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Marquette Iron Range: near Marquette and east of Negaunee. No. 154 1893

Bayley, William Shirley, 1861-1943

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

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

Marquette Range
W. S. Bayley.

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.

24144~
45 }

46

151

152

157

158

160

767

170

Book
#154

Verify location of 20. 24095

" Exposures p. 24

" " 24100-101 p 16

Bk 3

Marquette

Iron Range

Near Marquette

and

E. of Negaunee

W.S. Bailey
G.O. Smith
Chas. Day

Started on U line Sec 35-48-25
at 500 E of NW cor and traversed
back and forth over Mt. Mesnard.

The runs were at 500 E, 1000 E,
1250 E and 1500 E of NW cor of Sec.

- Δ The U.S. triangulation station at the
top of Mt. Mesnard is at
1040 N. 660 E of SW cor Sec 35.

On this hill we have quartzites,
marbles, slates and massive quartzite.
On the north side of the main hill
just north of the triangulation sta-
tion is an evenly banded sandy

24027 quartzite striking nearly E & W.
(10 to 15° E) and dipping vertically.
A little further south the same
rock dips south at 60°.

24028 South of this is a beach slate also
dipping S. and striking nearly
E & W. It is about 8 ft. thick and
is separated from the quartzite by

24029 a rotten conglomeratic looking
bed.

24030

Some of this is the south tran of the
 hill, and here only marbles are seen.
 Some are evenly bedded, striking
 E-W, and resemble quartzite, but
 when broken into they are found
 to be quartzite marbles.

24031

24032

A little further west the rocks are
 genuine quartzites banded and
 bedded like the marbles. This is
 evidently a quartzite band dip-
 ferent from the various quartzite
 north.

24033

At the west end of the knob is a
 breccia of quartzite cementing
 fragments of quartz.

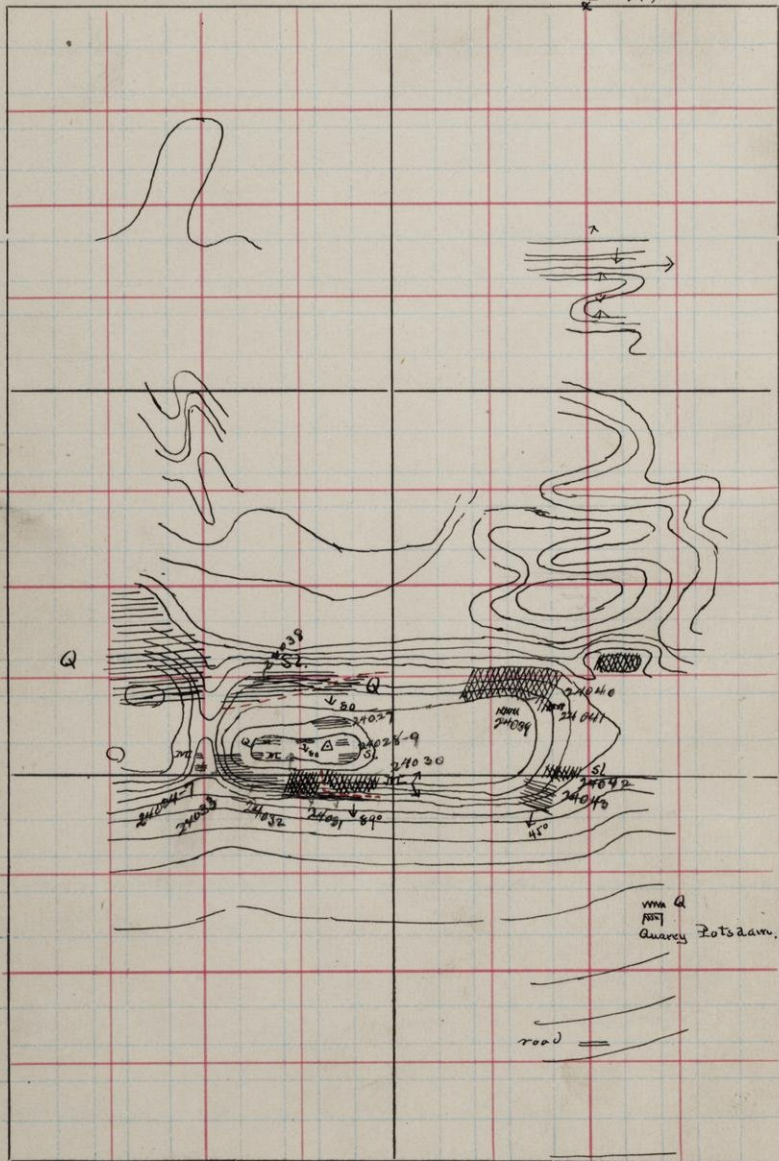
In the marbles we find contorting
 of beds on a large scale. Sometimes
 the strike is E-W, but usually it is
 10° N of E. Many small anticlinal
 and synclinal folds were noticed,
 but these are confined mainly to
 the marble, the quartzite having
 suffered little disturbance of this
 kind. In the most striking of these

S. 35

T. 48

R. 25-

$N^{1/4} / \beta$.



fold - in that are O.E. of Δ - the axis plunges almost vertically W to E.

- 24034 Green slate
 24035 Gray slate
 24036 Black slate
 24037 Gray slate

} About 1000 ft 500 E
 of SW cor Sec 35

Run N to S. within a distance of
 7 paces. Probably from marble
 series.

- 24038 Slate from N. side of hill, 1100 ft. 600 E.
 at 1000 E, the north side of the
 hill is 755' O. of the N 1/4 p. Sec 35.
 This consists solely of white quartz-
 ile in its northern side.
 At 850 S of N 1/4 p. Sec 35, the white
 quartzile is followed to the south by
 red quartzile and this
 by slate.

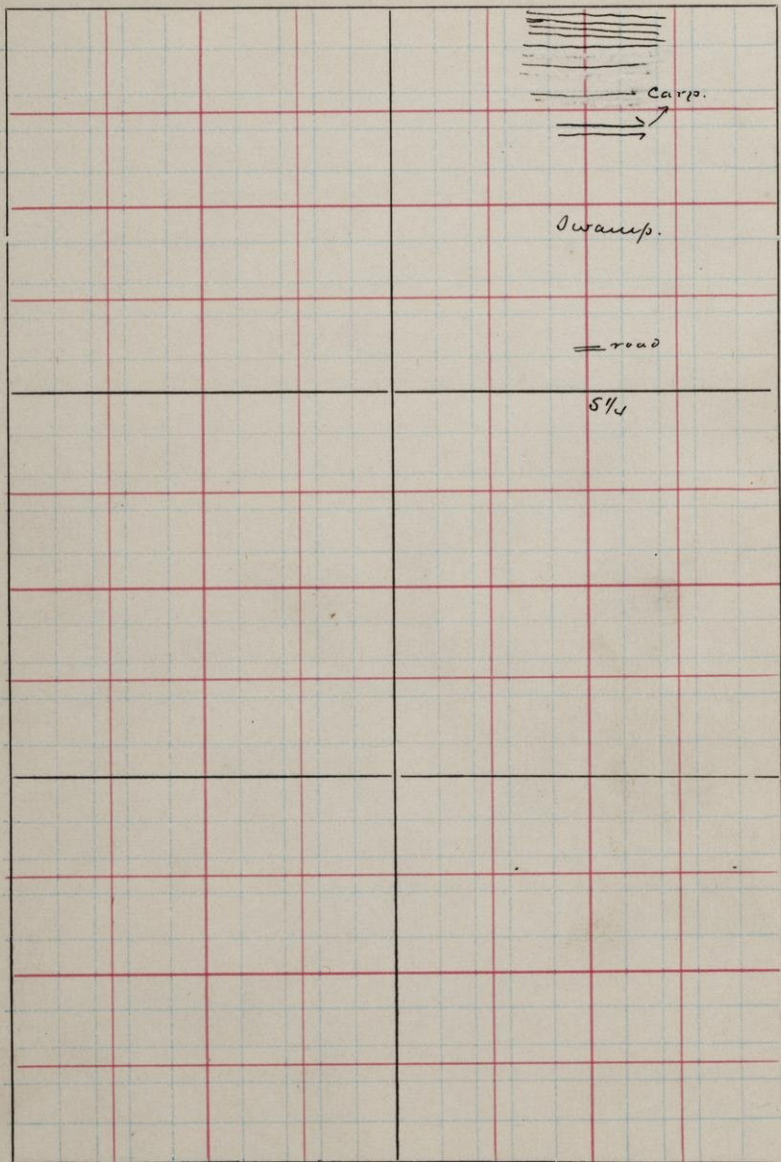
- 24039 Back in the hill to the west is a
 small smooth ledge of rock that
 looks like greenstone - schist.

- 24040 on the south side of the hill at
 1000 S of N 1/4 p. Sec 35 are genuine
 blue - black slates striking 10° N of E.

S. 35

T. 48

R. 25



4

and dipping nearly vertically,

24043 1075 S. are well bedded pink quartzites like the quartzite of the marble series. Strike 20° S of E and dips 45° S.

On the 1250 run quartzites were crossed at 900-945 S. and on the 1500 run at 950-1050 S. In both cases the strike of the rocks is 10° N of E, and their dip, nearly vertical - in the one case 80° N and in the other very nearly 90° S.

24044 Quartzite from 1020 N. 300 E of S 1/4 p. Sec. 35.

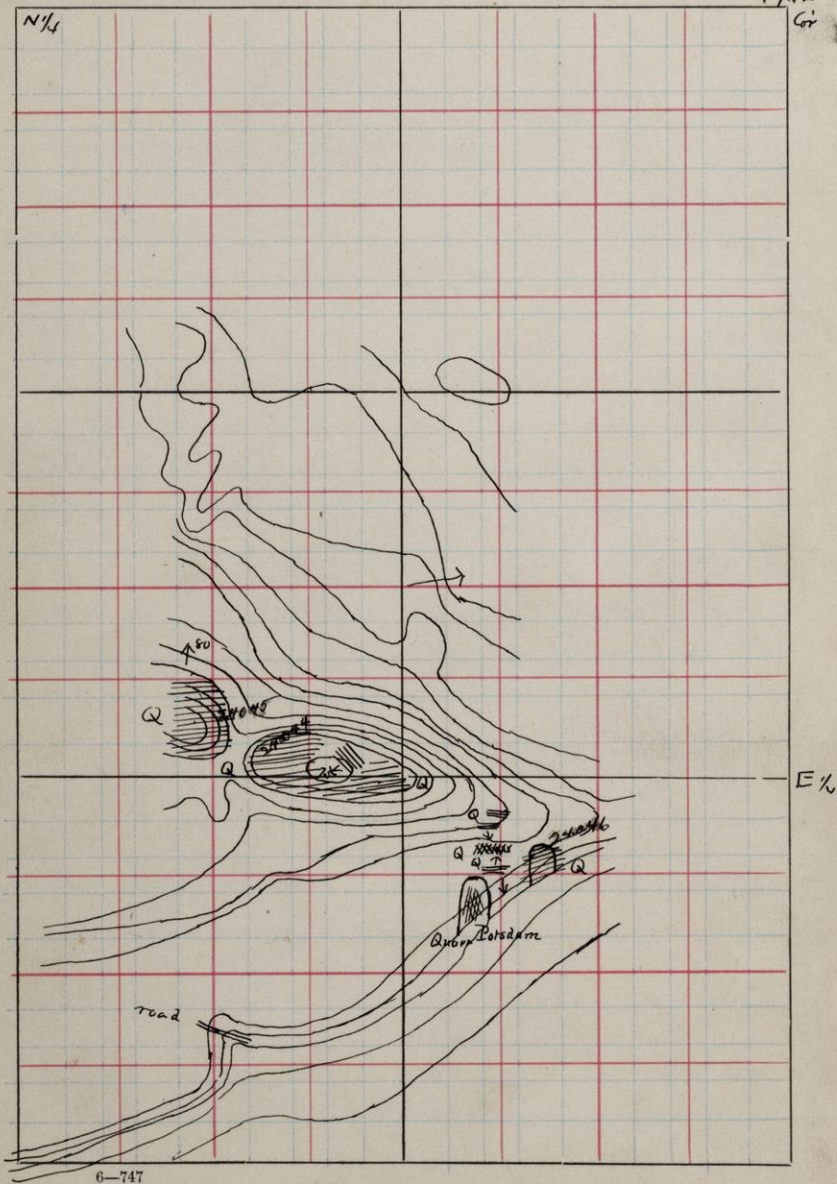
The main mass of the quartzite in this hill, strikes as has been said 10° N of E; but on its N-E side a new strike was seen, where the dip is 75° S.

24045 1070 N. 200 E of S 1/4 p. Sec 35. Brown Iron E end of opposite bluff.

S. 35

T. 48

R. 25

NE
Gr

24046

At 900 N. 700 E of D $\frac{1}{4}$ p. Sec 35-
is a quarry where the rocks are
evenly banded, striking 15° N of E
and standing nearly vertical.
To the west in the hill are several
exposures of the same rock striking
 $10-20^{\circ}$ N of E and generally dip-
ping south at high angles.

At 870 N. 625 E of S $\frac{1}{4}$ p. Sec 35-
the quartzite dips N at 45°

N.B. This quartzite is like that
south of the Corp river and east
of the house, which is an exten-
sion of the northernmost - well bed-
ded quartzites seen in the Lake
road.

24047

see Phillips notes and also

24073

notes pp 17-20

From $N \frac{1}{2} S.$ Dec 2. 117-25
 ran south one mile then East
 500 and North.

From 380-430 S of $N \frac{1}{2} S.$ is the top of
 the first ridge. This is composed of
 well bedded quartzite^o like that
 E. of prison. It is ripple marked,
 false-bedded, and thinly lamina-
 ted. It strikes $5-10^{\circ} N \frac{1}{2} E$ and dip
 70° S on its N. side, and about ver-
 tical in South side.

At 370 S. $30^{\circ} E$ of $N \frac{1}{2} S.$ Dec 2 in the
 bed of little stream are red and
 gray slates striking $15^{\circ}-20^{\circ} N \frac{1}{2} E$
 and dipping to the North almost
 vertically.

24074 red slate^o

24075 gray "

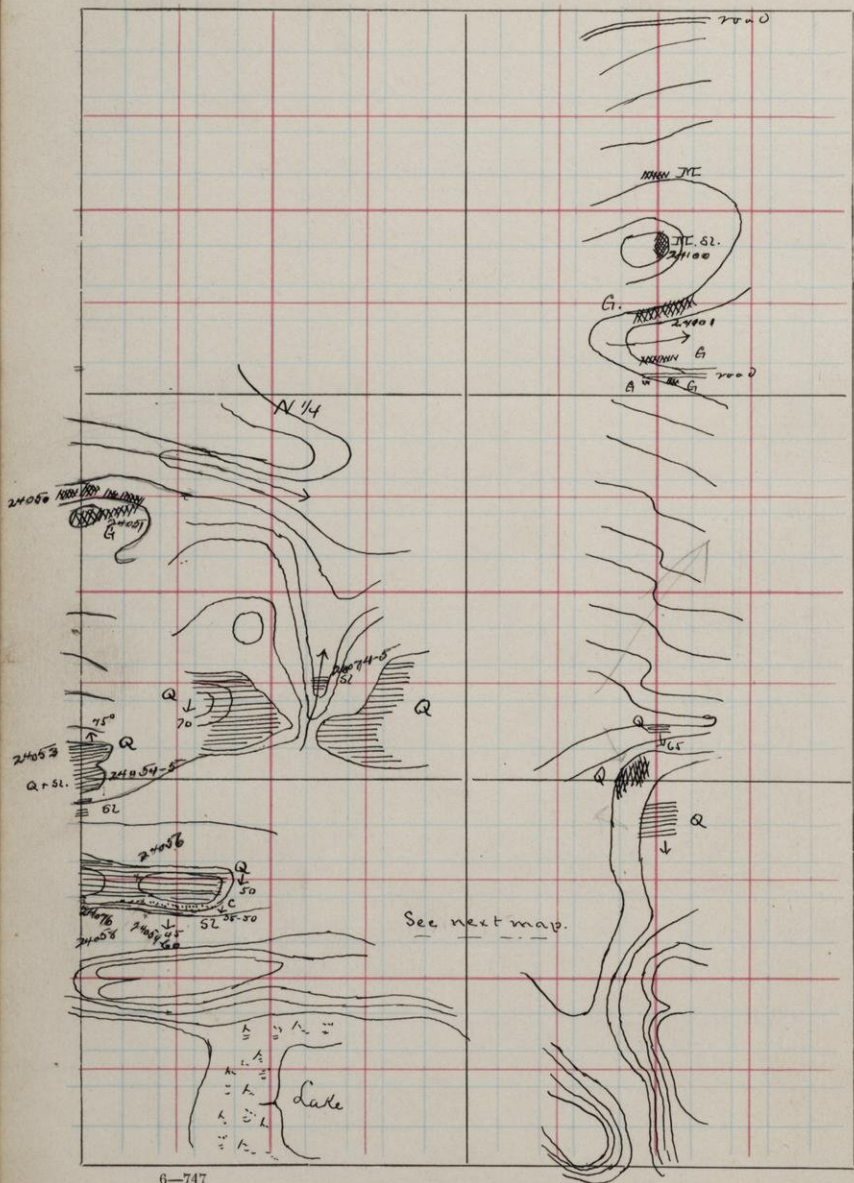
An attempt was made to find Kates
 and quartzite^o in contact but with-
 out success.

On the East fluff along its^o western
 face the layers are curved. The gen-
 eral dip is to the south at an

S. 2

T. 47

R. 25⁻



angle of $70-80^\circ$, but in the center of the bluff the rocks are curved, leaving for a short distance a northerly dip of 40° . Strike throughout is $5-7^\circ$ N of E.



At 620 S. and a little W of N 1/4 p. Sec 2. is another mass of quartzite that extends westerly into the higher hill. It was difficult to determine dip, but believe it to be about 50° S. on top of this, on the south face of the bluff is the conglomerate (21058) obtained by Smith & Phillips. It strikes with the quartzite and dips $55-60^\circ$ S. On top of this, further south is the graywacke slate (21059-60). The slate dips 45° S. So far as can determine there is no unconformity here.

At 425 S of N 1/4 p. Sec 2, on north

Plot

side of another ridge are interbedded slates and quartzites dipping 66° S.

24076 On the South side of the northern bluff and 200 W. of $\frac{1}{4}$ line is a small amount of brecciated stuff that looks like the Goose Lake material.

24077 The hill south in which the dip is 66° S as indicated, consists mainly of a gray slate, and to the South of this is a foliated, rolled rock that looks something like a squeezed conglomerate.

24078 Schistose variety of this rock, at 450 S. 25 W of $\frac{1}{4}$ p. Sec 2.

24079 More massive, fresher phase 480 S. 45 W of $\frac{1}{4}$ p. Sec 2.

On the South flank of the hill are a few thin skins of marble. Believe the slate and quartzite to be conformable, as for the relations of the marble to slate are not certain. If the rotten rock is a conglomerate, it would look as though

there were here an upper series in the marble, in the South limb of an overturned Syncline.

At 1200 S. of $N\frac{1}{4}$ Sec 2. is the East end of a hill that runs N.W. It is composed of the well bedded and well cleaved marble slates with a general strike of about N.W. and dip of $30^{\circ} - 50^{\circ}$ S.W. But at the East end of the hill, the dips become more and more easterly and strikes more northerly. The East end of the hill is evidently the end of a synclinal fold, plunging to the west.

East of this is a genuine marble hill in which Smith finds dips as indicated - a basin - which corresponds exactly with what Topography of Quartzite to the East would indicate.

East of the East end of the marble slate hill is another rise of marbles. The north half of the west cliff of this rise is composed of marbles, beautifully fluted, but lying in the whole nearly

feet in the North side of the hill and
dipping ± 250 S. on S. side.

24081

The marble appears to underlie a
quartzite², whose characteristics are
much like those of a vein quartz.
The two rocks have here a contact
that looks like an unconformable
one. Not enough of the quartzite was
seen to enable me to determine whether
a vein or a layer.

Going along the East end of this
same hill, which overlooks as a bold
promontory the hills East, we find
marble (like 21080) on top, then a

24082

bed of green schistose rock beneath
the marble. Under this bed of

24083

black slates, and under the slates

24084

beds of sandy quartzite.

As the dip is mainly to the South
this is the inverse order of the series.

At the S.E. end of the bluff, low
down in the plains at its foot,

24085

at 1375 S. 130 E of N.W. Sec 2 is
the west end of a ledge of quartz-
ite², that runs East and merges
into the large hills, that surround

the marbles concentrically.

24086

On lower side of this ledge is a small exposure of a schistose rock that has a contact with the quartzite indicating an unconformity. This runs a short distance N.W. and cuts out the quartzite in part.

On the extreme S. edge of the ledge are the red quartzites (of the marble series). So far as could be judged, the rocks in the ledge appear to dip S.

24087

At 1375 S. 80 E of N 1/2 p. Sec 2 a small pit has been dug in the schistose rock for chalcopyrite. This would seem to show that we have here a true greenstone and that the schistose rock is unquestionably a greenstone schist.

24088

The view is shown to be correct for at the 1/4 mile, 1375 S. is massive Diabase, forming a knob, whose contact with the marbles however could not be seen. Think it a dyke.

The line at 1450 - 1600 S. of $2\frac{1}{4}$ p. Sec 2, is mainly quartzite? On the north this quartzite dips S, at about 45° and strikes 20° N by W. On top of the hill is marble, whose dip and strike was not obtained, but which seems to lie flat, and on the south side of the top is again a much jointed quartzite?, resembling that north. Dip and strike could not be obtained.

On the south side of the hill, the granite comes in contact with the quartzite?, without a conglomerate intervening.

24089 The rock nearest the granite is light colored and schistose. It may be either a schistose granite or a re-crystallized rock.

24090 Granite from 1550 S of $2\frac{1}{4}$ p. Sec 2.

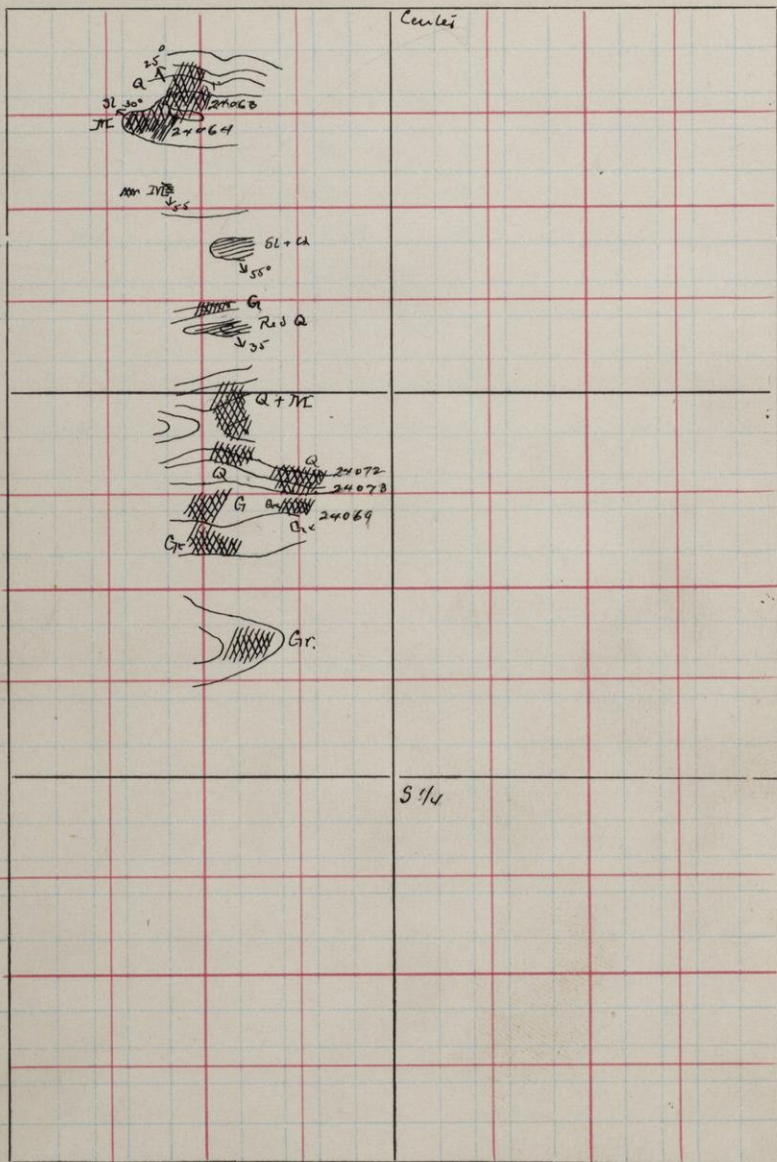
24091 The granite is cut by a diabase at 1640 S.

On the new north at 1500 E of W. Sec line, Sec 2, find small knolls of hornblende schist and gneiss at

S. 2

T. 47

R. 26~



450-500 N, and granite in small ledges as indicated on the map.

There are many more of the small ledges than are mapped, but these will give distribution of the rock.

The last ledge of granite is on the slope of the quartzite hill, at 400 N. 500 W. of S.E. cor Sec 2.

24092

It is in contact with a rock sup-

24093

posed to be quartzite? This rock is broken and shattered and in places it seems to be impregnated with pegmatizing material.

24094

Beyond this the quartzite forms a high hill, in which the rock is also in places much broken and shattered, but on the whole it seems quite fresh.

This quartzite trends around to the north and NW forming a horse shoe shaped basin in which lie the members of the Marble Series. Only one dip was measured. This was on the N.E. side of the hill, where the strike is NW and dip 35° S.W. Other strikes and dips were noticed

but they were not well enough de-
fined to yield definite figures.
In the opening of the horse shoe are
marbles and slates, as shown by
the roots of upturned trees etc.
This is a splendid example of
the structure, being brought out
by erosion, and of the connection
between structure and topogra-
phy.

Just north of this quartzite hill
is the East end of one of the marble-
slate ridges. On the Eastern Extrem-
ity of this ridge the slates strike
N 5 and dip west 35°. On N.E. side
the strike is N W and dip 30° S.W.
We have here then another indi-
cation of a basin in the quartzite
being filled with marble series,
with this forming like the quartz-
ite a synclinal with its axis at
the East end plunging west.

24045

Black slate from S.E. base of hill
1960 N. 550 W of S.E. cor. Sec. 2.

East of the marble bluff, as was expected, is a quartzite hill, forming the rim of a basin like that south. The quartzite is fresh and vitreous. It strikes N.E., N. & N.W. and dips toward the marble.

24096

Quartzite from about 1100 N and 500 W of S.E. cor Sec 2. It seems less jointed than the quartzite south but is otherwise like it.

On the west dipping face of the quartzite there was noticed a thin band, 6-7 inches thick, of conglomerate, which was traced continuously around the hill. It is persistent, but so far as could determine does not mark an unconformity.

Specimens taken from about 1100 N. 500 W of S.E. cor Sec 2.

24097

Conglomerate

24098

Pebbles from conglomerate

The pebbles are largely quartzites, white and red, jasper, rare and small, and quartz.

Other ledges north of this one are quartzite, jointed and broken

like that South.

Indeed it seems as though the conglomerate band separates the fresher variety of the quartzite from the gneiss. A difference between the two on the opposite sides of the conglomerate is quite distinctly noticeable.

24099

Quartzite from 1200-1300 ft. 500 E of Sec 2.

The other ledges north strike generally 10° N of E and dip $50-65^{\circ}$ S.

21400

At 200 ft. 500 E of S. 1/4 p. Sec 35 are small ledges of marble slates interbedded with marbles.

21401

At 100 ft. 500 E of S. 1/4 p. Sec 35 are small ledges of greenstone.

Sept 2.

Phillips and Smith ran S. from
N. line Dec 2 on line 750 E of
W. line of Sec

N.B. Some of these numbers seem to
be missing from Smith's book.
They may be in Phillips notes.

24047

24048

24049

No specimens
taken.

24050

750 E. 120 S of NW cor Dec 2.

Fine grained greenstone from north
side of Little Knob

24051

Coarse grained variety from same loc.
on top.

24052

24053

750 E. 460 S of NW cor Dec 2.

White cherty quartzite. Strike N 35° S.
and dip 75° W at E. end of Knob, while
at west end and near the top it is
striking 10-30° S of W. and dip
nearly vertical. On top of Knob the
strike is W. 3° S.

24054 450 E. 500 S of NW cor Sec 2.

Quartzite with yellow slate to the south, the two rocks also interbedded.

The strike of schistosity of the slate is 20° - 30° S of W, while dip, steep, to S.

The dip of the bedding may be to the north.

24054 Quartzite

24055 Slate.

24056 825 E 640 S of NW cor Sec 2

Quartzite less cherty than that north

24057

24058 910 E. 675 S of NW cor Sec 2.

South of the above mentioned quartzite and in contact with it is a conglomerate bearing pebbles of vein quartz, red quartzite, that is fine grained and jasper like. Strike of conglomerate bed is 15° S of W. Its dip 45° S.

24059

South of the conglomerate, the quartzite is redder than that to the N. In close contact with this quartzite and

24060

interbedded with it is a black slate.

14

24061 890 E. 710 S. of N.W. cor Sec 2
Black slate and interbedded quartz-
ite. Strike 10° S of W. Dip, 62° S.

24062

24063 770 E. 1100 S. of N.W. cor Sec 2
Red quartzite interbedded with yellow
slates. Strike 45° S of W. Dip, 25°
N.

24064 675 E. 1150 S. of N.W. cor Sec 2
Marble and slates interbedded
Strike $S. 15^{\circ} W.$ Dip, $30^{\circ} W.$

At 750 E. 1150 S. the strike is 60° S of W.
" 650 E. 1165 S. " " " $S. 10^{\circ} E.$
Dip $30^{\circ} W.$

24065 625 E. 1235 S. of N.W. cor. Sec 2
Calcareous quartzite with fleeted
concretions. Dip low W.S.W.

695 E. 1225 S. Marble with strike
N. 5° W. Dip 55° S.

750 E. 1320 S. of NW cor Sec 2.

Slate and quartzite? Dips 55° a little
E of S.

24066-7-8

750 E. 1390 S. of NW cor Sec 2.

Greenstone at base of hill, with red
quartzite further up. The latter
has strike of W 20° S, dip 35° S.

900 E. 1600 S. of NW cor Sec 2.

24073

Quartzite with

24078

granite in Southern contact.

The white quartzite resembles the
quartz occurring usually in veins,
but the mass seems to be too large
for a vein mass.

24069

825 E. 1625 S. of NW cor Sec 2

Red granite

24070

24071

Saw NW cor Sec 1 - 17-25-
ran south on Sec. line.

At 350 S. of NW cor Sec 1. find hill
of broken, jointed quartzite. This
rock resembles that to the west of it
in Sec 2.

24402

Specimen from H10 S.

24103

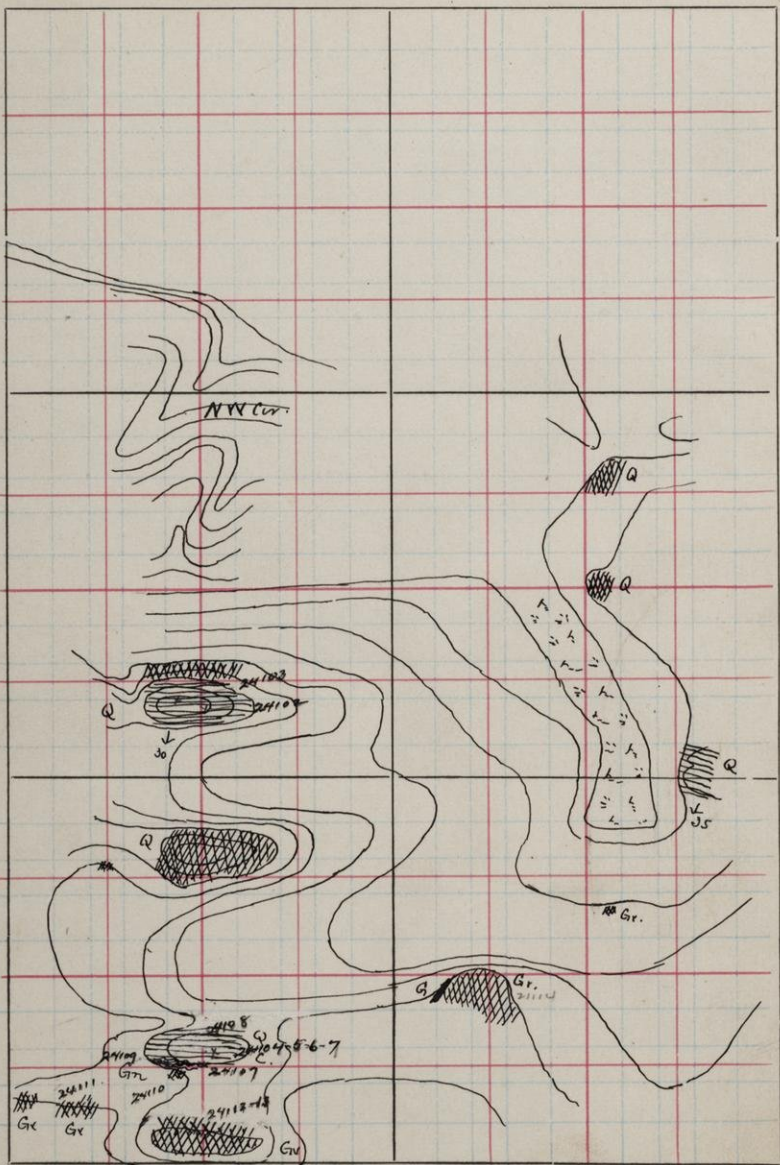
... spotted variety from 20 W of 21102.

flat

This quartzite extends almost uninter-
ruptedly to 650 S of NW cor Sec 1.
At 850 S. of NW cor 1. is a little
knoll of white & ochristine rock that
looks remarkably like the matrix
of the lower quartzite at Palmer.
It is plainly ochristine, with its
ochristizing striking 200 N of E and
dipping vertically. In places it has
the pinkish look of the sericite schist,
and south of this the lighter color
of a squeezed granite. It contains
across eyes of quartz, some of which
look like pebbles.

24404

pink sericite variety.



24105

'squeezed granite' variety -

24106

'Quartzite pebbles'

Further south and to the west the conglomeratic character of the rock is undoubted, while its pebbles are mainly quartzite.

24107

Pebbles from the conglomerate where the fragmental character of the rock was shown by its conglomeratic phases, it was traced northward into a true quartzite like the quartzites west.

24108

On the S.W. cor of the hill there is a contact of the Schistose rock (24104) with another Schistose rock that can be traced into genuine gneiss. There is a disconformity between the two Schists, though no gneiss pebbles were found in the overlying rock.

24109

Gneiss near contact

24110

" more distant from contact.

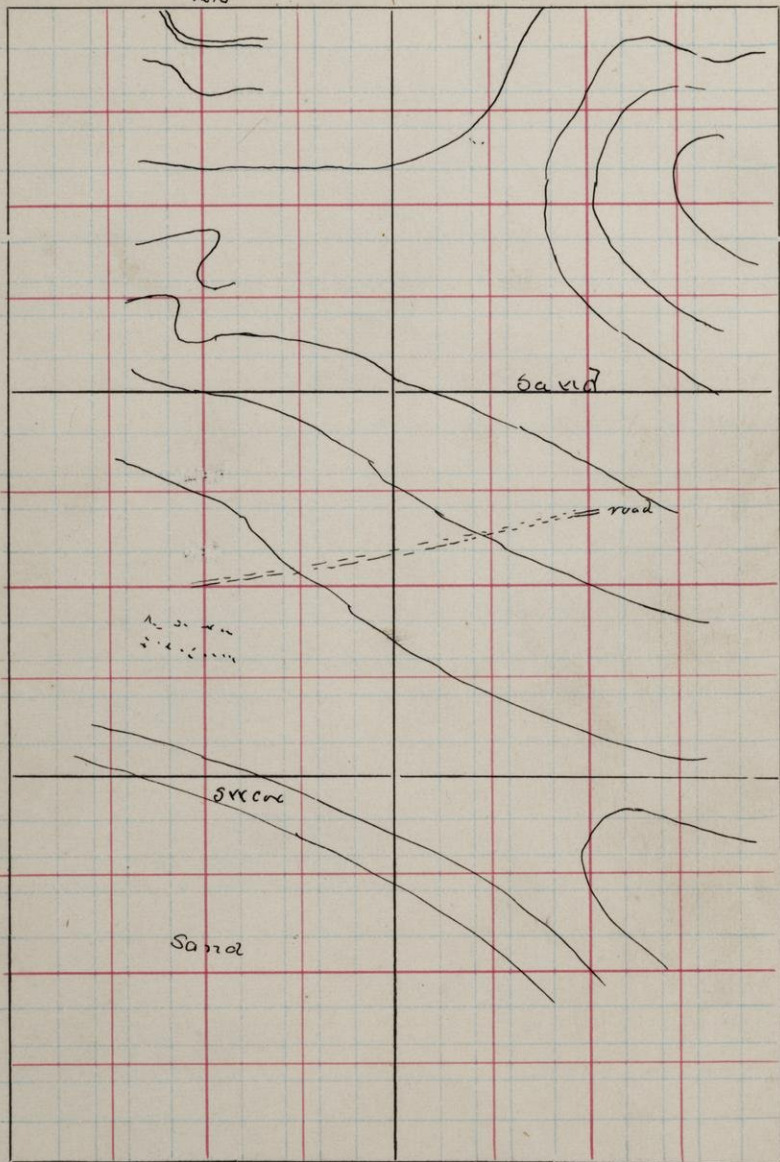
24111

about 100 paces from contact. about 900 S. 150 W of N.W. cor. See 1.

S. 1

T. 47
N/4

R. 25-



24112

A little knob south of the schist contacts consists of red granite cut by quartz veins and containing quartz eyes, and light areas of greenish granite.

24113

Continued south over sand plains to 300 S of NW cor Sec 12, then E 500 and north.

An northern run sand plain extends to 1100 N. of line Sec 1.

24114

At 1200 N. 450 E of S.W. cor Sec 1 is a large ledge of red granite, nearly 50 paces further N and 150 further W. On the west side it is cut by a dyke of greenstone trending 20° E of N.

At about 1450 N. 620 E of S.W. cor Sec 1 is the west end of a quartzite knob in which the rock strikes 20° S of E, and dips 32° - 35° S.

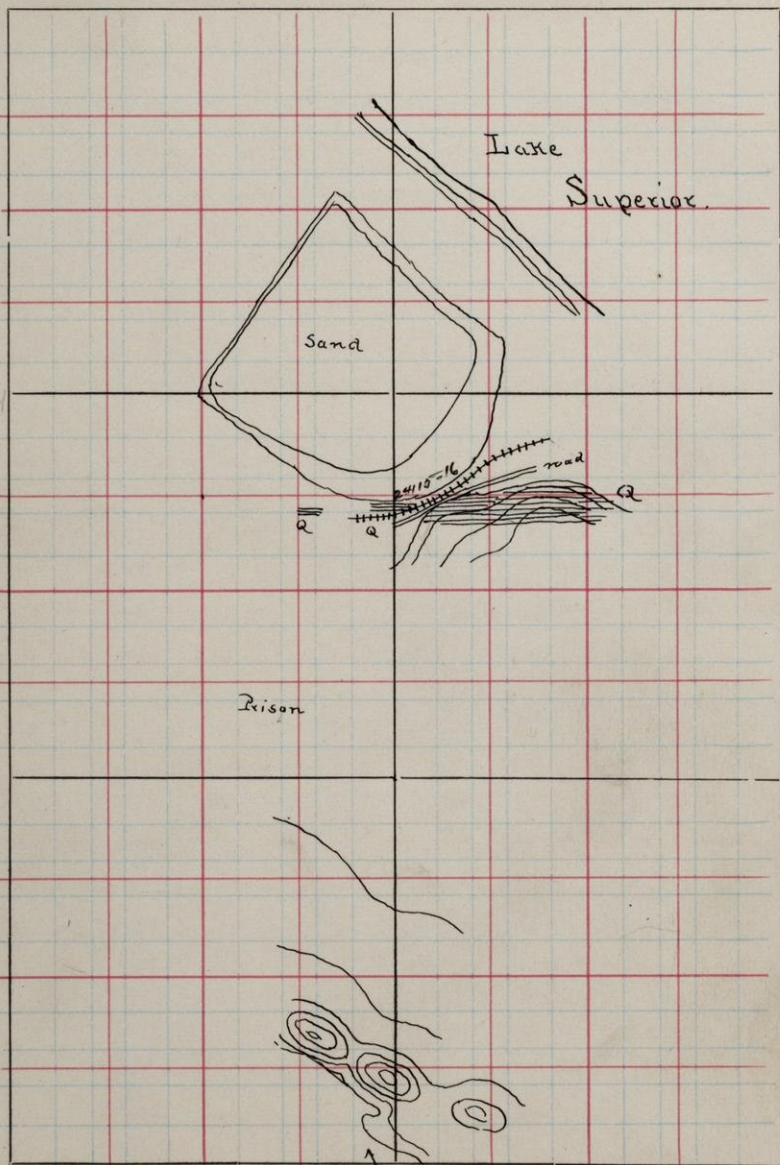
Other quartzite ledges are at 1750 N and 1900 N. The rock is the broken, jointed quartzite common to the west.

S. 36

T. 48

R. 25-

N/2



Sxx ca. 6-747

flat

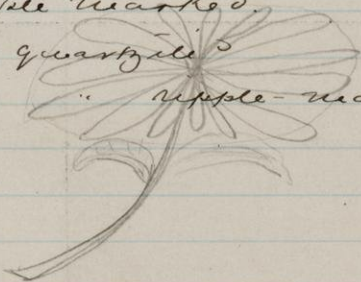
At 340 ft. 500 E of S.W. cor Sec 36
 are large E-W trending ledges
 of evenly banded quartzite beauti-
 fully ripple marked. The layers
 vary in thickness from a fraction
 of an inch to two inches or more,
 and every layer seems to be hand-
 sively ripple marked.

2415

Specimen quartzite

2416

ripple-marked.



25

From the lake shore at 550 ft of
the S $\frac{1}{4}$ p. Sec 36 - 48. 25 run
South on $\frac{1}{4}$ line to center of Sec 1,
then East 500 paces and north to lake
shore.

At 1100 S. 900 - 1150 E of N.W. cor Sec
36 is an exposure of novaculitic quartz-
ites like those E of prison. These are
evenly bedded rock striking nearly
E-W and dipping about vertically
on the little point that makes out
into the lake there is a gentle curve
in the strike, the beds bending slight-
ly to the N.E. and then again to the E.
The dip, though usually vertical is
inclined to the South in many places,
being 80° S on S. side of cut in road,
and 66° S. on the island.

24117

On the South side of the cut the rock
is dense and heavily bedded.

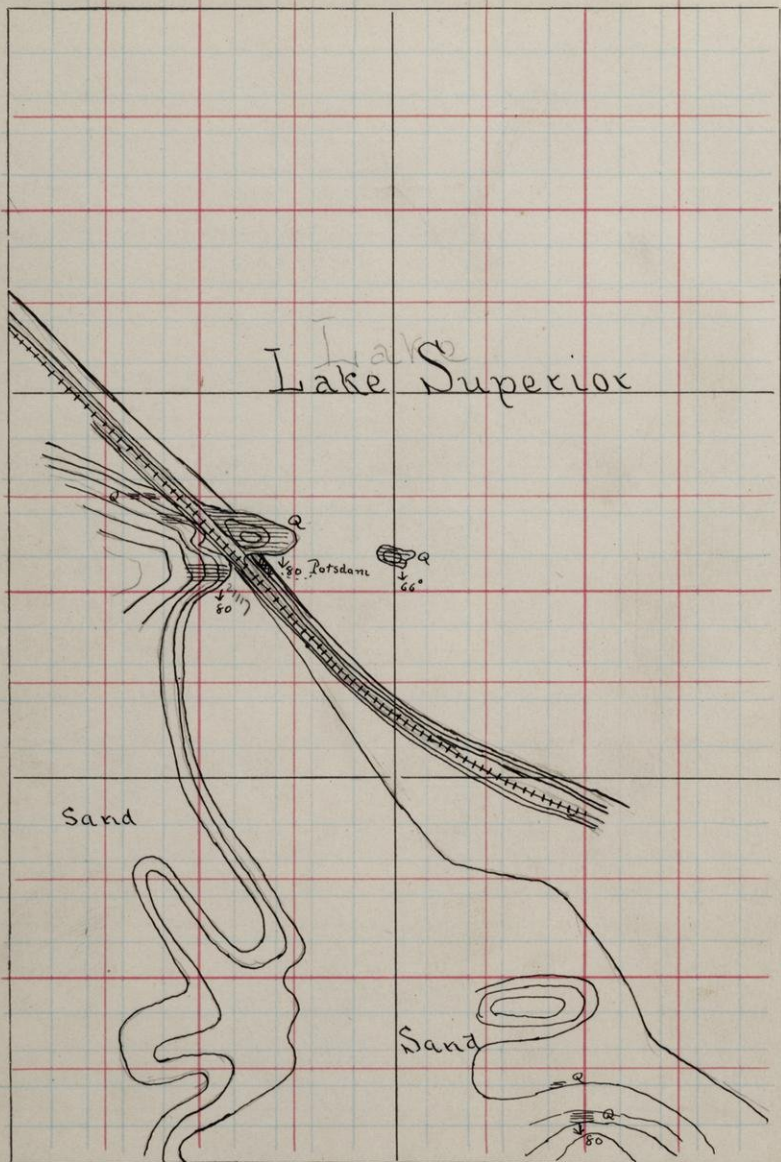
Sand hills cover the Southern por-
tion of Sec 36.

At 300 S of N $\frac{1}{4}$ p. Sec 1. are high
bare benches of the Marble Slates

S. 36

T. 48

R. 25



6-747

8 1/4

26

striking $20^{\circ}-30^{\circ}$ N of E and dipping
generally to the N 25° .

24118 Specimens from top of bluest.

24119 350 ft. of N 1/4 p. Sec 1.

These are something like 100 ft.
thick here and are followed with
out by about

25 ft. of well bedded brown quartzite?
and this by

30 ft. purple quartzite

Under this and conformable with
it as nearly as could determine,
are

24120 20 ft. of brecciated cherty quartzite.
of the Grove Lake Series.

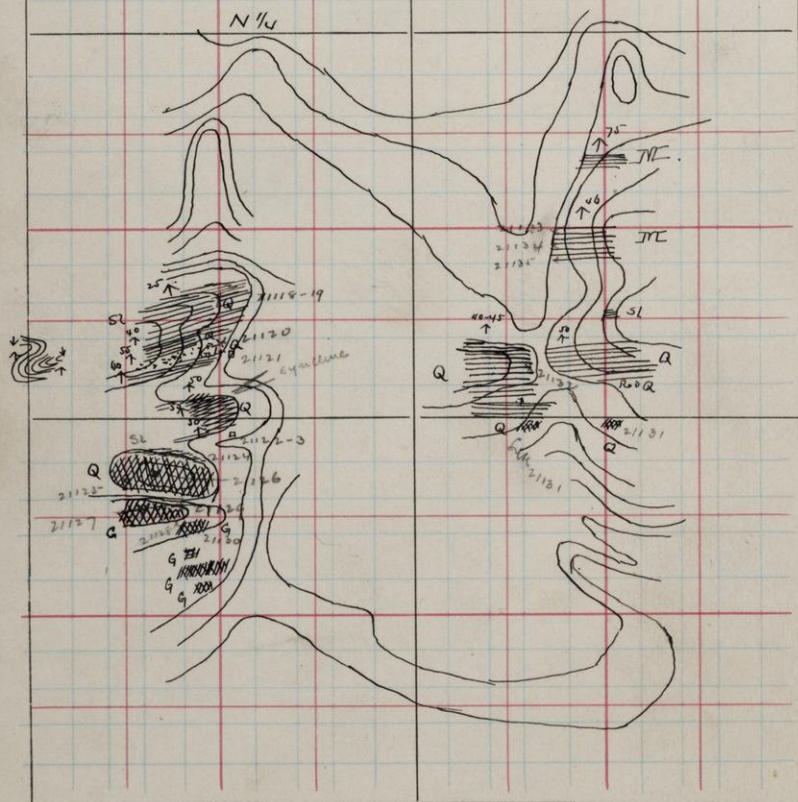
The quartzites dip a little steeper
to the north than do the slates, the
different dips taken being
 45° , 55° & 60° passing southward.

A little further west it is seen that
we have here a syncline in the
axis of which are slates, with quartzite
beneath them. The quartzites seen in
the 1/4 line are on the south limb of
the fold, those on the north limb
must be at the base of the line even.

S. 1

T. 48

R. 25



ed with talus.

In the west, where the bottom of the fold reaches the surface its axis is seen to strike about 10° N of E and to plunge 30° E. This fold is not simple, but is focused in the north by an anticlinal fold.

On Clements run to the west (250 W of $\frac{1}{4}$ line) are several synclines and anticlines, but as he is in lower beds of the series it is probable that the wire cuts only quartzites, is that the great thicknesses there will consist of quartzite.

24121

N 25 S. 20 E of N $\frac{1}{4}$ p. Sec 1.

From dump heap of small test pit

on the north rise to the south, we find under the Goose Lake quartzites a series of white quartzites that are exposed to better advantage in the high hill to the east.

This quartzite dips $50-55^{\circ}$ N and strikes $10-20^{\circ}$ N of E. It is well bedded and is not unlike the lower portions of Seaman's upper quartzite.

24122

24123

Slates from pit at
520 S. 10 E of N 1/4 p. Sec 1.

Before reaching the greenstone
which is at 580 S. we find an ex-
posure of rotten slaty rocks on the
north side of another quartzite hill.

24124

These rocks extend as a schist about
100 paces W. On the south is a 120 ft.
wide ledge of white quartzite that
is not evenly bedded like the quartz-
ite north, but is cherty and so much
jointed that could not be seen if it
dip.

24125

From S.W. edge of ledge. Quartzite

24126

In one place it is cut by a vein of
ore.

Since the quartzite is penetrated
by yellow slates that are evidently
along slipping planes in the rock,
it is believed that the similar yellow
slates, 24122 & 24123 are nothing but
sheared quartzites.

The greenstone occurs as ledges ex-
posed from 580 to 730 S of N 1/4 p. Sec 1.

24127 more massive phase

24128 schistose phase

24129 Schistose rock from north face of the greenstone ledge. It may be a sheared quartzite?

24130 Most massive phase of greenstone forming bluff overlooking plain.

24131 m. run road found at 1460 U. 500 W of D.E. Cr Sec 1 a little valley cutting across the quartzite hill. The outcrop on ledge is a much jointed and shattered quartzite? of a very dark color.

North of this is red quartzite? and north of this a high knoll of white? quartzite? striking 10° N of E and dipping 40° - 45° - 50° N. This rock is much jointed and ~~unlike~~ that north which is more plainly bedded.

24132 Quartzite? from knoll on W. side of valley - 1510 U. 500 W of D.E. Cr. 1.

Continuing north there is an exposure of scales² (marble-series) at 1640 N. and at

1700 - 1750 N. on west side of Kerob is a section through some of the layers of the marble series.

The rocks strike about E-W and dip 46° - 48° N.

24133 The topmost layer exposed is the pink corrugated marble.

21134 under which is a jointed² quartzite²

24135 And beneath this well bedded quartzite²

At 1830 N. 500 E of S.E. cor Sec 1 is another ledge of marble and at

70 + 110 N. 500 W of S.E. cor Sec 36 are two ledges of white² well bedded quartzite², striking $10-15^{\circ}$ N of E.

24136 } Specimens from unconformity on
24137 } Sec. 6. 47-25. See preceding book.
24138 }

Plane Table Notes

31

The succeeding specimens were all taken S.E. of the quarry to illustrate the plane table work. They are from Secs. 6-5-7 and 8, T 47 R. 26.

They cannot be located from corners etc., but can be located only by sights and descriptions.

24139 cherty ore from dump heap of old shaft. Sight 12.

Elba Mine, S.E. of Breitung House.

24140 Greenstone schist, from S. side of knob S.E. of Breitung House. The entire hill is greenstone, which is schistose especially along S. edge.

24141 Greenstone schist

24142 chert } from dump heap

39

Westernmost shaft Uegannee Mine
Sight 77.

24143 Iron chests from dump heap of old
shaft. Sight 90.

24144 } Specimens from dump heap of trunk
24145 } Mine, on S. edge of dump S.E.
of Uegannee Mine.

24146 Chest, which with greenstone make
the dump heap of old shaft. Sight
116.

24147 The little hill station $\triangle$ is in its
top an exposure of acicular $\rightarrow$ slates
running from 10 ft. E of station $\triangle$
to sight 126. It is 20 ft. wide.
It is an anticline with its axis
plunging N.W. on its South side
the rocks dip Sw. at 47° , on top are
flat and at the NW cor of the ledge
they dip about 45° W of N.
The axis of the anticline strikes

about 35° N of W and dips in this
dine cliff at 30° - 40° .

24148 Greenstone - Sight 162.

24149 North of Sight 163 and further.
Down the hill is a pit running
about $\frac{2}{3}$ length of hill. In it are
evenly bedded cherts striking
Nw and dipping 35° - 40° N.E.W.
Sight 168 end of pit.

24150 Chert iron from dump zone of a lot
of 4 or 8 pits of which Sight 174 is
the center.

24151 Actinolite schist(?) from dump
heap N. Green mine.

24152 Fragmental bands in 24151

24153 Jasper from one of a number of small
pits. Sight 198

24154 Specimen from old shaft. Sight
200.

- 24155 Top of hill ~~is~~ is a small ledge of slates, about 30 ft. long. The little bands in the slate that may indicate bedding strike E.W. and dip about 60° N.
- 24156 Specimen from dump heap of one of a group of 8 pits - Sight 205.
- 24157 Ledge of graywacke - slates stained by ochre. Ledge 30 ft. long. Sight 205.
- 24158 Slate from ledge about 50 ft. ^{or} in area. Sight 206.
- 24159 Ochreous slates and jasper, from pit at edge of swamp. Sight 207.
- 24160 Jasper slates in little pit 7 ft. more distant than Sight 210. There is a little syncline in pit west, where the rocks dip northward and southerly. Could not determine strike of its axis.

In the railroad cut N.E. of Miles
 there are exposed about 100 ft. of
 rock, on both sides of the road.
 On the S. side of the track the
 exposures are better than on north
 side. They are coarse and fine
 grained evenly bedded gray wackes,
 apparently dipping 30° W. ^{except} near
 the west end of the exposure where
 they are more or less curved,
 with a general dip S. of W. There
 they are in contact with a 25 ft.
 wide dyke of greenstone that is
 very schistose in the contact line.

24161 Finely banded gray wacke near
 contact with greenstone

24162 Fine grained gray wacke further
 E.

24163 Coarse grained gray wacke inter-
 stratified with 24162

24164

D. of the dyke is more graywacke and there a little pit in chert^s at the west bottom of the hill.

In other pits in this vicinity the rocks can be seen dipping N.W. ∴ the cherts are under the graywacke.

24165

Chertlike greenstone. Probably continuation of dyke mentioned above.

24166

Cherty slates from pit (Sight 227). Rocks strike about E to W. Dip N. 60°.

24167

Graywacke striking 10° S of W and dipping 55°-60° N. A little south of Sight 231 the rock changes to banded red and gray rock striking with the graywacke but dipping only 40° N.

S. side of railroad cut. Graywacke
shows for 10 ft. Dip is north but
angles could not be determined.
Massive graywacke S. side cut
Ferruginous bed in same, E side
cut.

24168

24169

W. S. Bayley.

at N. E. cor of sink hole (Sight
241) are iron cherts striking
 30° S of W and dipping 60° N. W.

^{bw}
24170

Graywacke on top of hill (Sight 252)
It strikes generally 10° S of W and
dips 50° N. In places it is con-
torted and brecciated.

From old shaft (Sight 256). Spot-
ted quartzite and iron cherts
comprise the greater mass of the
dump heap.

24171

Specimen spotted quartzite

24172

From old shaft (Sight 258). Rock
in dump heap banded iron and
chert.

The two hills in the road S. E. of
Legumee, leading to Buffalo
Green, Blue, Prince of Wales and
other mines consist of cherty
slates.

24173

The S.W. corner of the pyramid
to the west of the Southern hill is
an anticline with axis plunging
very steep (60° - 70°) a little N. of W.
The same rocks occur along the
S. side of the top of the hill and
at its East end, striking nearly
N. & S. here and dipping toward
the hill. The basin thus formed
however is not as symmetrical
as some others described, since on
the north side of the hill, at its
East end, there is a subordina-
te syncline, very flat, with axis
striking about S-10 N. of W. and
dipping W. only 15° .

24174

The west end of the little hill
north of the road is also com-
posed of iron chert, striking
S. of W. and dipping 66° N.

This strike and dip is uniform
until East end of hill is reached
when strike turns northward
and dip becomes flatter.

