage 28 for location)

Returned to W. quarter part of Dec 12 and ran north $1\frac{1}{2}$ miles to N. W. cor. Dec 12, where turned west following town line to R. R.

T 49 R 32

34

35



T.

R.

T 48 R 32

3

2

13752 At the N. quarter part of
 Sec 2 T 48 R 32 is a large
 hill of gneiss, which extends
 west with a gentle slope
 for 500 paces

N.W.
 Near the ^{N.W.} corner the country
 has been burned, exposing
 bare ledges of granite and
 gneiss.

T. 49

R. 32

16

53 M. Post

Gneiss

stark. Schist

Gneiss and

stark. Schist

13753

17

Gneiss

Granit.

13754 Gneiss

stark. Schist

Gneiss

52 M. Post

Gneiss

stark. Schist

Gneiss

stark. Schist

Gneiss

stark. Schist

Gneiss + H. Schist

Sept-9-

47

In the latter half of the mile between the 51 + 52 mile posts the road runs on the north of a series of gneiss bluffs, etc.

On the north is a swamp, whose center is occupied by a stream.

Between 52" + 53" mile stone the road crosses swamps and cuts through a few projecting bluffs of hornblende schist, gneiss, etc. The gneiss is rather coarse grained and micaceous, thus differing somewhat from the more prevalent coarse chlorite gneiss.

13753

950 paces east of 53" mile stone is a cut through hornblende schist. This rock is studded with granite veins, which sometimes cut through it parallel to the strike and at other times running across it in every direction. The banded variety is contorted and bent.

In the east half of the mile the fine grained hornblende schist is cut by veins and in many places the granitic magma seems to have dissolved the schist, forming a coarse hornblende gneiss.

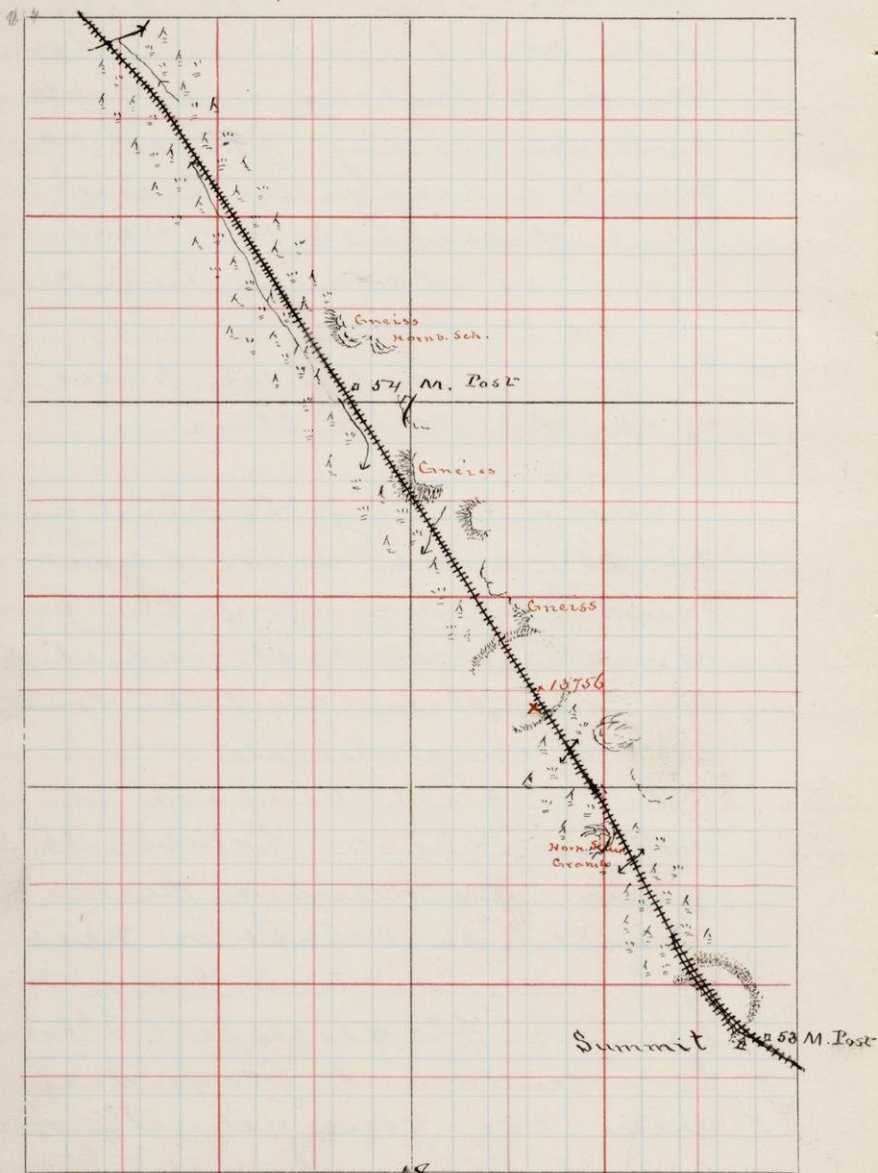
13754 is from a cut 1700 paces E. of the 53" mile stone.

Straw along the road and on the north side about the same distance from the foot is a curious rock, which on the weathered surface looks like a conglomerate.

On a fresh surface it appears like a hornblende gneiss containing pieces of hornblende schist or nests of hornblende and large round areas of plagioclase. These hornblende and plagioclase areas are generally elongated and the main foliation of the gneiss bends around them.

T. 49

R. 32



occasionally a granite dyke
cuts across the brecciated
gneiss, when the contact be-
tween the two is very sharp.
cf. 12220-

Sept. 10.

Traveled from Summit to
L^o Anse, working along the
R. R.

Between the 53rd & 54th mile
stone the country traversed is
like that to the east - Horn-
blende schist cut by granite
dykes from bluffs, under and
through which the road runs.

13756 is a specimen from a rock
cut 1075th paces west of 53rd
mile stone, just a few hun-
dred paces N of the E & W line
between Secs 70/18. This dark
mica gneiss appears to be very
similar to the ground mass of
13705.

Throughout the mile between the 54 and 55" posts the same rock appears to prevail.

Between the 55" & 56" mile stones the gneiss and hornblende schists are more entorted.

1500 w. of 55" mile post is an interesting cut made by the creek on the south side of the road. This cut is very deep, and in it the rocks are well exposed.

They are very highly schistose and look to be genuine fragments in the hands specimen.

13757 Greenish gray schistose rock, from cut. Strike 20° S of E.

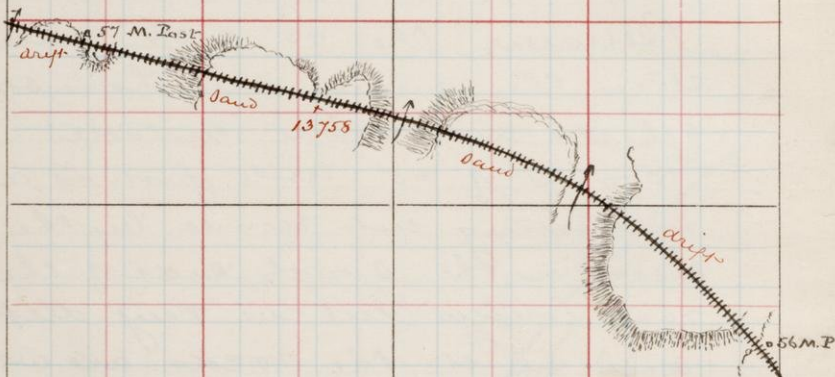
For the next mile the road does not cut through rock except in one place, where it runs through a hill of dark quartzite - 1350 w. of 56" mile post.

Strike 14° S of E.

T. 50

R. 33

35



2

T 49 R 33

