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Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1893

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

✓
Marquette District

W. S. Bailey.

1893

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section and the dip and strike when observable, the latter always being expressed from the north; for instance 4025, 250 N., 300 W., *Strike, N. 78° E., Dip 50° S.* Then follow with a full description of the ledge. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small-sized specimens, trimmed to a uniform size of $2 \times 2\frac{1}{2} \times \frac{1}{4}$ inches will be allowed, but in all other cases *large-sized specimens*, trimmed to a size of $3 \times 4 \times 1$ inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. Specimens should not be placed together without protection in the collecting bag, as the fresh surfaces, important in determining the character of rocks, are thus destroyed. They should be damaged by no temporary mark, but the numbers should be at once marked in at least two places upon the inclosing paper or cloth bags. Specimens may be permanently marked in camp by painting the numbers upon them in white upon a black background, using Silver White and Ivory Black oil tubes for color, with turpentine as a diluent.

4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc.

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

Book # 153

Verify locutinis 20950-51
" " " p. 26

Description of run in Sac 340 -
mitted platopp. p 45

Marquette
Iron District

T 48 + 47, R 25

Mich.

W. S. Bayley

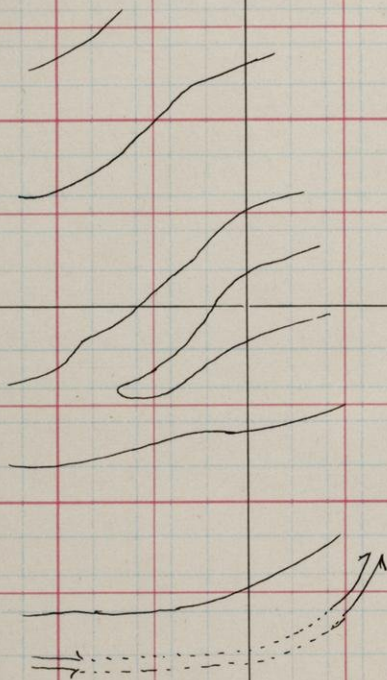
Chas Oley
Geo. Smith

S. 5

T. 47

R. 25

W4



S.W. cor.

1

From point 500 E of S.W. cor Sec 35
T 47 R. 25 run north ^{500 N 1/2} to U. line
Sec 32 in T 48 R. 25, then E. 250
paces and S. to 1/4 line Sec 5.

Two rocks were seen in S. 1/2 of Sec
5. The first ledge observed is at
20899 1500 N. 620 E. S.W. cor Sec 5. There
there is a high bluff of quartzite^d
facing north.

20900 At 1115 E of NW cor Sec 5 is another
high bluff of quartzite^d, but the rock
in it is red, whereas the rock 20899
is of the same white^d color.

At 10 N. 550 E of SW. cor Sec 32
are many loose blocks of a red
slate that may indicate the near
presence of a ledge.

From this point to 1500 N of S. line
Sec 32, ^{run} was over sand hills, steep
and rough.

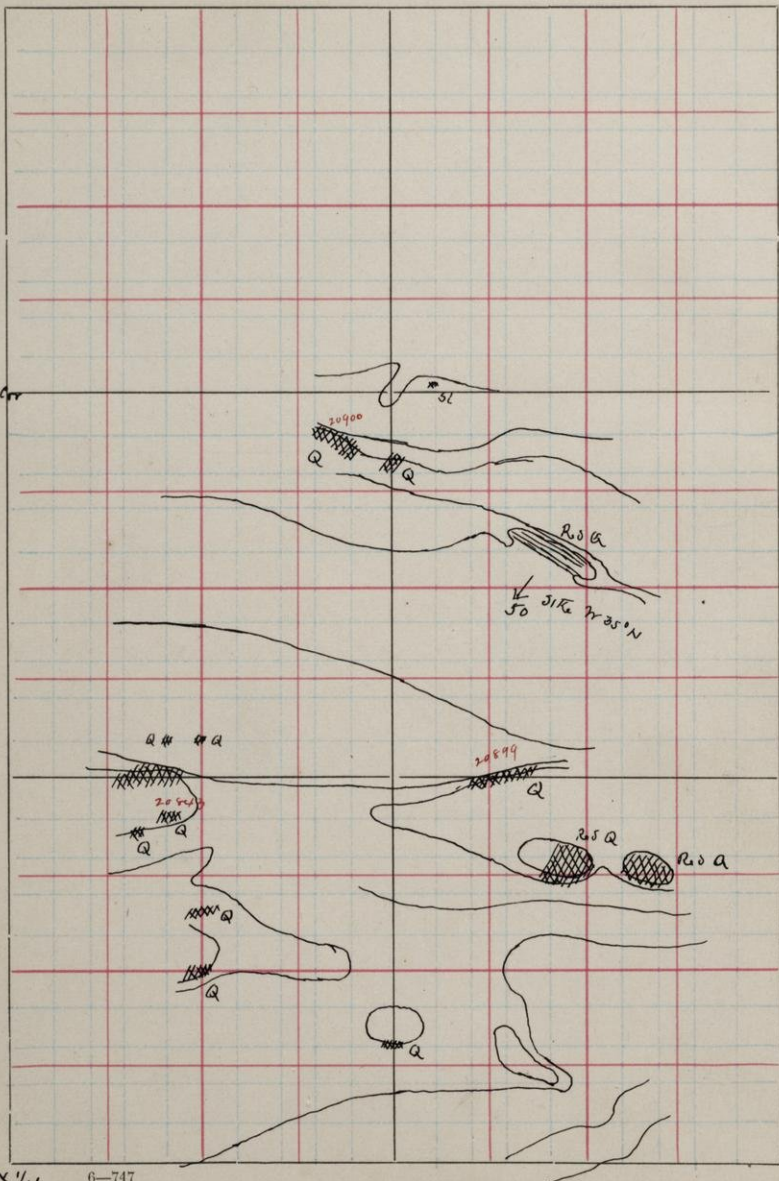
The rock was found until 1500 N
was reached.

S. 5

T.

R.

71K0r



X 1/4

0-747

In the sand plain at
1800 N. 400 E of S.W. Cor Sec 32 is
a small ledge of slates, with clear-
age striking E.W. and dip almost
vertical. The rocks here are

- 20901 a bluish black slate, and
20902 a yellow and pink banded one. The
yellow bands are slickensided in
many places, yielding a product
resembling sericite schist. Both
slates are quartzose.

No other rocks were seen in this
run until reached greenstone
forming cliff north of old State road
at 500 N. 500 E of S.W. Cor. Sec 29.

The rocks studied by Smith some
days ago in the S.W. of the S.W. 1/4
Sec 29, were again studied.

At 405 N. 400 E of S.W. Cor Sec 29
is a low ledge of reddish slate or
graywacke like 20901-2. A mile
further W and N. is the yellow

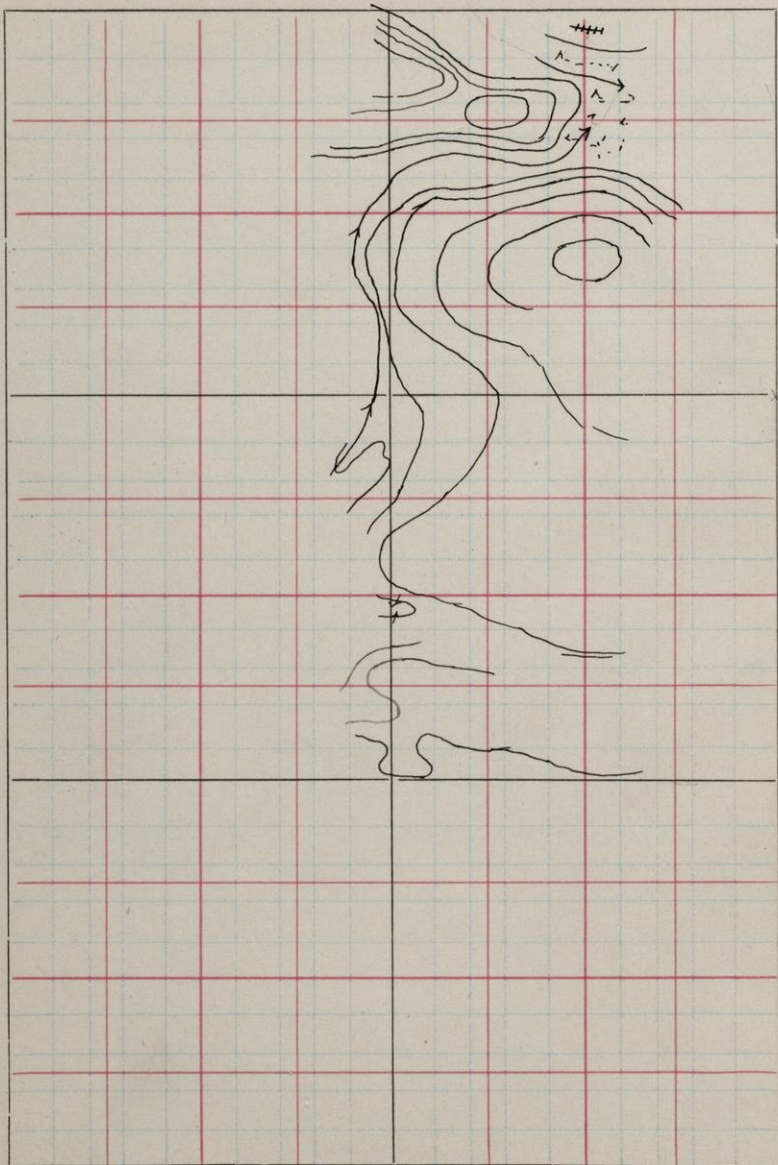
- 20903 } weathering slate, and at 280 E 450 N
20904 }
20905 260 E. 480 N. the greenstone

S. 32

T. 48

R. 25

500 IN



Following along the South side of the greenstones East, we find at 500 N. 760 E of W. Cr. Sec 29, a basal conglomerate which has so often been studied under the name of the State Road Conglomerate. Otherwise, for this distance the rock is all greenstone.

South of this and East are other ledges of the slates and quartzites forming a knoll overlooking the plain to the South. The same relations of the slate and the pink quartzite rock (slate or quartzite) are here seen. As at 20901-2, & 20903-4, the quartzite pinkish rock is South. The slates are very schistose and are puckered so badly that many sharp overturned anticlines and synclines are seen in it.

20906 Slate

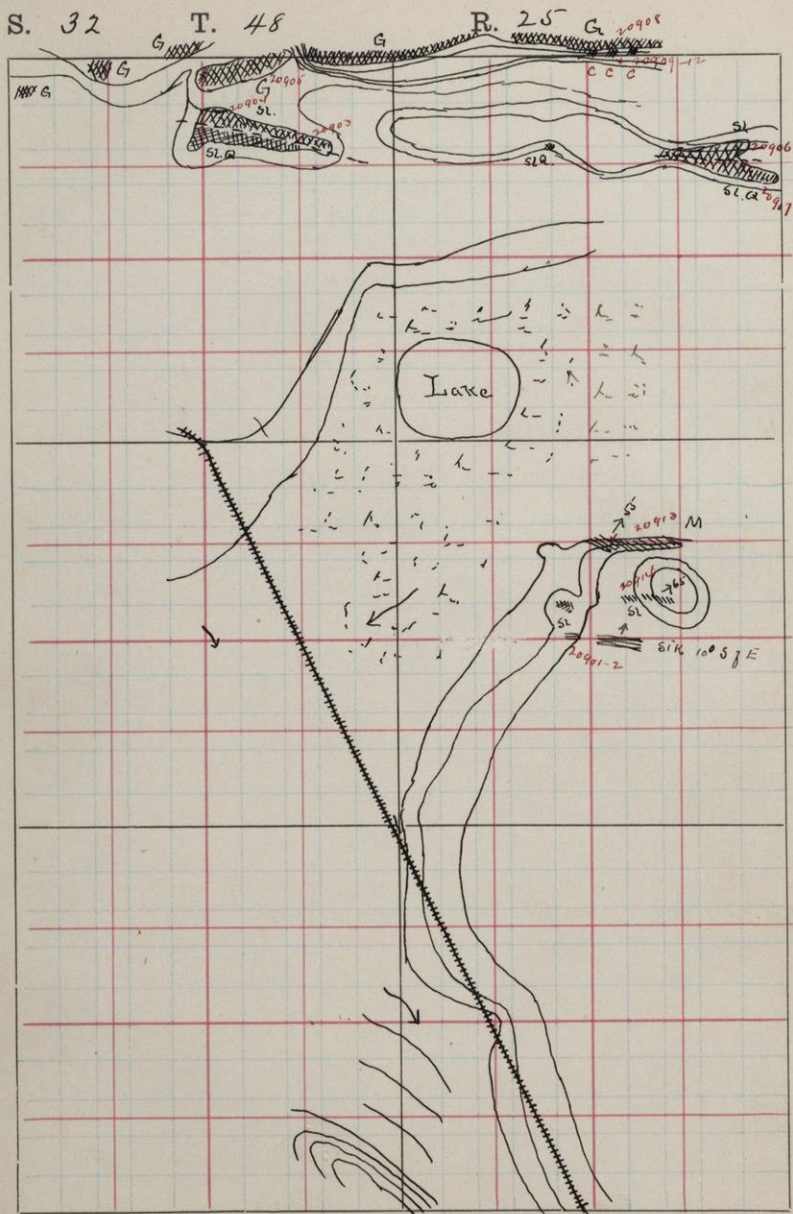
20907 Quartzite phase, S. of 20906. Location 400 N. 810-950 E of S.W. Cr. Sec 29

On the South side of the greenstones are several small ledges of the State road Conglomerate.

S. 32

T. 48

R. 25



20908 The greenstone is very slaty, constituting a greenstone schist.

At its foot and unconformable upon it is the granite conglomerate. This, further south, apparently under the coarser layers (for the dip is steep to the north) is much finer than it is near the greenstone. In this phase the bedding can be plainly seen to dip very steep to the north - 85° or more.

Under this the rock changes to a sandy quartzite and this is followed by the rock 20906-7.

20912 In places within the conglomerate are large areas of a ochreous, chloritic rock that fills in between some of the large pebbles.

South of this the next rocks seen are at

20913 100 S. 460 E of N.W. cor Sec 32

Here we find a steep ledge of marbles overlooking a swamp to the north. Strike 300 N of W. Dip 55° N.

200 S. 850 E of N. W. cor Sec 32

5
is the west end of a ledge of slates⁵
that appears to belong with the marbles,
and was like 20901-2. Interbedded
with them are quartzite layers
that dip 60° N and strike a little
N of W.

20914 Slate from 800 E 200 S. of Newer Sec
32.

20915

Brown point in Road's road at
700 S. 750 E. of N.W. cor Sec 8 runs
South through Secs 8 and 17.

At 715 S. 750 E. is the E. end of the
great marble hill that curved to the
west. At this point the red feldspathic
marble is well exposed dipping
predominantly to the South.

On the top of the hill at 730 S. 750 E. of
N.W. cor Sec 8 the marble shows a
small synclinal fold with a dip
of 10° - 12° N. on its S. side, but at
790-800 S. are large exposures of the
dark dense marble with a South
dip of 15° - 20° . The marbles in the
hill are not only folded with E-W
axes, but also with N-S axes. There
was too much moss and underbrush
to enable us to work out structure
in detail.

20916

At 450 S. 830 E. of N.W. cor Sec 17 is
the west end of a hill of cherty
quartzite belonging to the Goose Lake
Series. It is much folded and at

1
one place noted its foot has an axis
plunging S.E.

The predominant strike is 20° N of E
and dip, about 40° S. A little further
N.E. the rock is flat.

20917 Just south of 20916 is a brown quartz-
ite^o and

20918. South of this again the marble dipping
0

At 470 S. 820 E the marble and
quartzite are very close, but then
actual. A little further East it is
well exposed.

The marble strikes 10° S of E and dips
0. 25° - 30° , while the quartzite to the west
strikes 25° N of E and dips 22° S. This
would indicate slight discordance,
but nevertheless they are believed
to be conformable. The quartzite^o is
lenticled locally and is interbedded
with thin seams of black slate.

South of this here the sand plain
stretches E, W & S, and is not
broken until reach a point
 1100 S. 750 E of N.W. Cor Sec. 17, where
we find another line of the marble
series with the rock dipping 60° S.

20919

and striking $10^{\circ}-12^{\circ}$ S of E. Lites
bedded with the marbles is an
occasional layer of slate, with the
same strike and dip as the lime-
stones, but with dip of the slaty cleav-
age high to the north.

This hill which extends 1100-1250
S. is composed entirely of the marble
series, dipping and striking uni-
formly.

At 1500 S. 750 E of N.W. cor Sec 17
turn Eastward and travel 250
paces to 1500 S. 1900 E of N.E. cor
Sec 17. Then turn on the $\frac{1}{4}$ line

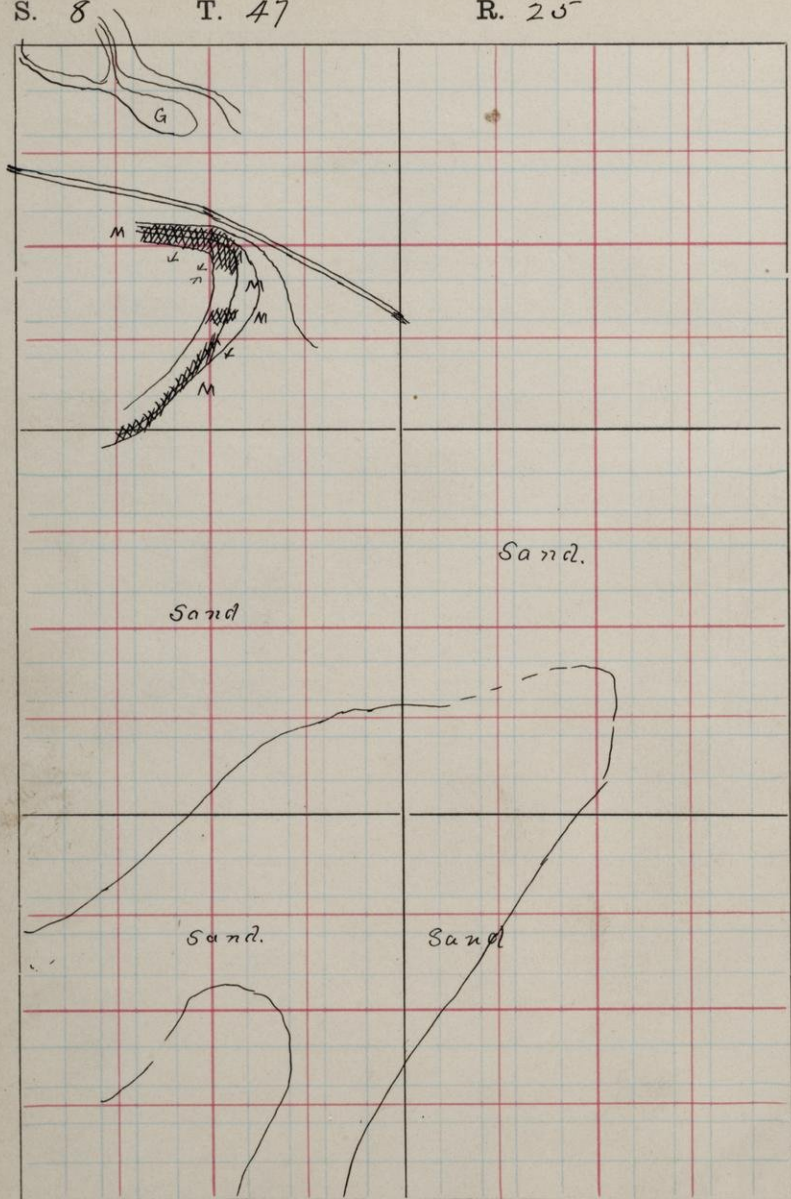
On the East side of the Northernmost
marble hill are a ledge of marble,
and one of slate, all else sand
will reach a point

1470 N of S $\frac{1}{2}$ S. Sec 17, where
again struck the marble-quartzite
hill. The marble is well bedded on
its South side, dipping about 45°
S. and apparently abutting against
the quartzite which forms a cliff.
a few paces N. the relations of the

S. 8

T. 47

R. 25



two rocks are not plain. There seems to be an unconformity with the quartzite above the marble, as cracks in the latter are filled with material from the former. On the north slope of the first high rise in the hill, the marble and quartzite appear conformable and at

20920 1650 ft. of $1\frac{1}{2}$ p. Loc 17 is an exposure of dense red marbles and slates dipping S. The slate seems to be an intermediate rock between the marble and the quartzite.

On a little rise north of the main one the quartzite is well bedded and thinly bedded. It seems unquestionably with the marble series for it grades into the limestones.

On the south side of this rise the rock dips 15° N. and strikes a little S. of E. and on the N.W. of the same rise it strikes NW and dips 30° S.W.

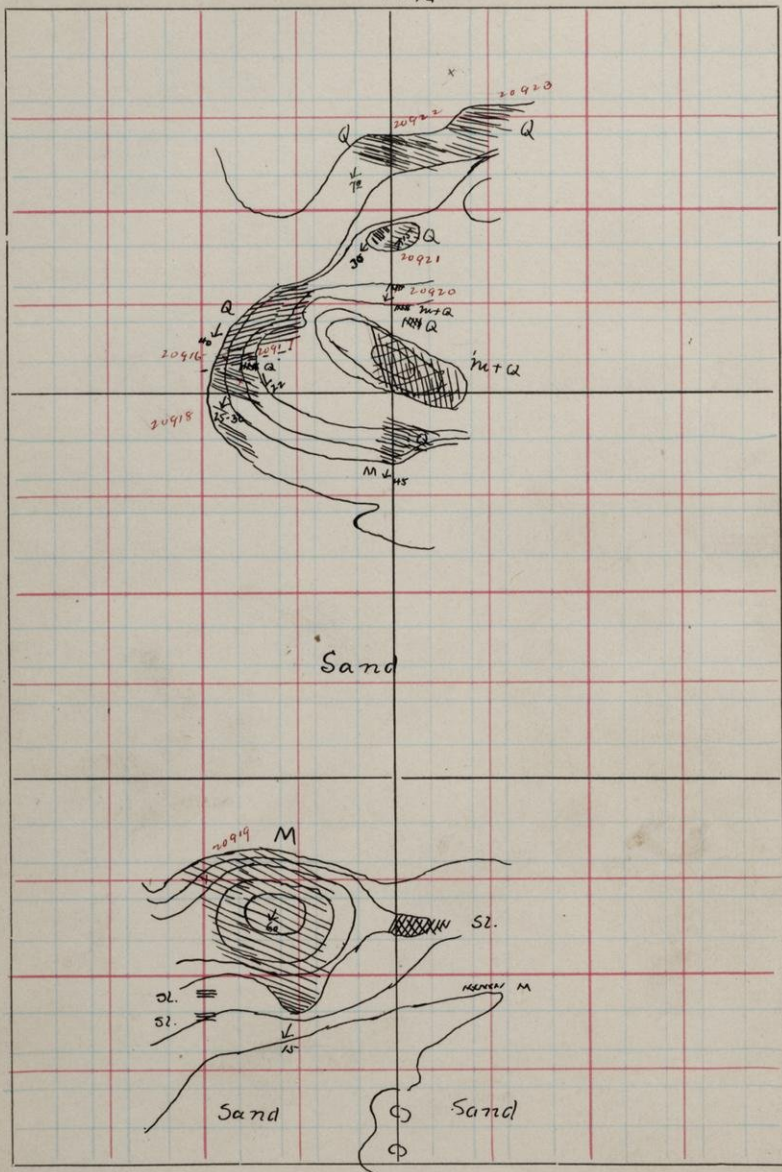
20921 is a banded calcareous quartzite

S. 17

T. 47

N $\frac{1}{4}$

R. 25



from this place.

20922 Further north, on northern slope of hill the quartzite predominates and on a little north-facing precipice it is nearly flat. There at 1850 ft of S. 1/4 p. Sec. 17. The rock is sandy and well bedded. The general strike is $10^{\circ} S$ of E and generally dip. $5-7^{\circ}$.

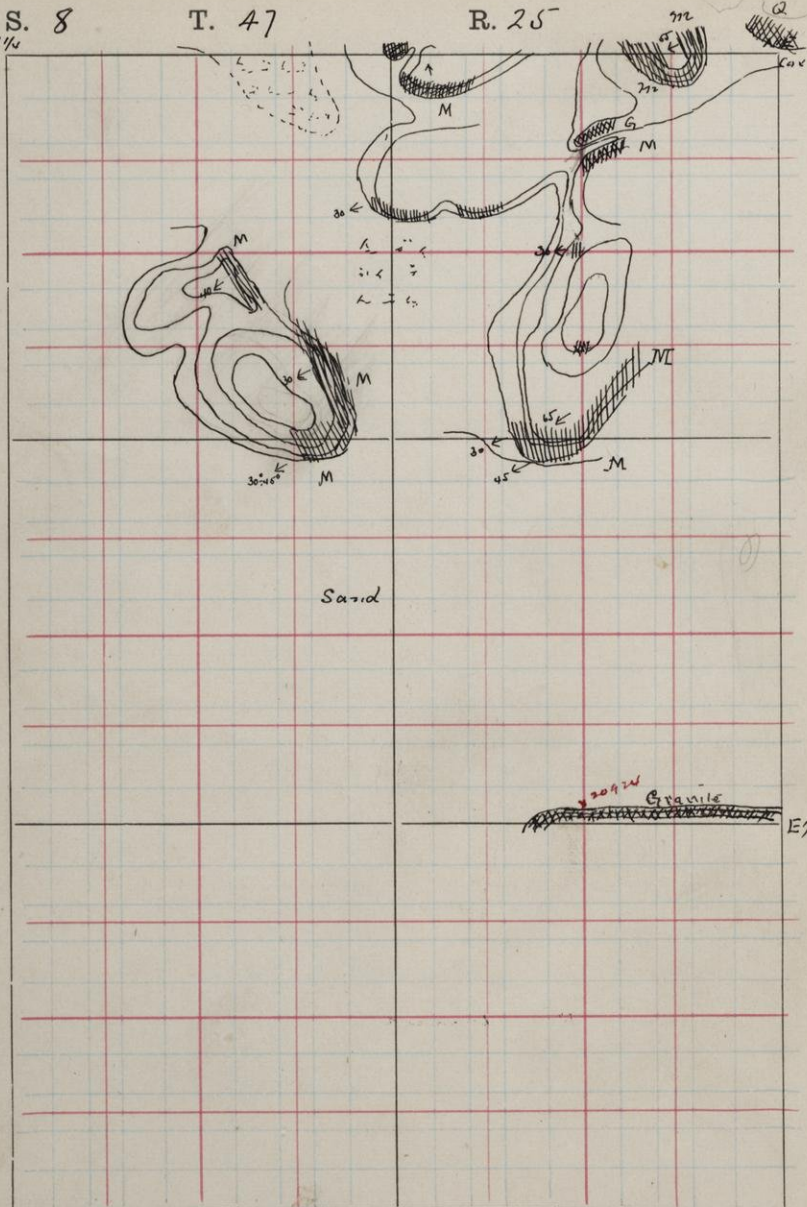
At 1930 ft. $45^{\circ} E$ of S. 1/4 p. Sec. 17 the marble is slaty and cherty.

Although there seems to be two evidences of unconformity between the marble and the quartzite, I believe that no such relation exists. It is true that large round masses of the marble are in the lower layers of the quartzite, and that the latter thus seems to be conglomerate, but this phenomenon is thought to be due to the irregularity of contact between the two rocks and their unequal weathering.

S. 8
N 1/4

T. 47

R. 25-



From $N\frac{1}{4}$ p. Sec 8 run 250 E then
 O. to Read's road, 250 E again and
 north to the north line of the section.

At 1745 N. 1250-1350 E of S.W. cor
 Sec 8. on north side of line is a
 large ledge of marbles striking
 20° W of N and dipping 40° S.W.

400 S. 1425 E of N.W. cor Sec 8 on East
 side. of same line are more well
 banded marbles striking 15° W of N.
 and dipping 30° S.W.

and at

200 S. 1500 E of N.W. cor Sec 8 other
 well banded marbles, striking
 15° W of N and dipping S.W.

Continued O. to 1000 S. 500 E of $N\frac{1}{4}$ p.
 Sec 8 then 250 E to 1750 E and
 south to granite?

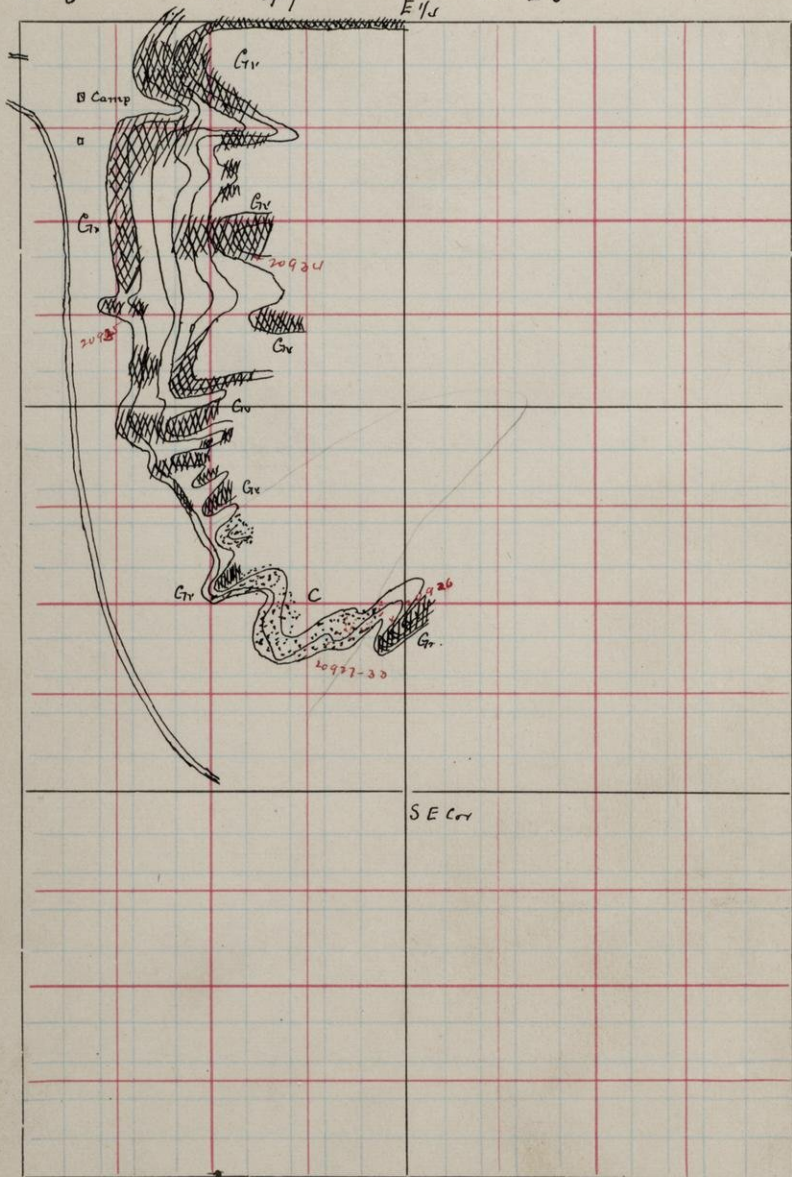
At 1000 S. 750 E of $N\frac{1}{4}$ p. Sec 8. is
 the north side of a granite bluff that
 runs E. about a quarter of a mile.
 Just a dark gray granite or gneiss

S. 8

T. 47

E 1/4

R. 25-



into a hornblende schist, whose
schistosity strikes about E.W.
Granite?

20924

From this point went west 250 paces
and South to 1000 S of N line Sec
17, then E. 250 and north.

The run in Sec 8 was over sand
plains until reached S. line, and
in Sec 17 until had traveled to
200 S. where at

200 S. 1150 E of N.W. cor Sec 17, found
a cliff of marbles and calcareous
shales. For the most part the dip
is S. but at one place the rocks
strike 10° S of E and dip nearly E at
40-45°.

20925

is black slate interbanded with
marbles.

The marbles are of the normal kind.
Here and there they pass into Si-
licious varieties, especially at their
bases, but are nevertheless very cal-
careous.

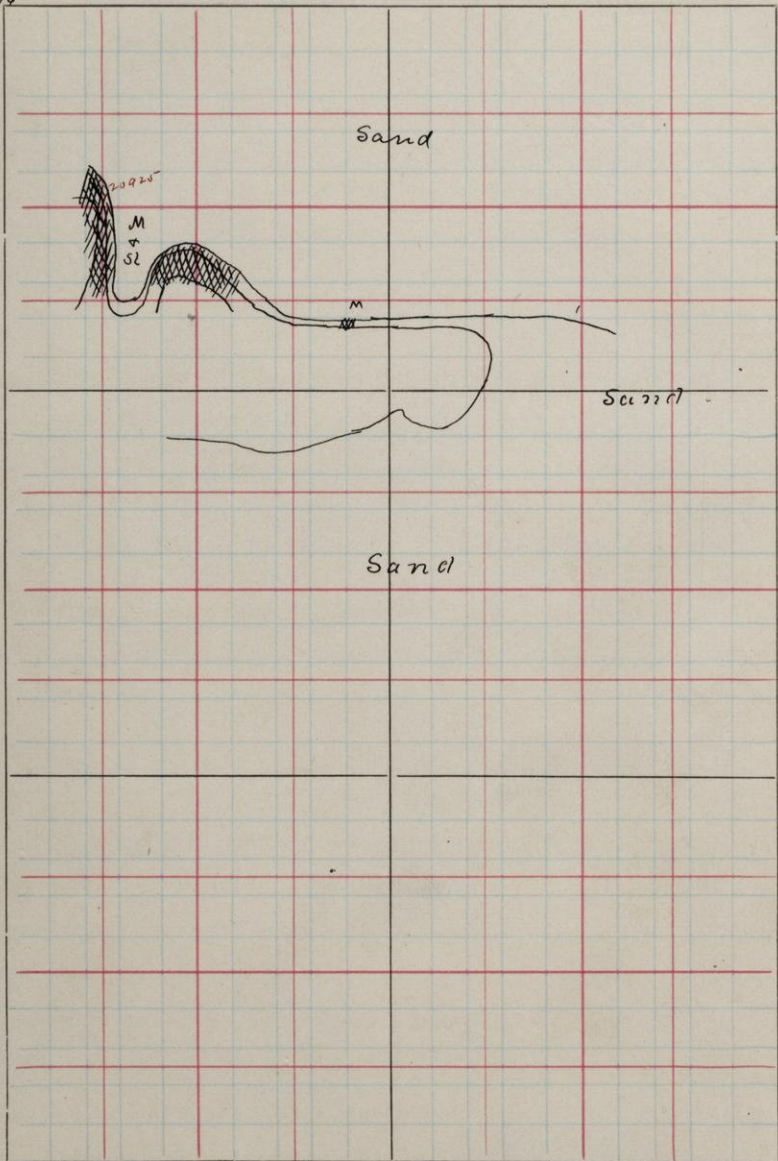
In places they are flat lying and
in other places are contorted with
S. plunging, axes.

S. 17
N 1/4

T. 47

R. 25-

NE
Cor



E 1/2

175

On the north rim the first rocks seen
are on the South side of the granite
hill whose north side is on the $\frac{1}{4}$
line of loc 8.

The South side is just north of the
S. line of loc 8. There is a grand
display of granite & conglomerate,
which faces the South side of the hill
and extends back into it as indica-
ted on the map. The rock is made
up of granite debris, and is filled
with quartz pebbles, green schist,
granite, jasper, etc.

It is an upper conglomerate at the
base of the quartzite, which is presum-
ably in the Marble series.

20926 Granite from E. side little ravine
by which it is separated from the
conglomerate to the west.

20927 granite pebble

20928 jasper "

20929 greenstone(?) "

} From the conglomerate

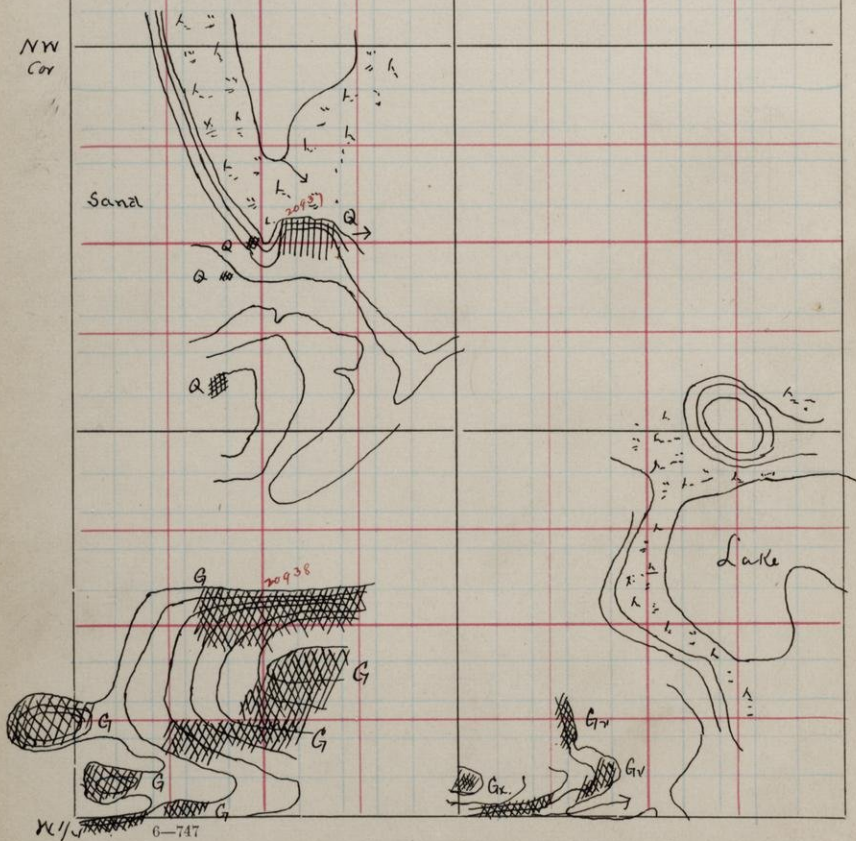
20930 Fine grained recombined granite
in irregular bands in the conglomerate

20931 Coarse conglomerate with green quartz

S. 9

T. 47

R. 25-



pebbles.

20932 green cherty granite & pebbles from conglomerate

20933 Coarse recrystallized granite

20934 The granite in top of the hill is banded with coarse and fine bands, forming dark and light sinuous lines that are remarkably like fluvial lines. Though the rock is banded would not call it a gneiss, as are not confident that this banding may be called foliation.

20935 Schist interleaved with granite
625 N 375 W of S.E. cor Sec 8, on west side of hill.

After crossing N. line of Sec 8 continued N. to N line finding marbles etc.

20936 At 1900 N. 250 W of S.E. cor Sec 8 is a small ledge of greenstone, apparently cutting the marbles

At the north line of Sec. ran E to N.E. cor. crossing rough hill of marbles dipping about S.W. at 50° - 60°

S. 9

T. 47

R. 25 →

 $\frac{3x}{2}$

Gr.

Gr.

Gr.

Gr 1000

G. 140

Granite

 $\star G$ ~~Case~~ Gr

Gr.

Gr. ~~100~~

Gr.

Gr

S.W.
Cov.

— 47 —

15

2439-110

Granite

5/4

 γ

Q

and at the corner a ledge of quartzite?

From the corner run East to 250 E
then South to $\frac{1}{4}$ line of Sec 9.

20937 At 220 S. 275 E of NW cor Sec 9
is a great north facing ledge of
massive quartzite? that seems to
strike a few degrees E of N and S dip
E about 45° .

This quartzite? outcrops in small
ledges until reach.

20938 750 S. 250 E of NW cor Sec 9, where
strike north side of a granite hill
N.B. Examine to determine whether
granite, or a recrystallized rock.

From $W \frac{1}{4}$ p. Sec 9 - 47-25 ran
South on line to 500 S, ^{to NW cor Sec 16} then East
500 and north to $W \frac{1}{4}$ line of Sec 9.

We now south crossed the great gran-
ite hill, which is a solid ledge as
far south as 500 S of $W \frac{1}{4}$ post Sec 9.
At this point there are spurs of con-
glomerate in the western flank of a
granite knob.

Granite continues south of this
point uninterrupted to very
near the S. line of the section, where
quartzites appear, striking nearly
E-W, and dipping 15° S.

The quartzite nearest the granite
is feldspathic - a recrystallized gran-
ite. This grades outward into
white quartzite of the usual kind.

20939

Delicately recrystallized granite at
135 E. 50 S. NE cor Sec 16.

20940

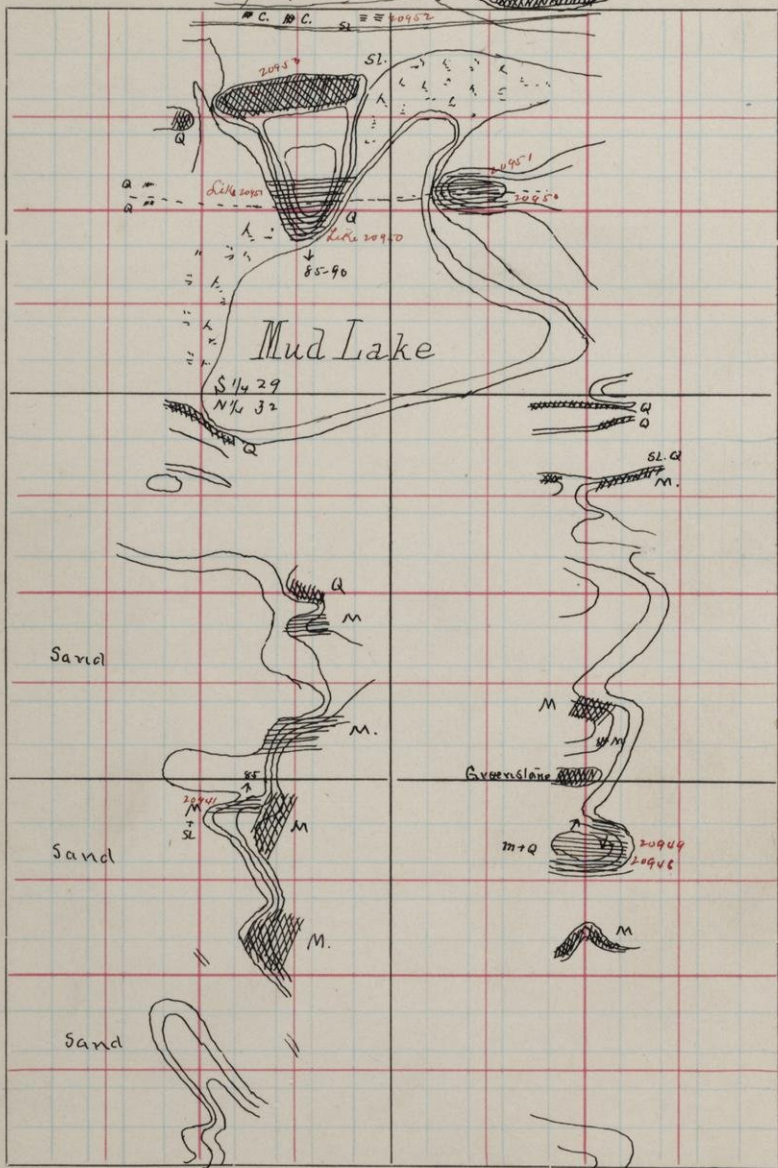
Very near 20939.

on run north on line 500 E of
 W line Secs 16 & 9 nothing but gran-
 ite appears. At $\frac{1}{2}$ line Sec 9
 ran 400 E and South again. On
 this run nothing but granite was
 seen until reached S. W. and of hill
 here at

500 S. 220° W of $\frac{1}{2}$ $\frac{1}{2}$ p. Sec 16 is
 small exposure of quartzite in which
 a pit has been dug.

S. $\frac{29}{32}$

T. $\frac{18}{32}$ G. R. $\frac{25}{32}$ G.



6-747

Center 32

From $2\frac{1}{4}$ p. Sec 32 T 48 R 25 ran
S for $1\frac{1}{2}$ miles, then East 500 paces,
and north to road, 500 N. of S.
line Sec 29.

At 20-50 S of $2\frac{1}{4}$ p. Sec 32, on the
south side of Mud Lake rises a steep
hike, on north side of which is ex-
posed fresh pink vitreous quartzite?

Just East of the course taken, which
lay in the sand plains, is a series
cliffs forming the western escarp-
ment of a higher plain.

On this escarpment at
250 S. 100 E of $2\frac{1}{4}$ p. Sec 32 is the
pink quartzite? again

N. B. Compare carefully this quartzite
with that north of the Lake, that
north of the Lake is regarded as the
upper quartzite? while this south
of the Lake appears to be continuous
with that underlying the conglomerate
sand. It may consequently belong
with the upper quartzite?, or it
may in the other hand be the

19

of the marble series interstratified
quartzites.

South of the quartzite the escapement is made up entirely of marble. The strike of the series is about E. & W., varying from this nearly 5° to 7° in both sides and their dip nearly vertical, perhaps in all cases inclining to the north. The marbles are interstratified with slates of which the specimen is the purple variety.

20941 550 S. 60 E of $N\frac{1}{4}$ Sec 32.
Slate, dipping 85° S.

From 700 S. to 2000 S. are sand plains with no exposures.

at 385 S. of $N\frac{1}{4}$ p. Sec. 5 is ledge of quartzite and at.

20942 485 S. 10 E of same $\frac{1}{4}$ p. sec. is a small ledge of black slate.

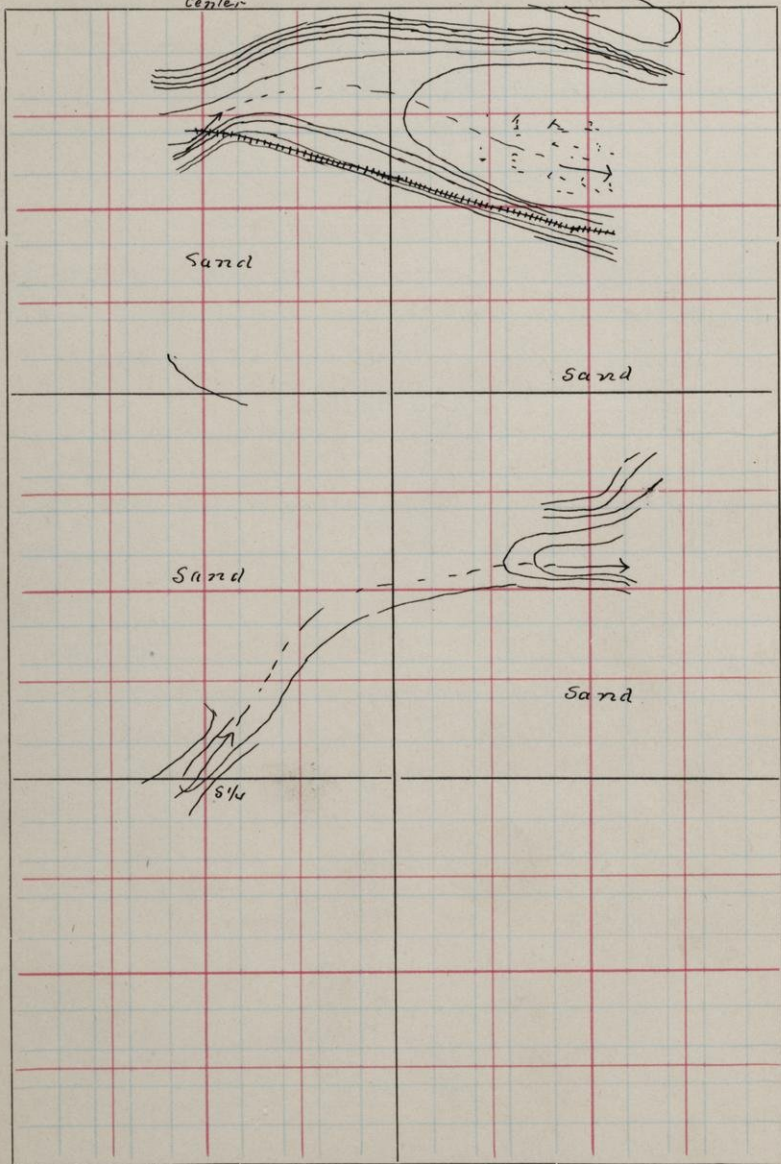
20943 580 S. 10 E of $N\frac{1}{4}$ p. Sec 5, another small ledge of slate occurs.

S. 32

T. 48

R. 25

Center



- 20
- 20944 At 690 S. 60 E of N 1/4 p. Sec 5, is another small ledge of slates striking 20° W of N. and dipping 45° S.W. The rock is a dark slate, banded with chert. At west end of ledge, at,
- 20945 670 S. 10 W of N 1/4 p. Sec 5, the rock is very heavy as though richly laminating.

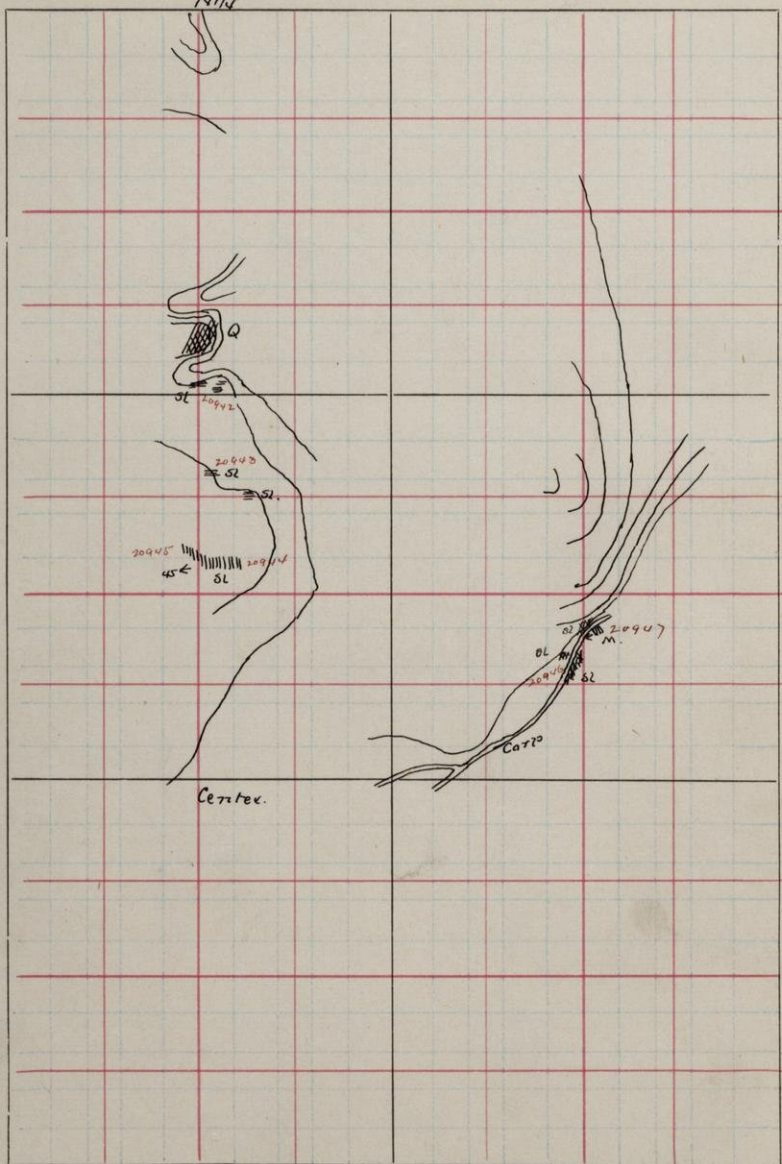
Beyond this point no ledges were seen until reached the Camp in Eastern run. There are again good slates with slate cleavage striking in many places 10° W of N and dipping 30°-40° N. Dip of the bedded was not observed.

- 20946 is specimens of this slate from about 900 S. 450 E of N 1/4 p. Sec 5. The north bank of the stream is slate at 500 E. and on the S. bank Smith
- 20947 reports large ledge of marble N.B. At the time run was made it was thought that the slates and marble were of the same series, but if not, as Leanne thinks, then this place is his outcrop between the slates and marbles.

S. 5

T. 47

R. 25



Smith reported here an abutting
of the slates against the marble, but
this was supposed to be simply the
abutting, folio slaty cleavage against
the harder beds.

If the slates belong with the Kes-
wad there should be no unconfor-
mity with the marble. Cannot see
how this exposure makes for
against Seaman's theory.

Running N. no rocks were noticed
until reached

1300 N. 500 E of S 1/4 p. S. 32. where
we have the Southern Escarpment of
the marble plateau. Great ledges
of marble and slate are here ex-
posed, showing the rock much
contorted and striking in all
directions, with any one predom-
inating. In some places are
small overturned synclinal
with both legs composed of north
dipping strata, and the axes
plunging to the East.

At 1420 U. 500 E of S 1/4 Sec 32
the marbles become more quartzitic
Here both beds are contorted, but
the predominant strike is about
10° N of W, and dip, 20°-40° U. On the
north side of the exposure, the quartzite
layers are abundant and thicker
than to the south, and the rock
passes into a quartzite in places.

20948 Fine grained red marble, very
quartzite

20949 Quartzite near 20948.

At 1777 U. 300-425 E of S 1/4 Sec
29 is a knob of quartzite on the
east side of the lake. There are ex-
posed here in contact the various
white quartzite striking a little
N of E and dipping nearly vertic-
ally, and north of this the yellow
sandy quartzite? The quartzites are
conformable and near the contact
are occasional beds of the yellow in
the white? The dip may be slightly
to the south.

20950

20951

North of this ledge is a swamp, and

North of the Swamp is the crest of
quartzite.

Near the road, at

20952 490 N. 250 and 210 E of S $\frac{1}{4}$ p. Sec 29
are two small ridges resembling
slate, and at

20953 490 N. 10 - 200 W of S $\frac{1}{4}$ p. 29 a
large hill of slate whose dip and
strike could not be obtained. The
slate is like that west.

On north side of lake at 225 N.
150 E of S $\frac{1}{4}$ p. Sec 29 is south end
of tract in which the rocks are
like 20951 and 20950, dipping
85° S.

Run South on Sec line between
Sec 28 & 29 W.S.W. cor Sec 4 then E.
500 and North.

20954 At 1500 S of N.W. cor Sec 28 is a high
hill which on top is covered with a
ledge of a quartzitic slate, and at bot-
tom of which are many loose bould-
ers or fragments of quartzite?

20955 Sandy quartzite? (probably of near-
by series) found top of same hill from
other west.

Near the N.W. cor Sec 33 is a large
quartzite? hill

At 50 S. of N.W. cor Sec 33 is another
knoll of quartzite?, but this is cer-
tainly a marble series member, as
its surface is sandy though alterna-
tive

At 115 S. is a north facing cliff of
a marble hill, in which the rock
dips a little S of W. indicating a
W of N. strike. The marble is quartz-
aceous, and is interbedded with layers of

quartzite?

At 160 S of U.W. Cr Sec 33 on the S. side of the Marble Knob, slate occurs with the marble.

Further South an independent knob is made calcareous quartzite.

20956 200 S of U.W. Cr Sec 33. Calcareous quartzite of the Marble series.

South of this point the slates and marbles are interbedded. Specimen of

20957 slate from 665 S. of U.W. Cr Sec 33.

The only dips observed were vertical or perhaps slightly tilted to the E.

No other rocks outcrop until reach the Camp River at 350 S of ^{North Cr} Sec 4. ^{Ph.}

2 350 S., where there is a series of slates making faces of 5-15 ft. in height.

20958 The slates where seen are light pink and yellow, and in places are weathered. They are regarded as members of the Marble series. Strike at 100 E of line is 30° E of U, dip 45° U.W.

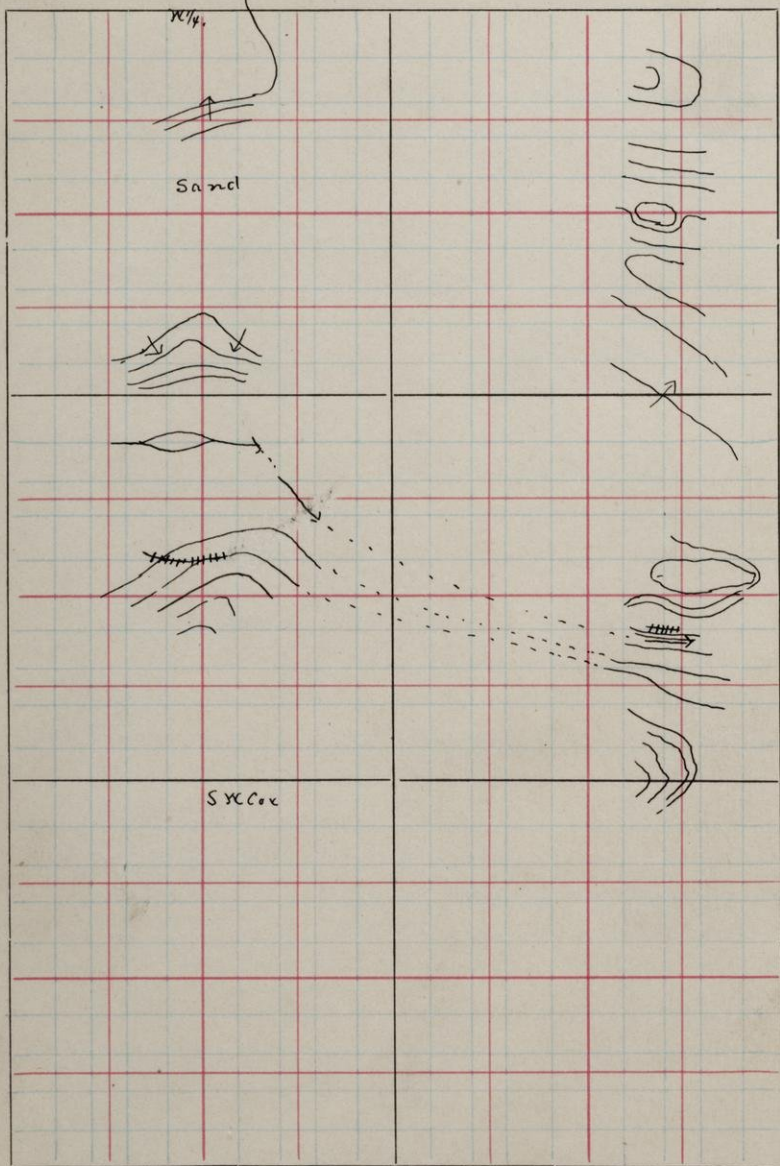
Further west they strike 30° W of U and dip S.W.

One of the faces has for its barrier a

S. 33

T. 48

R. 25



✓
 20959 shale enclosing layers and lenses of quartz. It resembles in appearance a conglomerate.

At 1400 S. of NW cor Sec 4 is a small ledge of vitreous quartzite striking 20° W of N and dipping in the neighborhood of 30° S of W.

20960 At 1470 S. and 40 E of NW cor Sec 4 at the base of a high hill are light slates that seem to belong with the marbles. The strike about NW and dip S.W.

20961 Further up the hill the rock is like a fine grained siliceous limestone and at

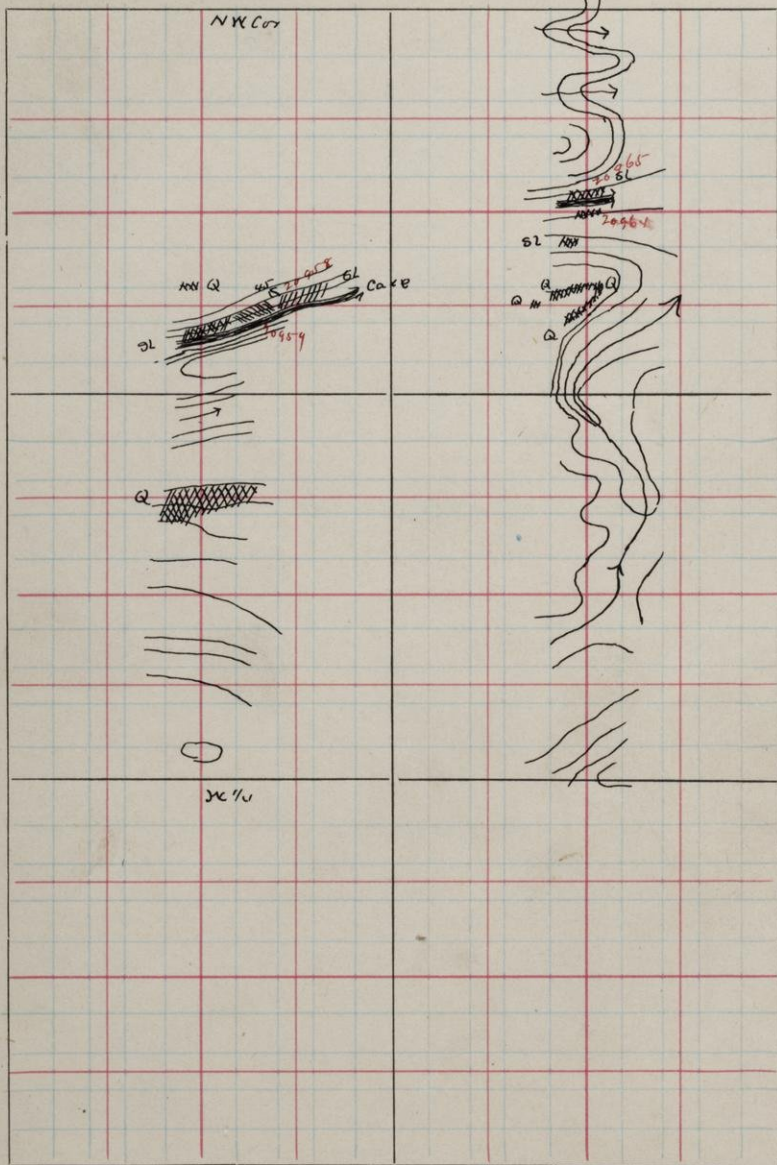
20962 1660 S of N W cor Sec 4 are banded slaty limestones striking 25° W of S. The rock 20961 is very quartzose, grading in places into quartzite?

After reaching SW cor Sec 5, went around the lake and found on its East side great exposures of quartzite and marble. The former is at the bottom and on the west side of

S. 4

T. 47

R. 25-



99

the bluff. It is well bedded and lies flat. Further up the hill is the marble dipping 15° S. Then again on the north side of the bluff are flat lying marbles and quartzites striking 30° N. by W. and dipping 30° S. W. They form a precipice overlooking the lake.

10963

Another precipice, not quite so high as the first mentioned is at 270 N. of S line of Sec 4, is composed of slaty marbles interbedded with quartzite, which have usually the rotted weathered surface of the marble quartzites.

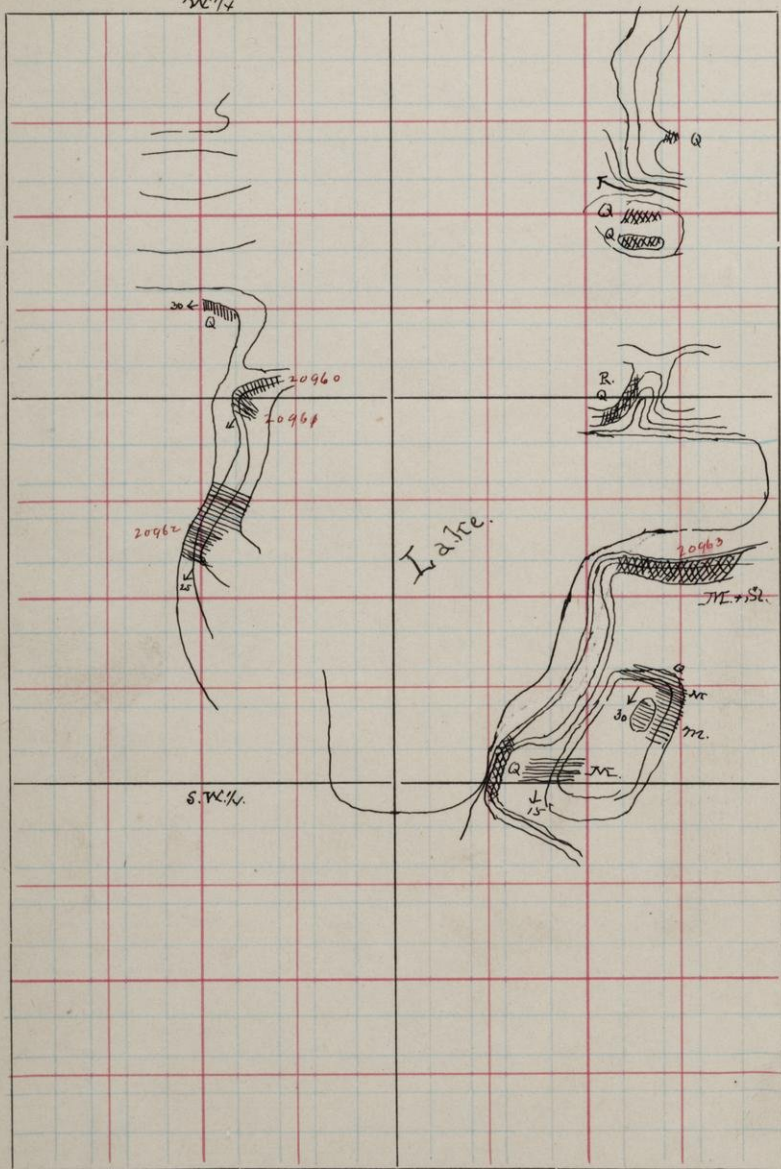
North of the lake at 500 N. 525° E. of S. W. Cor Sec 4 is a ledge of red quartzite and north of this several other ledges of the white variety - that seems like the true quartzite.

On the South bank of the Carp, at 1775 N. 500 E of S. W. Cor Sec 4, the slates are well exposed for some distance. Their bedding could not be distinguished but their schistosity is nearly

S. 4

T. 47
N¹/₄

R. 28-



E.W., and its dip, 45° - 50° N.

20964

is a red slate from an Exploring
cave on S. bank of stream.

The fossils, of which there are several
in this vein, are over a bluish
slate of which specimen is from

20965

me, at 500 E.

No other rocks appear until reach
the N. line of Sec 28, where are several
large and high exposures of quartz-
ite.

At 590 N. 500 E. of J.W. Cor. 28 the
greenstone reappears and forms a
cliff west of road as usual.

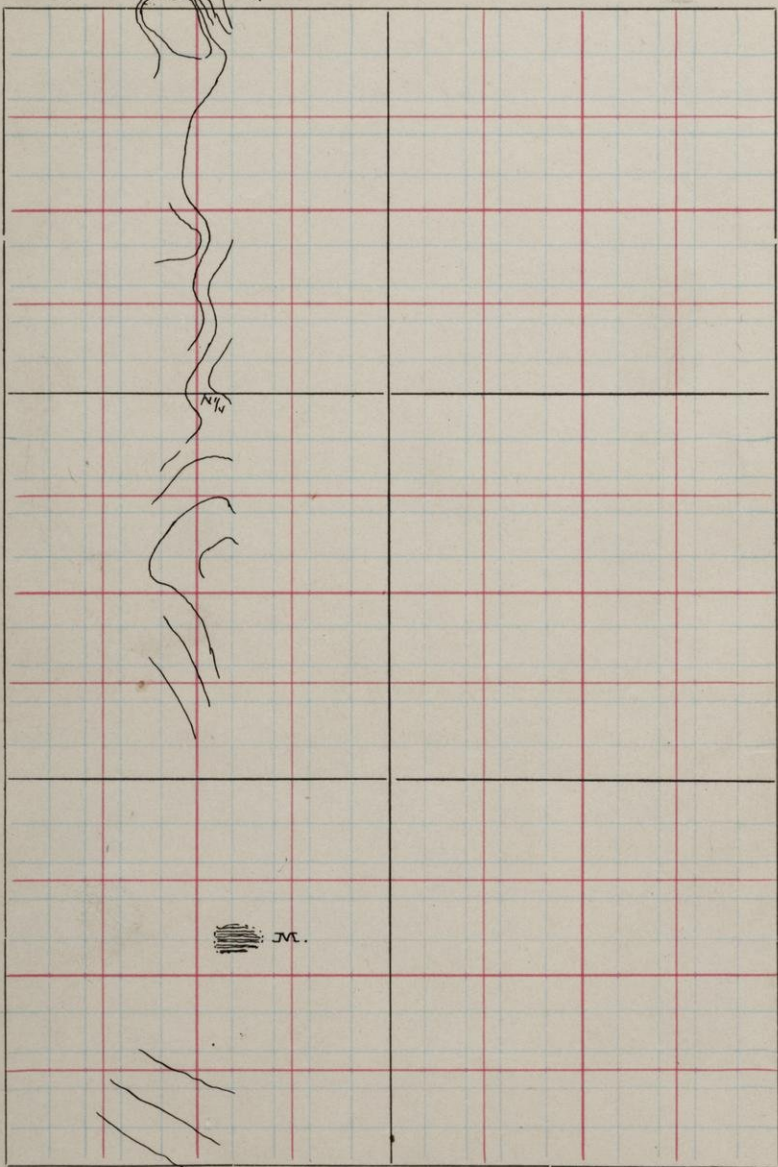
20966

Schistose greenstone from pit N. of
road, at 590 N. 500 E. of J.W. Cor. 28.

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

R. 25-

T. 48
 N. 1/4



Ran south on $\frac{1}{4}$ line of Secs 28, 33
and 4, beginning 500 ^N of S $\frac{1}{4}$ p. 33
and turning East S $\frac{1}{4}$ p. Sec 4. went
500 paces and the north to railroad.

The greenstone ridge occurs as usual
at 600 ft of S $\frac{1}{4}$ p. Sec 28.

The only rocks seen in Sec 33, are
at 700, 75-75-E of $\frac{1}{4}$ p. Sec 33, where
there is a small outcrop of marbles
striking about EOW and dipping
nearly vertically. The rock is the
dense pink variety.

Just south of $\frac{1}{4}$ p. Sec 4 and
45 paces E, the small stream that
have caused so frequently empties
into the Carp river, tumbling at its
mouth over a ledge of slates.

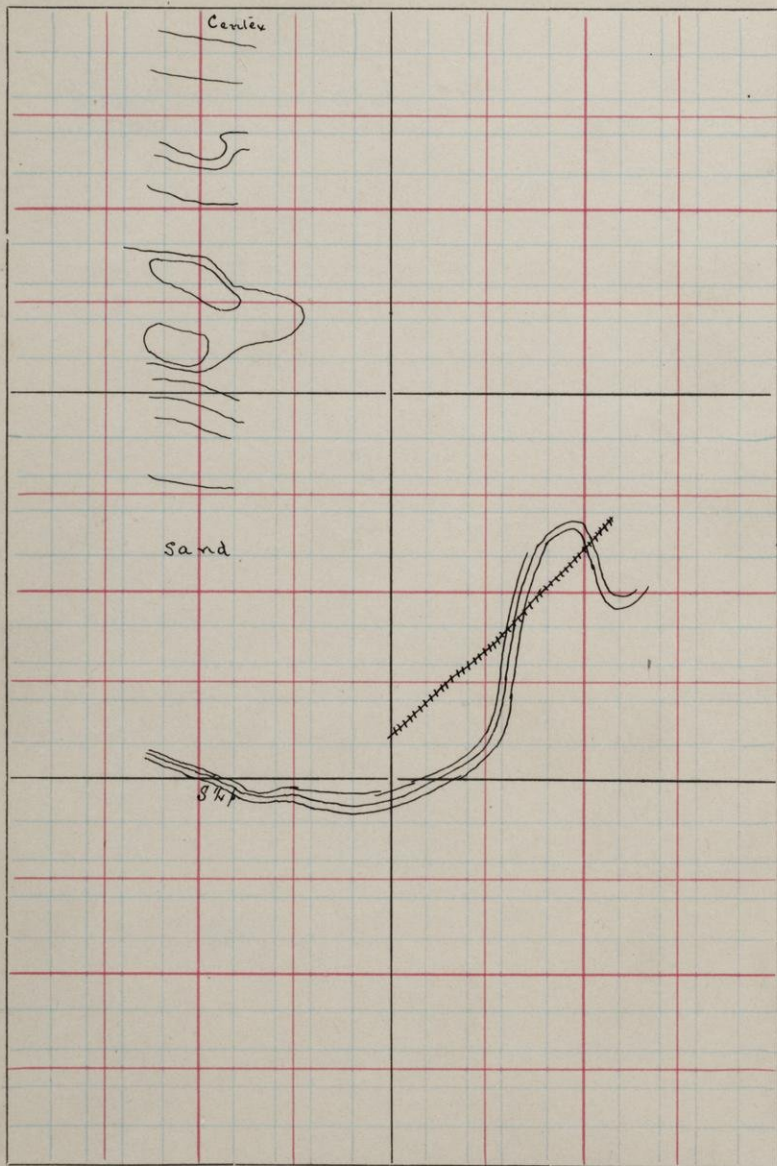
20964 100 S. 75 E. of $\frac{1}{4}$ p. Sec 4.
Sericitic slate.

20968 The same slates occur ^{on} south side of
the Carp river. It is very much
jointed, and highly chlorite.

S. 33

T. 48

R. 25



From 700-1000 S of U 1/4 p. Sec 4 is a big hill of quartzite and further south at

20969 1070 S of U 1/4 p. Sec 4 is an exposure of shale dipping S.E. The shale is well banded and appears to belong with the Marble series.

20970 Was taken for marble. It underlies the shale.

20971 1160 S of U 1/4 p. Sec 4. Calcareous quartzite, from S. side, top of hill.

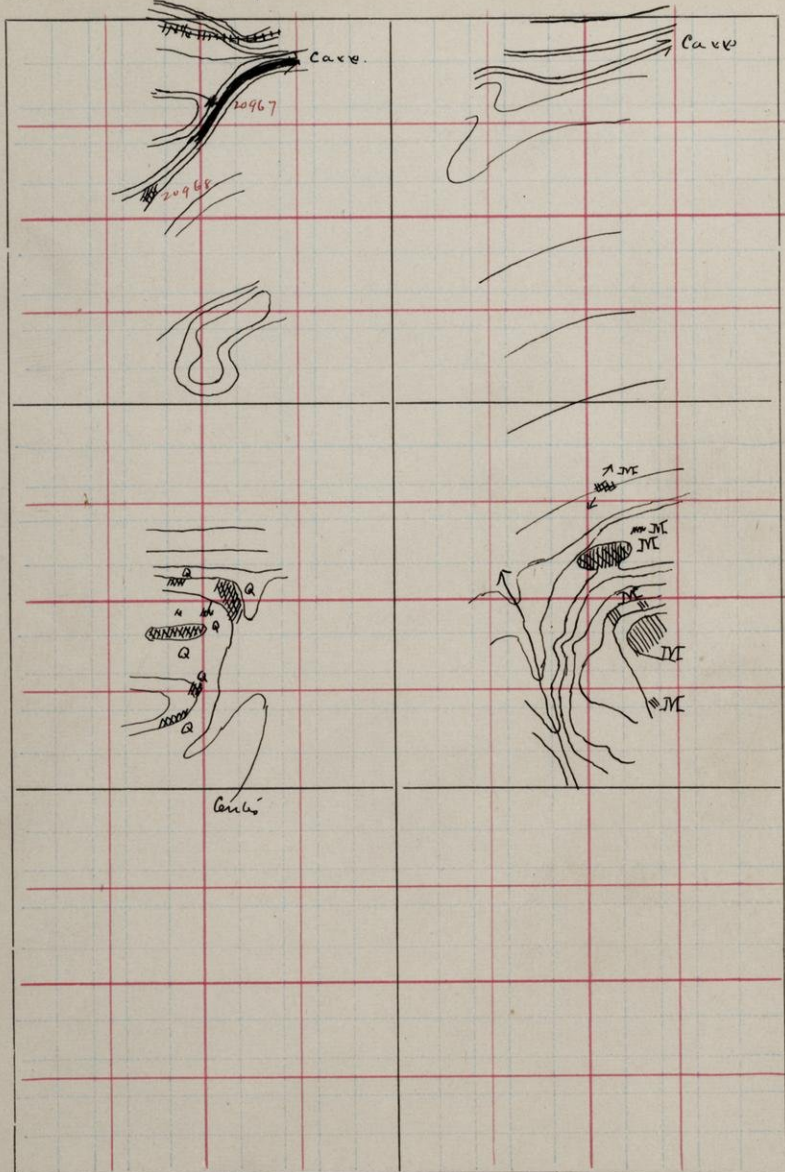
At 1420 S. of U 1/4 p. Sec 4 is the west end of a high knob of quartzite with obscure banding striking 30° N of W. and dipping 26° S.W. This quartzite seems to be different from the calcareous quartzites, belonging with the marbles.

On the S. side of Sec. 4. at 365 E of S 1/2 E. of Sec is a very high knob of white quartzite striking 30° W of N. and dipping 35° S.W. It is a very vitreous variety and in some places is pinkish in color.

S. 4

T. 47

R. 25



North of this the granite cuts in
outcropping in many ledges from
500 - 760 U, 500 E of S 1/4 p. Sec 4.

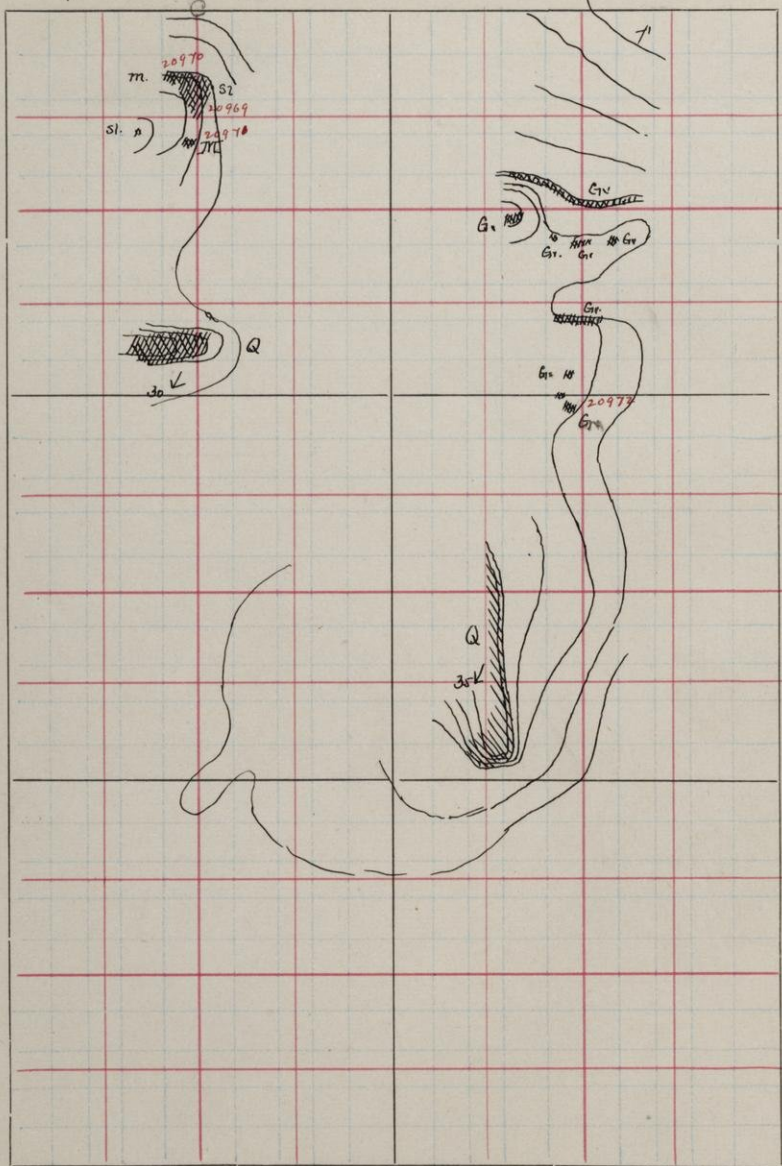
20972 Specimen granite from
1190 U. 500 E. S 1/4 p. Sec 4.

No rocks appear for the next 350
paces north, but north of this at
1240 U. 500 E of S 1/4 p. Sec 4. in
top of a hill the dense red marble
with a dip of about 25° N.E. and
strike S.E.

S. 4

T. 47

R. 25



Ran 500 ft of NW cor Sec 34 ran
South to S.W. cor Sec, then South
1700 ft of NW cor Sec 3, East 500
and North again to N. line Sec 34.

Until reached point 200 ft of NW
Cor. Sec 34 nothing was seen
but greenstone.

At 250 ft of NW cor Sec 34 is a
high steep hill rising almost
perpendicularly from level hills
at its foot. Its face is composed of
a dark slaty conglomerate carrying
pebbles of ore, jasper, quartz and
yellow schist. It is evidently a
basal slate conglomerate. It con-
tains only rarely a boulder or peb-
ble of granite, since the basement
in which it was deposited must
have been composed of lower for-
mation material.

20973

Specimen of conglomerate

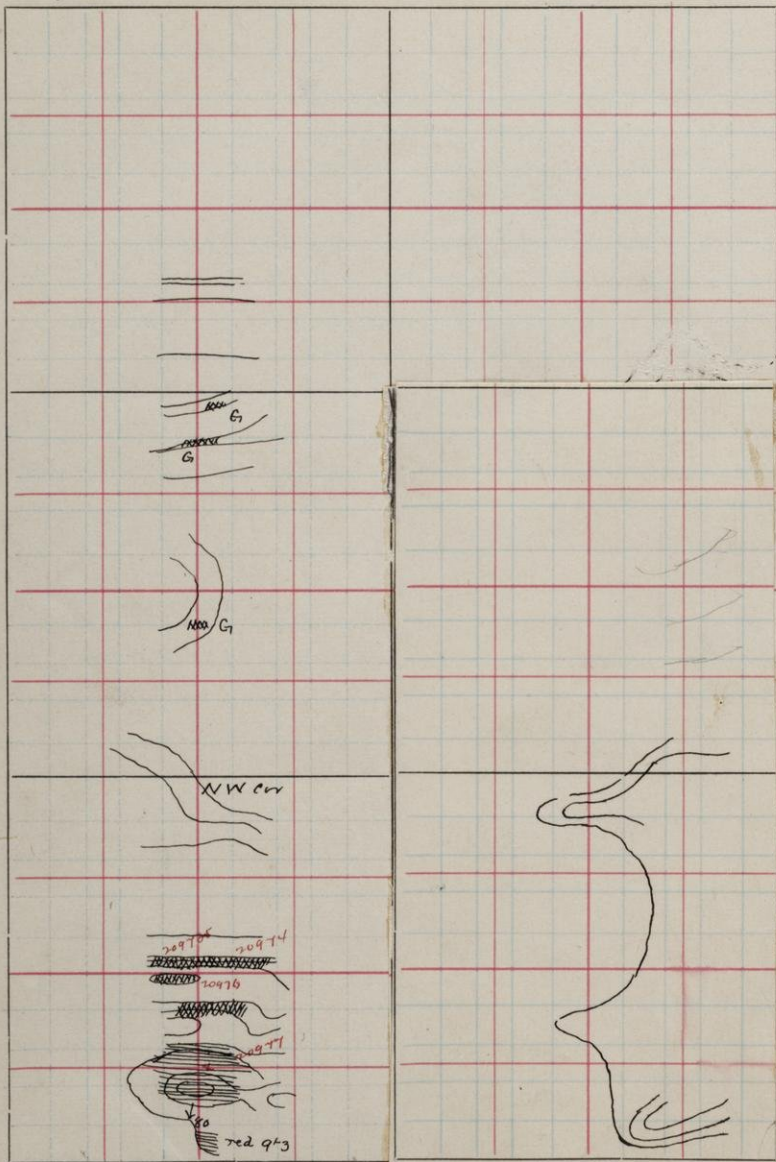
20974

Slate interbedded with conglomerate.
Strike nearly E.W. Dip vertical

S. $\frac{27}{34}$

T. 48

R. 25-



6—747

6—747

20945 Green schist. Pebbles from conglomerate?

On top of the hill the conglomerate changes into quartzite, and here it shows its basal character in the

20946 fact that it is reddish graywacke-like.

20947 Further south it changes to the true massive quartzite.

This is probably one of the places at which it is supposed there is a basal conglomerate under a younger quartzite and above the Mesnard Series. That is, the massive quartzite 20947 is supposed to unconformably upon the Mesnard.

But this quartzite, it is believed, may be traced directly into the quartzite in Unit. Mesnard. If this is conformable with the Mesnard to the south of it, then the quartzite at the base of which the above conglomerate is found is also Mesnard. There is no evidence to the south of the exposure that the

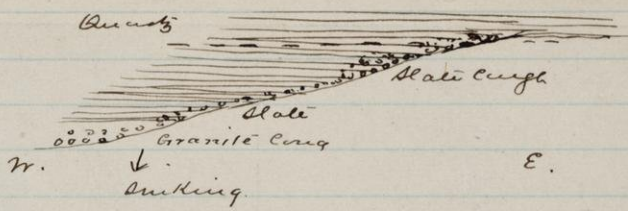
25

quartz, it is micaceous and upon
the weathered occurring there, con-
sequently in the field the two
rocks were regarded as members
of the same series.

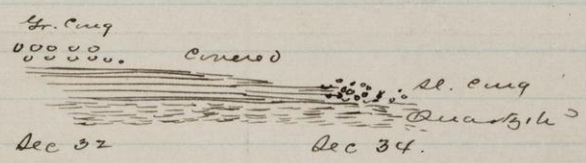
Since this locality and no other
500 E, were the only two seen by
me, and since the relations of the
rocks are the same at both places,
and by no means convinced that
we have here a case like that
in the Corp river, in Sec 6.

The explanation in the field was
to the effect that the State road
conglomerate is the lowermost
conglomerate of the upper series,
that upon this was deposited the
slate that underlies the quartzite
in Sec 32. This slate was con-
sidered to be the same as that
forming the matrix of the Congl-
omerate, and interstratified with it,
and that this has become con-
glomeratic in this place.

An encroachment of the shore
line toward E would explain the
phenomena



Overturning to S. and erosion would produce this plan



The quartzite forms a large hill at 350-500 S. in which it dips 80° S. Further S at 600 S of NW cor Dec 34 the quartzite ends in a cliff that overlooks a little swamp. On the South side of this swamp is a little knob extending west from the main hill dipping Southward. It is composed mainly of a Sericite schist or a schistose quartzite, that is in contact with the quartzite.

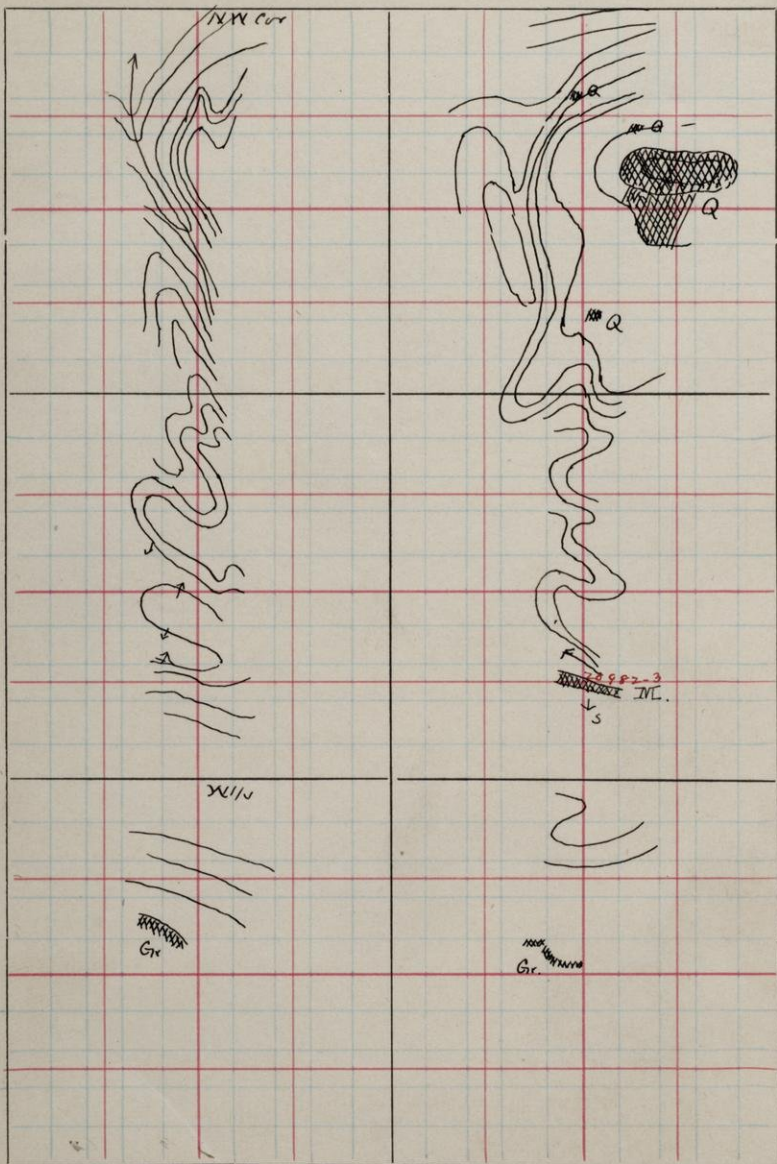
20978

U.B. This contact ought to be ex-

S. 3

T. 47

R. 25



37

examined them carefully, in search
of evidence of unconformity.

20979 700 S of NW cor Sec 34. Marble
from face of hill. This marble
seems to grade northward through
cherty quartzite into true quartzite.

At 850-1000 S of NW cor Sec 34 the
hill faces by a series of precipices
in all of which marble is exposed.

20980 900 S of NW cor Sec 34. Dense
cherty band in rocks that belong
with the marble series.

At 1000 S of NW cor Sec 34 the
marbles are interstratified with yellow
slates and are cut at

20981 1050 S of NW cor Sec 34 by green-
stone, occurring in small beds.

No other rocks were seen in south-
ern run until reach the granite
at 1200 S of NW cor Sec 3.

on run East the only exposures
noted were at

750 - 800 U. 500 E of SW cor Sec 3.
 There are several ledges of granite
 on the north side of a knob.

At 1100 U. 500 E of SW cor Sec 4
 a little cliff of marble and slates
 that seem like dipping S.

20982 marble

20983 Slates.

North of this are great exposures of
 quartzite at 1500 - 1900 U.

flat

20984 At 760 U. 540 E of SW cor Sec 3
 is the south face of the West-
 ward bluff. The lower portion of the
 cliff is a fine grained pink
 quartzite that is probably a mem-
 ber of the marble series, as further
 up in cliff occurs a fine grained

20985 pink marble. The latter rock

20986 is quartzite and ochristine in places,
 when it looks not unlike some
 of the lighter slates.

The marbles continue in almost
 unbroken exposures for about 300

paces further north, forming cliffs,
knolls and ragged knobs in pro-
fusion.

20987 At 1050 ft. 500 E of D.W. cor Sec 34
is slate belonging with the marbles
and at

1100 ft. 500 E is a cliff of calcareous
quartzite dipping E.W. and dipping
80 - 90 ft.

Across a little swamp -

at 1170 ft. 500 E of D.W. cor Sec 34.

20988 the bright red marbles reappear
and change rapidly into the pink
schistose kind

Then at 1210 ft. 500 E of D.W. cor
20989 Sec 34 is a narrow band of black
slate that outcrops in a few
ledges, and beyond this at

20990 1220 ft. 500 E is quartzite
a little further E. the quartzite
and marble are interbedded. They
seem to grade into each other through
the pink rock that has been called
the calcareous quartzite.

From this point north the exposures
are of quartzites, slates, marbles, and

finally massive quartzite?

Unit of the massive quartzite joining
the large hill to the north, occurs
again a face of slate conglomerate?

20991

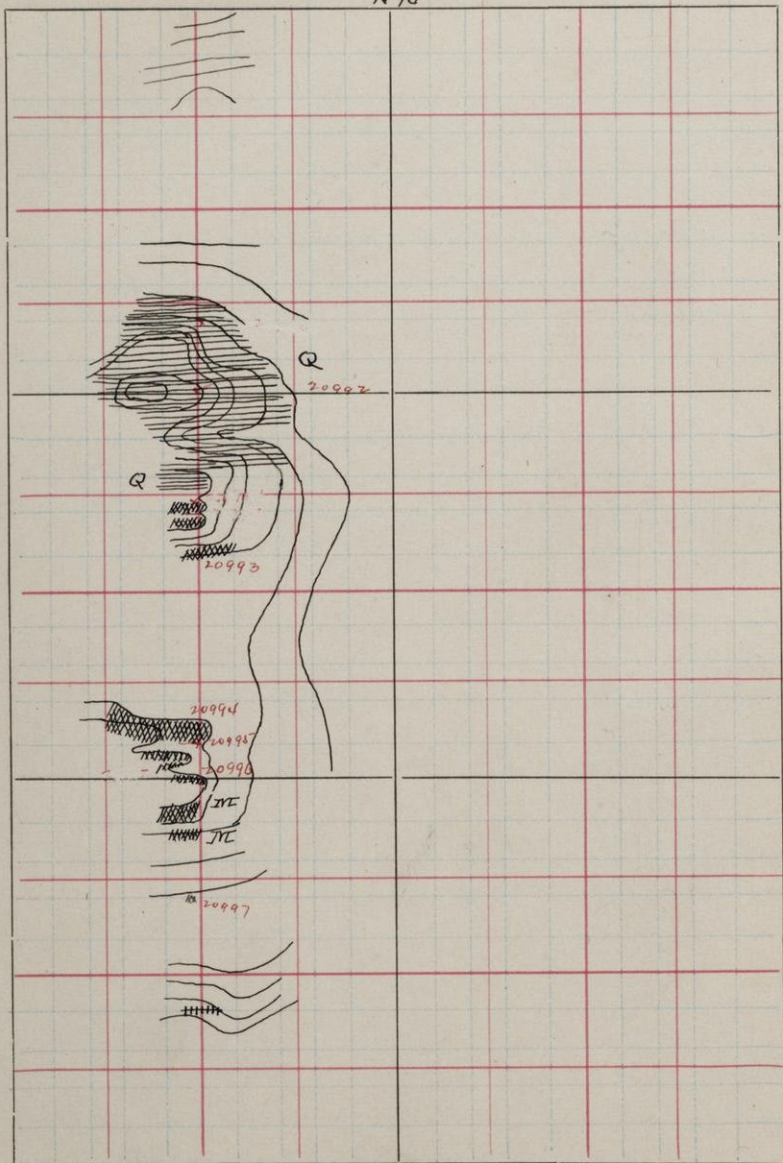
1320 to 500 ft of D.W. on Sec 34.

Banded slaty quartzite?

S. 34

T. 48

R. 25-

N¹/₄

From 750 E of N.W. cor Sec 34 - 48 - 25
 Run S. to railroad, crossing Mt.
 Udden and range of quartzite at
 300 - 400 S.

The quartzite is of the usual kind,
 striking E.W. and dipping almost
 vertically. It is interbedded with
 a light colored schist and on the
 north side of the hill are numbers
 of conglomerate boulders. No conglom-
 erate was found in place, but from
 the abundance of boulders imagine
 it to be in situ near by.

20992

is specimen of quartzite from top
 of hill at 1500 N of N.W. cor Sec 34
 and 750 E.

20993

At 700 S. 750 E of N.W. cor Sec 34 on
 the S. side of the hill is a pink
 quartzite, resembling quartzite of
 the marble series.

20994

At 900 S. 750 E of N.W. cor Sec 34
 is a large cliff of pink quartzite
 marble, with crystals of calcite in
 'Schlieren' cutting it.

- 20995 On 950 S. 750 E of N.W. cor. Sec 31
The rock is a pink marble, and
20996 at 1000 S. 750 E is white-marble

20997 is slaty red marble from
1150 S. 750 E. of N.W. cor. Sec 31, on
side of hill just north of railroad
track, Inas ledge.

110

From $2\frac{1}{4}$ p. Sec 34 run South
to 1000 S of $2\frac{1}{4}$ p. Sec 3, then E.
500 and north to line Sec 35.

On this run the quartzite range
is crossed at 500-700 S of $2\frac{1}{4}$ p. Sec
34. On the north side the quartzite
is like that west. Further south
on top of the hill at

20998 640 S of $2\frac{1}{4}$ p. Sec 34 is a small
precipitous ledge of pink quartz
slate, and

20999 a quartz slate or chert that is quartz-
like.

24000

Further South at

1890 S of $2\frac{1}{4}$ p. Sec 35 on the north
slope of a very high hill is a small
ledge of rock that resembles a quartz-
ite.

24001

Ascending this hill, we find at
200 S. 60 W of $2\frac{1}{4}$ p. Sec 3 a little
knot of greenstone. It occurs further
East as a hillock in which it is
schistose like the basement green.

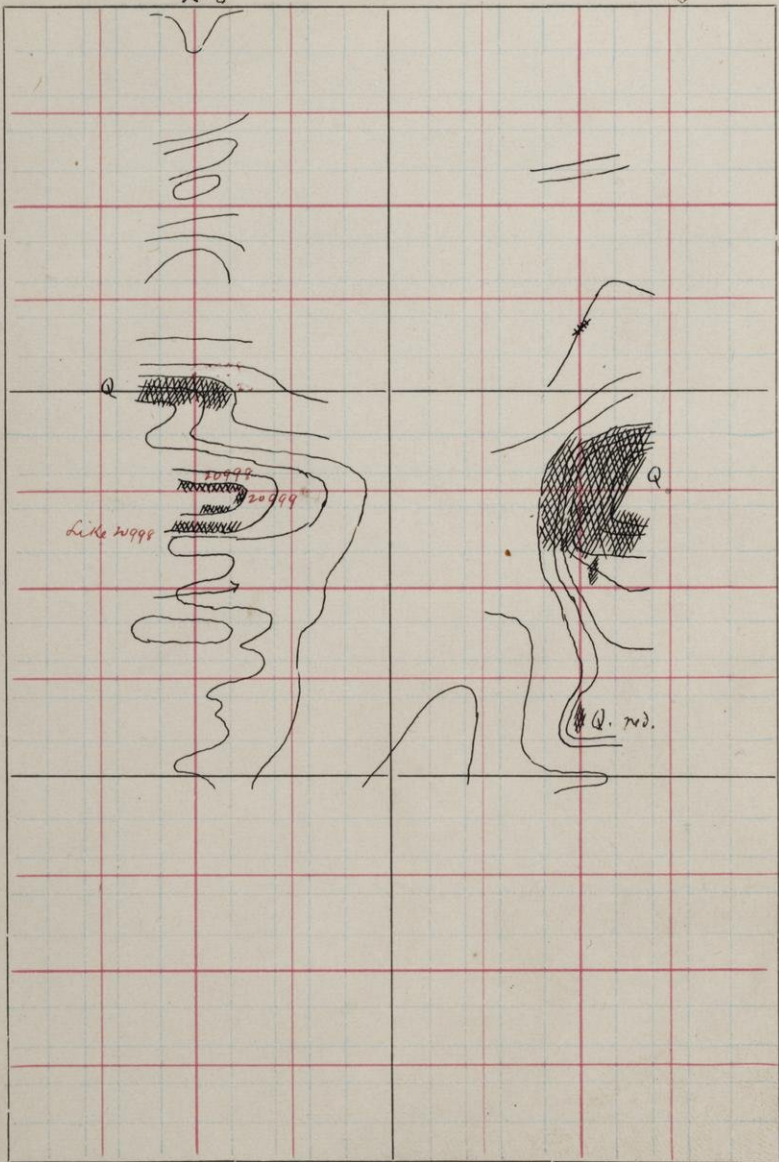
S. 34

T. 48

R. 25

N. 1/4

10



Schists?

24002

170 S. 30 E of $\frac{1}{4}$ p. Sec 3. Specimen
of this Schistose greenstone.

24003

At 370 S it is more massive
and at

24004

400 S. it appears to become a horn-
blende schist.

24005

At 450 S of $\frac{1}{4}$ p. Sec 3 the quartzite
begins again. Here it is white and
slaty. It strikes 10° S of W and dips
 75° to 80° N. With it is a small band of
black slate?

The crest of this hill is composed
mainly of white massive quartzite,
which on its N. side is faced with
a layer of black slate. The dip of the
slate is nearly vertical and strike
about E. W., while dip of the quartzite
cleavage is 70° .

On this hill the 'Camp' triangulation
Station of the U.S. Survey was established.
Its location is

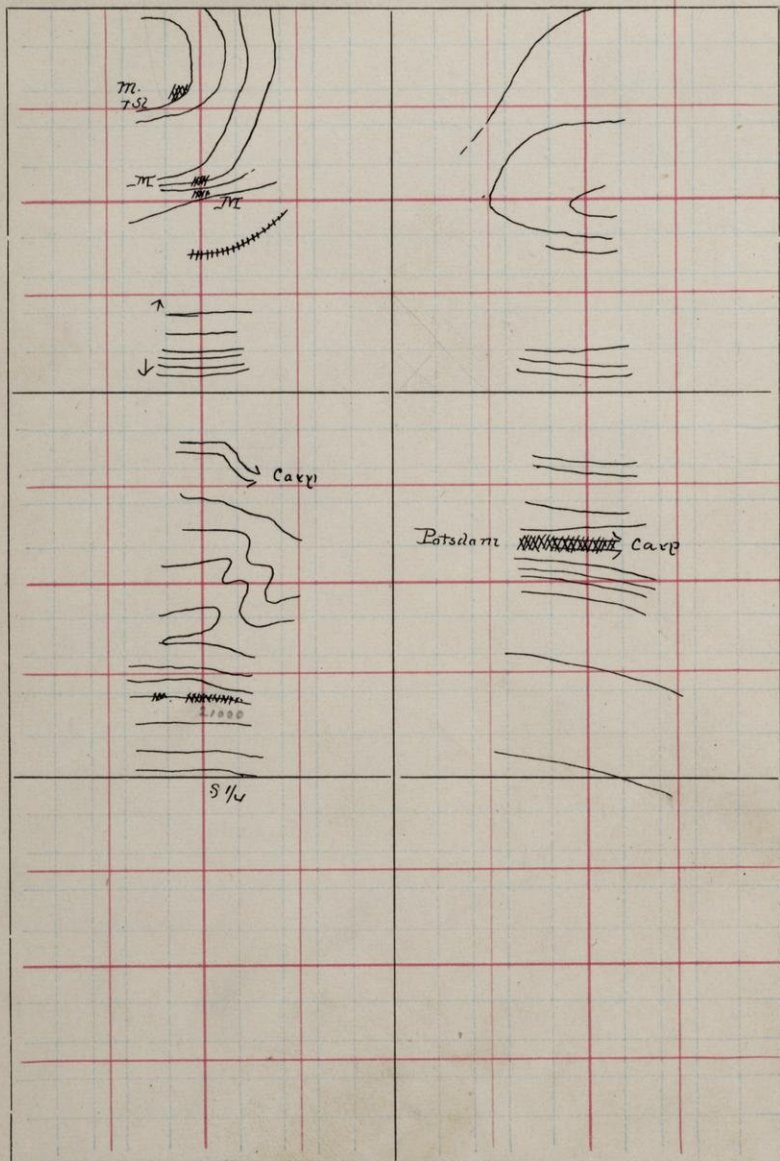
Δ

575 S. 130 W of $\frac{1}{4}$ p. Sec 3.

S. 34

T. 48

R. 26



South of this point a small ledge
of quartzite was seen at
1050 S. 100 W of $2\frac{1}{4}$ p. Sec 3 and
granite at 1360 S. 10 W.

On run north found granite at
1500 S. 250 E of $2\frac{1}{4}$ p. Sec 3 and then
a large, high, rough hill of marble.

24006

At 1450 S. 250 E of $2\frac{1}{4}$ p. Sec 3
from west side of large hill took
specimen of what was at first sup-
posed to be granite, but afterwards
discovered to be marble dipping
about 30° N. The specimen is a
cherty marble.

Marble continues in outcrops that
were specimened by Clemens.

24007

At 750 N. 700 W of S. E. cor Sec 3
is a small exposure of greenstone

Continuing north meet no other
ledges until reached south side of
a hill at

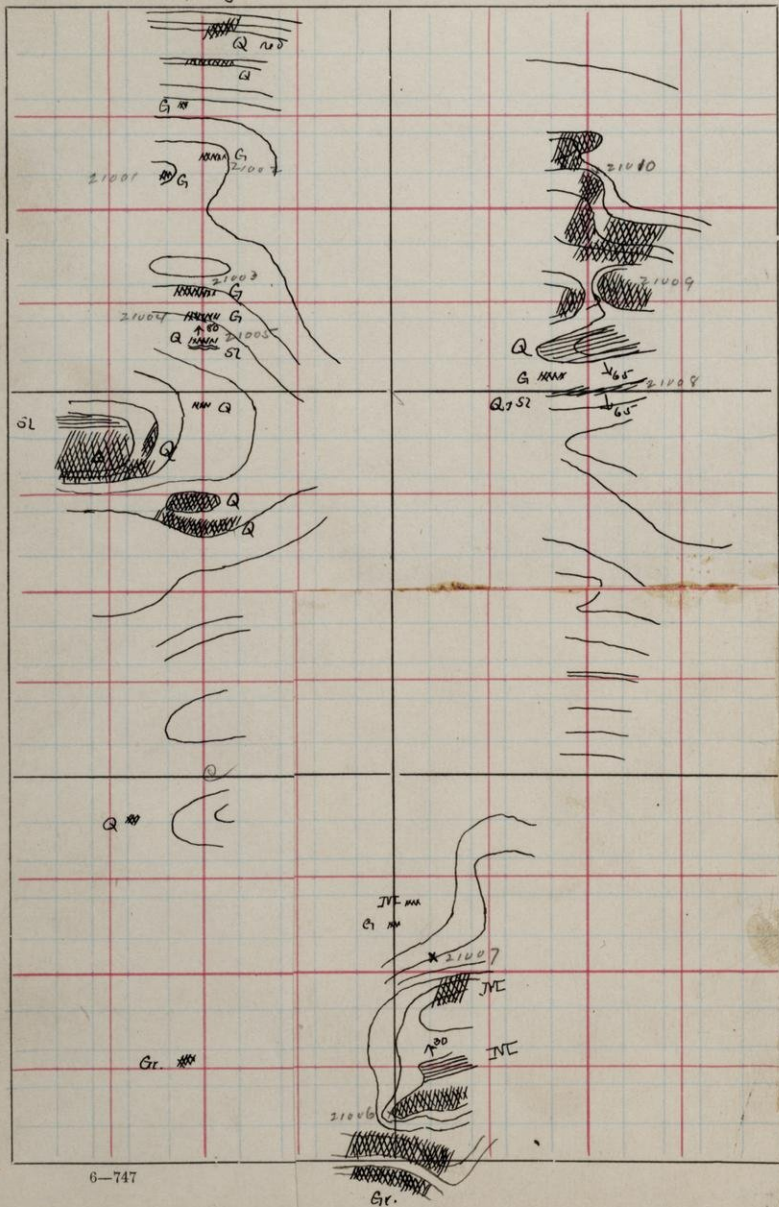
24008

1500 N. 500 W of S. E. cor Sec 3.

S. 3

T. 47
N 11/2

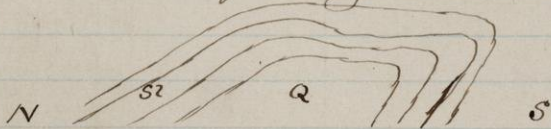
R. 25-



where on the steep south facing cliff occur interbedded quartzite² and a yellow schistose chert, like that elsewhere interbedded with the quartzite. The strike of the beds is 30° N of E and dip 64° S.E.

The same rocks are exposed at 1570 N. 500 W. where their dip and strike is as before.

At 20 E of the course there is an overthrust anticline with its axis striking E or W and plunging 15° - 20° E. The slaty layers wrap around a quartzite² nucleus



24009

At 1630 N 500 W of S.E. cor Sec 3 find Southern Edge of the schistose greenstone area, that curved further west as we South. The thin bedded rocky layers exposed here look remarkably like the exposures of the basal greenstone near Marquette.

24010

At 1785 N. 500 W of S.E. cor Sec 3

47
is a more northerly head of the
Schistose greenstone, which looks
even more like the basal green-
stone than that south.

At the Camp river the Potsdam
sandstone and conglomerate are well
exposed, and

at 1075-1450 ft, 500. W of SE cor
Sec 34 is the west end of a great
head of quartzite?

From N. W. cor Sec 35-48-25
run south in line to Sw cor Sec
2, then E. 500 paces and north
to $\frac{1}{4}$ line of Sec 35.

From N W cor of Sec 35 to the north
side of Mt. Mesnard Range, at
700 ft. traverse up sand hills
At 400 ft of N W cor Sec 35 is the
first exposure of rock. Facing the
high quartzite ridge, whose east-
ern extension is Mt. Mesnard.
The rock here exposed is a cherty
quartzite.

24011

24012

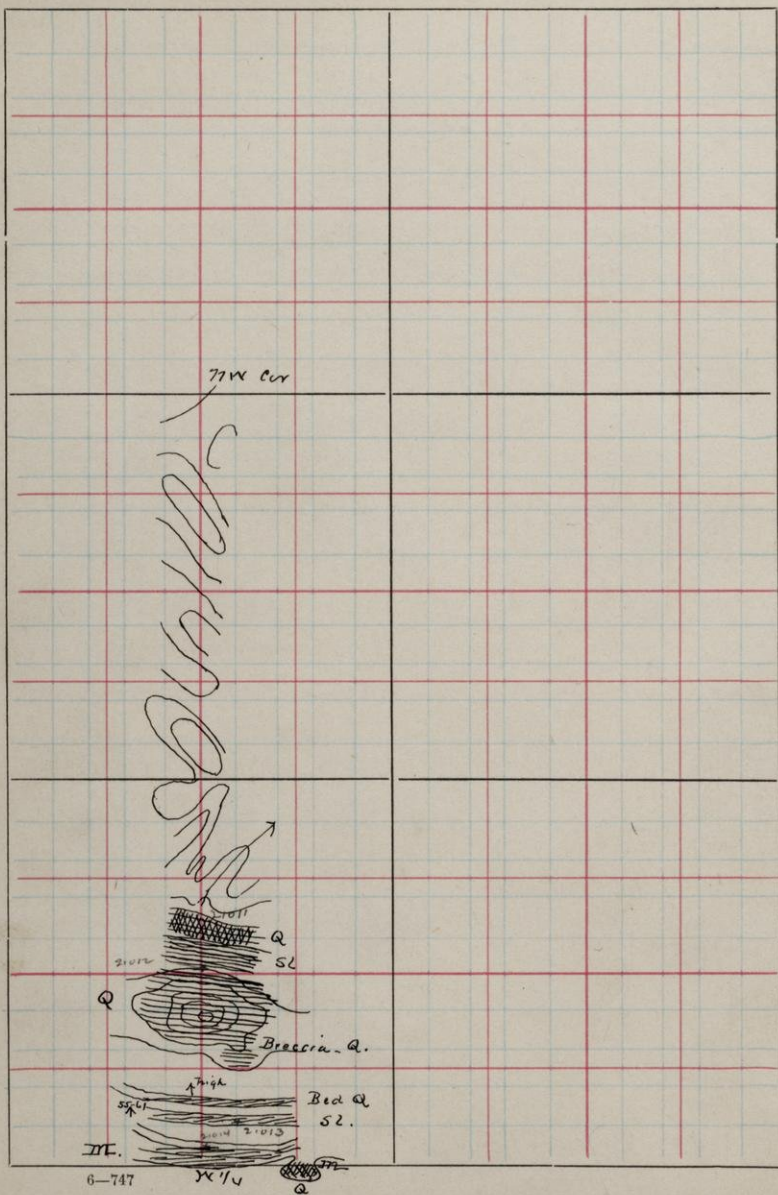
at 710 ft is the first exposure of
black and pink slates, probably
interbedded with quartzite which
constitutes the greater mass of the
hill.

The strike of the quartzite is 10° S of
E. Its dip could not be determined
here. on the little knob to south
side of hill the quartzite is more
or less brecciated. It moreover, con-
tains fragments of hematite and

S. 35

T. 48

R. 25



49

being sandy material.

24013

A little further south are the red quartzites striking 10° N of E and dipping high to the north, and south of this in same bluff are slaty quartzites striking 10° N of E and dipping 55° - 61° N. Interbedded with these are black slates, though the name today of slaty quartzites is pink. These probably all belong with the marbles.

24014

Further down the hill forming a little precipice overlooking Sand Hills is a white weathering marble, and chert, striking and dipping like the quartz slates. Interbedded with this is the red quartzite of the marble series and below this again exposures of contorted marbles.

The little knob, east of the $\frac{1}{2}$ post is the pink siliceous limestone or chert on top and quartzite below. The rocks are contorted in places but in general they have the same

strike and dip as the beds to the north.

The Camp river runs down over Potosi Dam Sandstone and conglomerate. Otherwise no rocks were seen until we had traveled to 560-600 S of N.W. Cr. Sec 2, where is the west end of a hill of vitreous quartzite running E. Strike 15° by E. Dip about 80° S (?)

The north side of the South Mesnard range is at 960 S of N.W. Cr. Sec 2. Here we find a great marble hill that is so covered with underbrush that it is studded with dip-finally. The relations indicated by Rominger certainly do not exist here.

24015

The main portion of the north side of the hill is a flat lying slate belonging with the Marble Series.

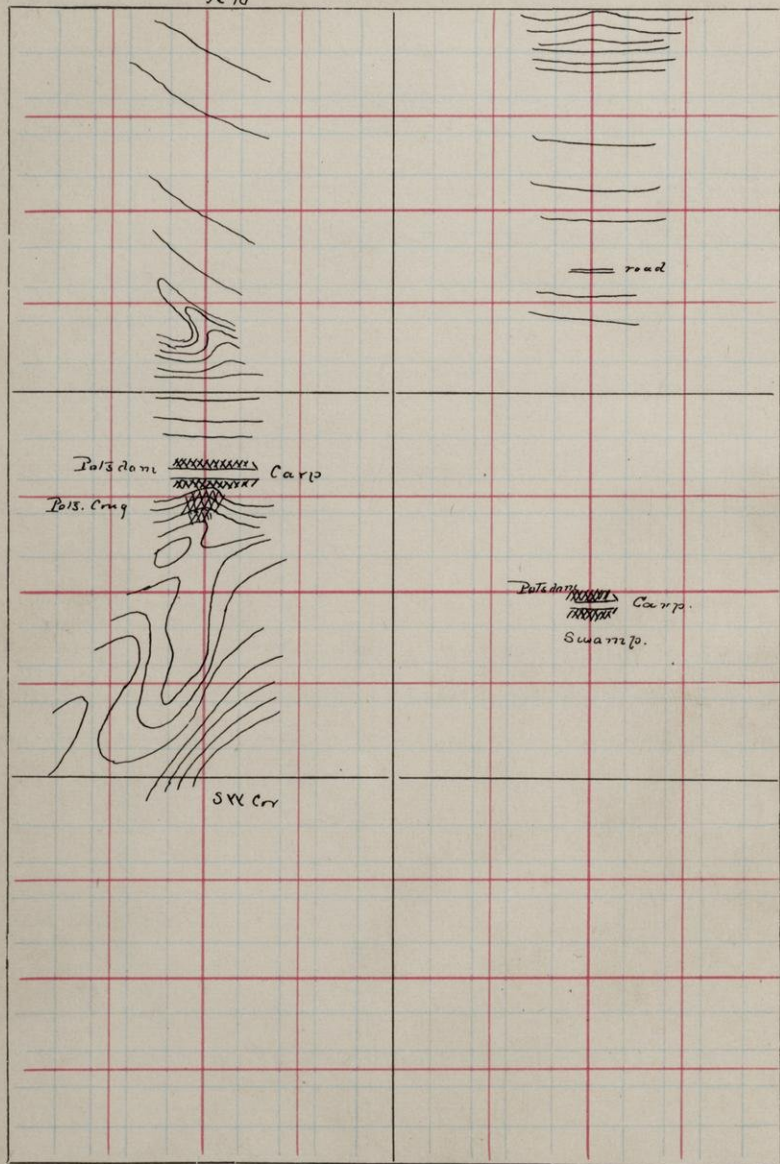
24016

This, on the west side of where the first shown here, is cut by greenstone so completely saturated with quartz, etc. that it might well be regarded

S. 35

T. 48
N 1/2

R. 25



as member of the basal complex, although I believe it is a cutting dyke. No granite was found in the vicinity?

On top of the hill at about 1050 S. of New
 Or Sec 2. are again flat lying mar-
 bles and slates, and a little to the N.E.
 is a large ledge of marble that
 seems to be in the form of a syn-
 clinal with an axis striking a
 little S. of E and plunging 30° to the
 E.

On the south side of the first knob
 at 1050 S. the series strikes E.W.
 and dips S. $20-40^{\circ}$.

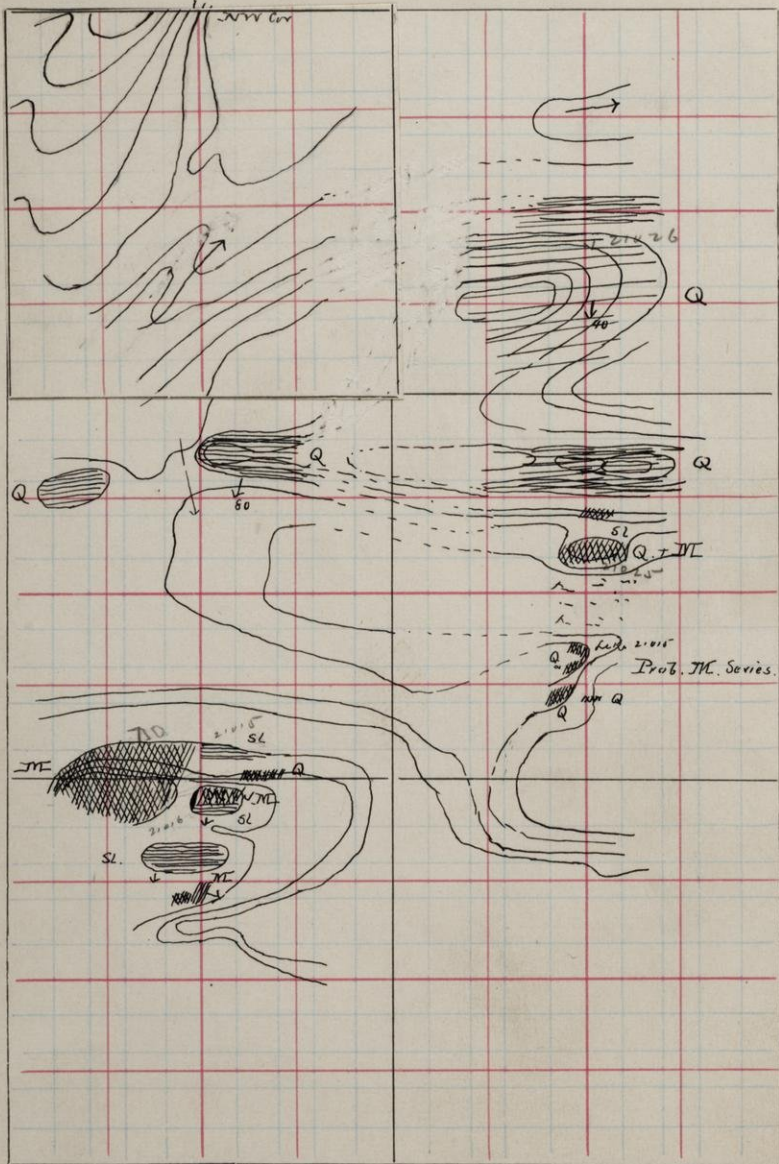
On the South side of the main hill
 at 1150 S. of New Or Sec 2, strike
 undoubted marbles in which the
 strike is N.W. and the dip 15° N.E.
 Most of its blocks are large good
 determinations of strike and dip are
 impossible.

On the opposite side of a little
 gulch is the north side of another knob
 of the same size. Here are pink mar-
 bles interstratified with slates.

S. 2

T. 47

R. 25



24017

1175 S. 20 E of NW cor Sec 2

Pink marble.

24018

Scale, interbedded with 21017.

24019

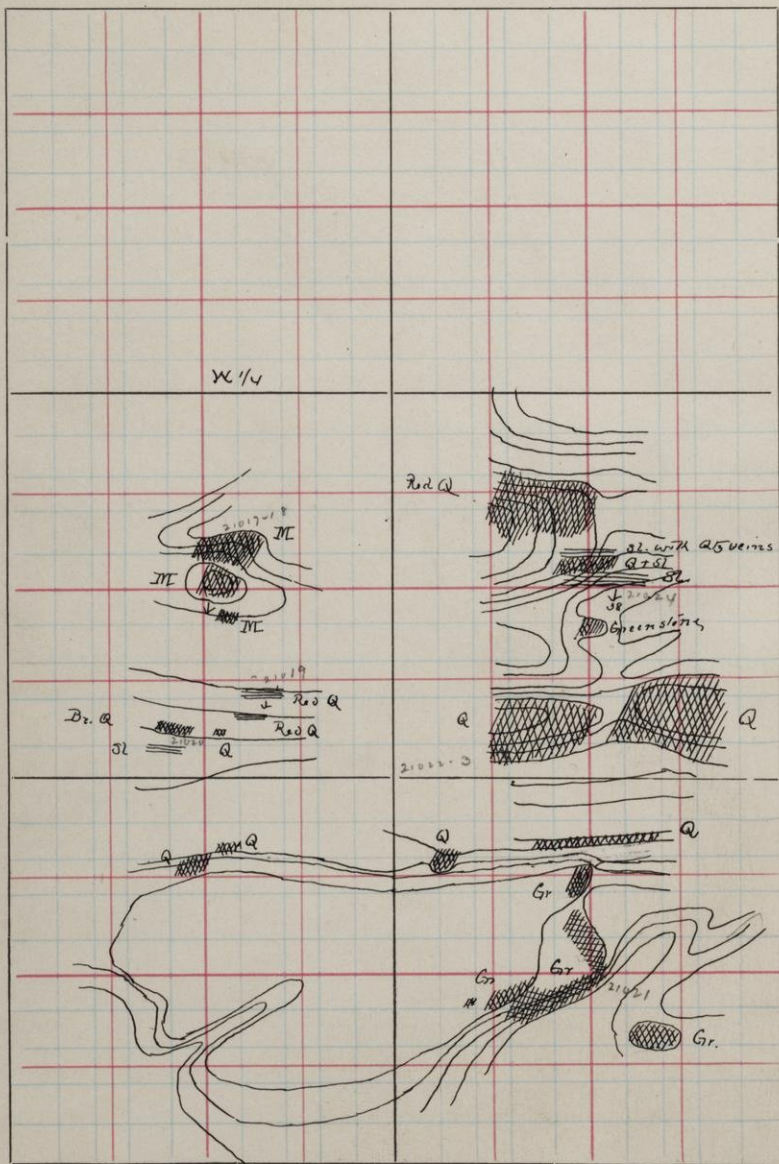
At 1425 S. of NW cor Sec 2 are
small ledges of red quartzite and
at 1400 S. 50 E, large bare ledges
of same rock, striking ESW and
dipping S. In this a pit was
dug for hematite, and from it
some ore was taken. In this
the simple vein material, as
indications of hematite veins are
apparent in vicinity.

24020

At 1450 S of NW cor Sec 2 are large
ledges of a iron cemented quartzite
breccia. Below this is quartzite
and beneath this at
1470 S are scales.

At 1600 S. are other ledges of quartz-
ite, but no other rocks were
seen until reached a point.

1800 S. 350 E of NW cor Sec 2, where
is westernmost ledge of granite.



The granite extends to 500 E. where it forms a high bare precipitous ledge overlooking the great sand plains of the Chocoma.

24071

175 U. 500 E. J.W. cor Sec 2
Specimen of this granite.

At 380 U. 500 E. of J.W. cor. Sec 2 is the northernmost ledge of granite, forming N.E. facing bluff, 20 paces north of which is the southernmost ledge of quartzite.

There is no conglomerate between the quartzite and the granite, but the former is full of senecite and feldspar as though formed from granite's detritus.

24072

Quartzite 500 U. 400 E. of J.W. cor 2

24073

" " " " " "

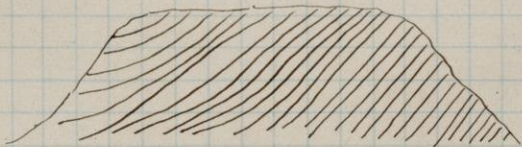
24074

At 420 U. 500 E. J.W. cor Sec 2 strike S.E. fault of thin yellow scales dipping 35° S.

From this point to 860 U. cross bluffs and cliffs of quartzite. The main hill is of red quartzite, which dips S. at a low angle.

The west hill north, extending from 1100 - 1450 U. is composed in its southern portion of slates and calcareous quartzite and in its north an half of white-vitreous quartzite. striking 15° N of E and dipping 40° W.S.

The dip is not regular with the south at this angle, but apparently the dips get shallower with the south - On face of the higher hill W. of 1400 point the dips show thus:



24025 1350 U. 500 E of SW cor Sec 2.
Calcareous quartzite, S. of main hill

24026 1700 U. 500 E of SW cor Sec 2.
Vitreous quartzite from top of hill

