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Gogebic Iron Range: [specimens] 7300-7459. No. 22 July 1884

Van Hise, Charles Richard, 1857-1918
[s.l.]: [s.n.], July 1884

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U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 22

July 1884

Gogebic Iron Range

C. R. Vanhise

7300-7459

Survey of the Pre-Cambrian Rocks of the N. W. States.

INSTRUCTIONS.

1. Devote at least two pages of this note book 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. 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 smaller spaces as 100 paces, each of the spaces between the red lines as 500 paces, and four of these large spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the first red 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 down one space, 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, after which give in order 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 exposure as possible. Very often the notes for one section will cover more than one page in which case pass to the next right hand page, *repeating the map on each left hand page* as long as the notes, with regard to one section, continue.

3. Collect a specimen from each separate ledge of rock, or whenever 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 the note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples will be allowed, but in all other cases *large sized trimmed specimens*, with chips for slicing, must be selected in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. All specimens are to have numbers painted on them, in white on a black background, in camp.

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, etc., etc.

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

#22

Sec.

3

T. 46

R. 42

C

1329
150
138
150
21

X

X

Boylebic, Mich
July 8, 1884

Micaceous

7300 Slate, from exposure upon
south bank of a creek near
its mouth, flowing into Boyle-
bic Lake. S.W. $\frac{1}{4}$, S.W. $\frac{1}{4}$ Sec. 3
T. 46 R. 42.

7307 Different phases of same
7312 slate.

The exposure from which the
above specimens were taken
is the water edge in 500 steps
N. 15° E. of S.W. corner of sec. 3,
T. 46, R. 42. The strike is N.
15° S., Dip 65° S. This ledge ex-
tends for a distance of 100
steps across the strike.

Sec. 30

T. 46 N R. 41 W

C

7362a-3-4-5

XXXX

H. B. Schist

+ Gr. Stone

X

X

Bozetic, Mich.

July 9, 1884.

7302 ^{Micaceous} Hornblende Schist. Small exposure - from easternmost end - in rail way cut 157 rail lengths ~~East~~ of Bozetic station. S. W. $\frac{1}{4}$ S. W. $\frac{1}{4}$ Sec. 30 T. 46 R. 41 W.

7303 Contact specimen between schist and a greenstone dyke which cuts the schist in a nearly north and south direction and about vertically. Dyke about four feet wide.

7304 From above dyke.

7305 ^{Micaceous} Hornblende schist west of dyke.

The above exposure is so small that nothing could be made out in regard to strike or dip.

7306 From eastern end of massive greenstone exposure 60 feet long - located 108 rail lengths East of Bozetic station S. 2. $\frac{1}{4}$ Sec. 25 T. 46 R. 42 W.

Sec. 25

T. 46

R. 42

7306-4
~~1111~~
SW.

7307 From western end of room
& porch.

Sec. 12 ± 13 T. 46

R. 42

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Bozette, Mich.
July 10, 1884

- 7308 Hornblende Schist. From low ledge 150 paces north, and 270 paces west of $\frac{1}{4}$ post between Secs 12 + 13 T. 46 R. 42. Strike and dip could not be made out.
- 7309 Slate. From dump pile of test pit. 140 paces north and 270 paces west of $\frac{1}{4}$ post between Secs 12 + 13 T. 46 R. 42.
- 7310 Chloritic slate, Chloritic quartzite and lean ore, all from dump pile of single test pit. 50 paces north and 250 paces west of $\frac{1}{4}$ post between Secs 12 + 13. T. 46 R. 42
- 7311 Conglomeratic Chlorite Schist varying into Banded Quartzite. From exposure made by test pit. 25 paces north, 320 paces west of $\frac{1}{4}$ post between Secs 12 + 13 T. 46 R. 42. Strike 50° east of north, dip 60° to the south-east. As the 4-

7311
(cont)

porphy is very small, and the laminae are much contorted. These determinations are very rough, and if the exposure were larger might prove to be far out of the way. In fact the bands from which the small quartzite piece is taken has its laminae cutting almost perpendicularly against the main part of the exposure or is often the core in in the Mesomorie and Maquette iron regions.

7312 Conglomeratic Chlorite Schist. From test pit - ledge 30 feet below surface. 50 paces south, 250 paces west of $\frac{1}{4}$ post between sec. 12 + 13 in sec. 13 T. 46 R. 42.

7313 Chloritic Slate. From test pit - ledge 30 feet below surface. 85 paces south, 250 paces west of $\frac{1}{4}$ post between sec. 12 + 13 in sec. 13 T. 46 R. 42.

7314 Chloritic Schist - ^{and micaceous} two phases of. From test pit - ledge 19 1/2 feet below surface. 215 paces south, 250 paces west of $\frac{1}{4}$ post

7314 between peds. 12 + 13 in sec.
(cont) 13, T.46 R.42

7315 Quartzite, Conglomeratic chlorite schist and chlorite schist, all grading into each other.
From test pit - edge 20 feet below surface. On section line between 12 + 13, 360 paces west of $\frac{1}{4}$ post. T.46 R.42

7316 Hornblende Schist. From small exposure 480 paces east of S.W. corner of sec. 12, T.41 R.42

7317 Hornblende Schist. From north side of bluff overlooking low ground, 100 paces south, 360 paces east of N.W. corner sec. 13 T.46 R.42

7318 Slate. From same bluff as 7317, 8 paces south of it. Most of the bluff is made up of this rock and of

7319 Chloritic slate which is 29 paces south of 7318 and on south side of bluff.

7320 Hornblende Schist. From north side of bluff 170 paces south, 360 paces east of N.W. corner of Sec. 13 T. 46 R. 42

7321. Slate. From same bluff as 7320, 20 paces south of it. The two kinds of rock 7320 and 7321 were found within a half dozen feet of each other.

The bluff which is represented by 7317, 7318 + 7319 lies directly north and runs parallel with the bluff represented by 7320 and 7321. The two bluffs are separated from each other but a few paces. The curious thing about them is that in each we find the two places of rock, hornblende schist, and chloritic slate similarly situated with respect to each other.

Hornblende
7322. Slate. From north side of bluff 250 paces south, and 250 paces east of the N.W. corner of Sec. 13 T. 46 R. 42

Sec. 25 T. 46 R. 42

73-2-3-4-5
must have
R.R. Map.

3/2 7623 Hb. 36.
3/2

3/2 7324-5
3/2

Geologic Mich July 11, 1884. 8

Hornblende

- 7323 Mica Schist. Located
400 steps north of Geologic
station on Geologic Lake road.
N.W. $\frac{1}{4}$ Sec. 25 T. 46, R. 42
Strike 55° east of north, dip 82°
to south east
- 7324 Greenstone. Massive outcrop
50 steps south of depot.
N.E. $\frac{1}{4}$ S.W. $\frac{1}{4}$ Sec 25 T. 46 R. 42
- 7325 Mica Schist. From between
depot and 7324, 25 steps
north of latter. N.E. $\frac{1}{4}$ S.W. $\frac{1}{4}$
Sec 25 T. 46 R. 42 Strike 55° east
of north, dip 81° to south east.
- 7326 Granite. From low outcrop
647 steps north of east and west
line between sec. 24
& 25 as placed on Geologic
Lake road. Sec. 23 T. 46 R. 42
- 7327 Mica Hornblende Schist.
From small outcrop 1265
steps north of east and west
line between sec. 24 & 25
as placed on Geologic Lake
road. Sec. 23 T. 46 R. 42

Sec. 23

T. 46

R. 42

23 Sec 23 7328

7326 1/2

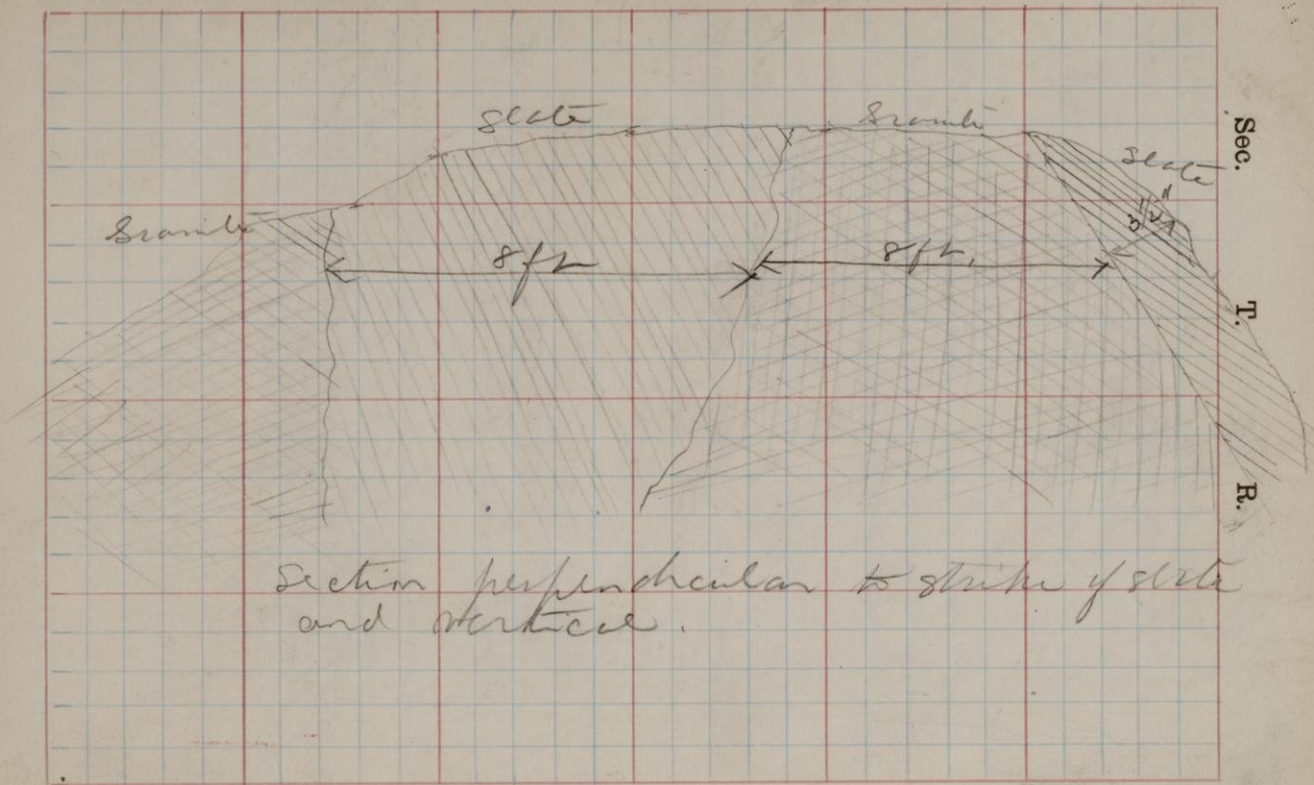
Sec. 23

T. 46

R. 42

23 SE ~~1/4~~ 7328

7326 ~~1/4~~ S.



Saturday, July 12, 1884.
 At falls on the northern branch
 of Plate river, in the N. W. $\frac{1}{4}$
 Sec. 4, T. 46 R. 42, there is an un-
 conformity between chloritic mica
 schist and granite, both being
 there well exposed for some dis-
 tance upon the stream. This
 unconformity can be followed
 100 feet along the surface.

The schist is located south
 of the granite and lower down
 the stream. The strike of the
 schist is upon an average
 35° South of West, but, it
 being somewhat contorted, its
 strike varies from W. 25° S. to
 N. 40° S. The dip is pretty con-
 stantly 60° to the southward.
 The strike of the main line
 of the junction between the
 schist and granite is W. 30° S.
 and its dip 90° . However while
 this line, as far as I was able
 to follow it, is constant in
 direction, yet the granite was
 observed to cut into the schist
 in an irregular manner in one
 place. The accompanying
 diagram shows how the
 relation between the two, the

Sec.

T

R

42

7334

7327

Cl, 5c

1338

7339

Page 5

7350-1-2

7833-4-5 Cl. SC

32

469

W. B. L. R. W.

c

vertical line being that of the main junction.

The uppermost point at which the granite appears is 1580 steps north and 80 steps east of S. W. corner of sec. 4. Lowest point at which schists exposed is 1485 steps north and 120 steps east of S. W. corner of sec. 4.

7330 Typical Granite. From 30 feet above unconformity.

7331 Contact specimen of granite and slate. 1570 steps north, 120 steps east of S. W. corner of sec. 4. J. 46 R. 42

7332 Granite. Shows smooth surface of this rock where it comes in contact with the schist. Such a surface is spread, of several square feet of area, in one place, and if it were upon the surface would have been taken for glacial smoothing.

7333 A very quartzitic phase of the schist which was found in small quantities near the unconformity.

- 7334 Typical schist at main fall.
1510 steps north, 120 steps
east of the S. W. corner of Sec. 4
T. 46, R. 42.
- 7335 Schist, containing calcite vein,
Much of the schist contains num-
erous veins of this sort.
- 7336 Granite. 400 steps east of N. W.
corner of Sec. 4. T. 46 R. 42
- 7337 Chloritic mica schist. 750 steps
east of N. W. corner of Sec. 4
T. 46 R. 42. Strike W. 15° S.
Dip 60° S. This is found on the
northern side of a bluff, and
is overlaid unconformably by
granite which composes the
most of the large bluff. The granite
in places rises 20 feet or more
above the schist. The line of con-
tact of the schist and granite (which
is perfectly clear and sharp as at
the falls on Slate River) was
traced more than fifty feet.
The strike and dip of the con-
tact correspond to the strike
and dip of the schist.
This granite here is precisely
like 7336.

7338 Granite. 770 steps east, 25 steps north of N.W. corner of Sec. 4 T. 46, R. 42. Although this specimen was not taken in a direction perpendicular to the strike of the schist at the point where 7337 was taken, this granite bluff runs nearly as far east and west as the schist, and at its nearest point is but 25 steps from it. So here we have a schist striking approximately east and west, and in contact with it upon the south side granite and separated from it on the north side by a short space, more granite.

Granite. at 850 steps east of N.W. corner of Sec. 4, T. 46, R. 42.

Granite at 900 paces east of N.W. corner of Sec. 4 T. 46, R. 42.

Granite at $\frac{1}{4}$ post, 1000 steps east of N.W. corner of Sec. 4, T. 46, R. 42.

7339 Hornblende Schist. 1200 steps east of N.W. corner Sec. 4, T. 46, R. 42. This schist occurs as a thin layer in the massive granite of which the bluff is composed.

Sec. 33

T. 47

R. 42

~~1111~~
7340



Granite, 1323 Steps east of
N.W. corner Sec 4 T46 R42.

The above are some of the
numerous exposures of granite
which form an almost con-
tinuous high ridge at or near
the north line of Sec 4. T46
R42 from 400 steps east of
the N.W. corner of Sec 4 to over
1300 paces east of the same
corner.

7340 Granite. From bluff several
hundred feet above Lake So-
gibic, 500 steps south, 800 steps
west of the N.W. corner of
Sec. 33. T. 47 R. 42, there
are no exposures along the
east line of this section, the
entire line having been fol-
lowed.

Sec. 16

T.

46

R.

42

Sunday, July 13, 1884,
Upon the main stream of
Slate River in the N. E. $\frac{1}{4}$
of Sec. 16 T 46 R. 42 there are
three falls over slate and
quartzite. The middle one
is the highest, having a fall
including rapids above and be-
low of thirty or forty feet. Each
of the other falls is about half
this in height. The slate
and quartzite are exposed con-
tinuously from 870 steps W.,
250 steps S. of the N. E. corner
of Sec. 16. T. 46, R. 42 to 565 steps
W. 500 steps S. of the same
corner. Commencing at the
lower falls, the reckoning for
various points of the stream
where rock is exposed, are as
follows.

Lower Fall	870 steps W.	250 S.
Middle Fall	750 "	W. 250 S.
Upper Fall	650 "	W. 350 S.
Stream	600 "	W. 450 S.
"	565 "	W. 500 S.

The extremes of the above show
the lowest and highest points
upon the river at which ex-
posed are here found.

The strike of the slate and

quartzite at the lower falls in
 W. 15° S, its dip at the same
 place is 50° S. Upper Falls.
 Strike W 180° S. dip 60° S.

Neither of the ^{regions} was an entirely
 satisfactory one for determining
 strike and dip, and both of the
 above determinations may be
 several degrees from the truth.

Below the middle falls the
 rocks are mainly slate, above
 the falls they are mainly quartzite.
 At the middle falls, the strike
 of the layers are nearly in the
~~same~~ direction which the river
 flows at that point, and here
 upon the north side the rock
 is slate, upon the south side,
 quartzite. The two varieties
 of rock however grade into
 each other and both are found
 above and below the middle
 falls. The change from slate
 to quartzite or the contrary
 often occurs in a distance
 of a few feet or even a few
 inches across the strike.

Below the middle falls the
 quartzite is apt to occur in
 narrow bands while above
 the slate is found in much
 bands.

- 7341 Slate. From Lower Falls 870 steps
N. 25° S. of the N. E. corner of sec
16 T. 46, R. 42. Strike N. 15° S.
Dip 50° S.
- 7342 Slate. From Middle Falls on the
north side of the river. 750 steps
N. 25° S. of the N. E. corner of
Sec. 16 T. 46, R. 42
- 7343 A more quartzitic phase of slate
one foot south of 7342 across
the strike.
- 7344 Still more quartzitic slate 6 in.
south of 7343.
- 7345 ^{Slate} Staty quartzitic 4 in south of
7344.
- 7346 ^{Mica Schist} Quartzitic on south side of stream
at middle falls, across the
strike from 7345.
- 7347 Slate. From one of the slaty
~~ptosis~~ layers in the quartzite
near the upper falls.
- 7348 Typical quartzitic ^{Mica Schist} from the
upper falls.

Secs 20+17 T. 46 R. 42

cl. m. s. c.

m. s. c. 735 1/2 7350
2. m. s. c. 7352 1/2 7350

20

Mica Schist

7349 Slaty quartzite. From bluff
in center of Sec. 16 T41 R42

Mica Schist

7350 Slaty quartzite. Small exposure
in woods. 625 steps W, 25
N. from N.E. corner of Sec. 20
T46 R42

7351 Siliceous slate. North side
of large bluff 700 steps W. 50 S.
of N.E. corner of Sec. 20 T46 R42
Steps W. 20 S. Dip 55° S.

7352 Slaty quartzite. Mica Schist
bluff from which 7351 is taken.
25 paces south of 7351. The
gradation from one to the other
is gradual.

Secs 28+29 T. 47

R. 42

7355

N

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7300

28

Monday, July 14, 1884
 7353 Granite from small exposure
 in woods 1100 steps W.
 200 N. of S.E. corner of Sec 28
 T47 R 42.

Granite, 1250 steps W. 250 N.
 of S.E. corner of Sec. 28 T47 R 42.

Granite, 1400 steps W. 300 N.
 of S.E. corner of Sec 28 T47 R 42.

Granite, 280 steps N. of the
 S.W. corner of Sec. 28 T47 R 42

7354 Granite, 450 steps N., 50 W.
 of S.W. corner of Sec. 28 T47 R 42

From the point passing
 north upon the line between
 sec 28 + 29 Granite is
 exposed at the following points
 The workings are from the
 S.W. corner of Sec. 28 T47 R 42
 and are given in steps.

- (1) 520 N
- (2) 730 N. 50 E.
- (3) 800 N. 20 W
- (4) 900 N.
- (5) 1138 N.
- (6) 1270 N

Sec. 20 T. 47 R. 42

20

7 80 ⁵⁰
7302

(7) 1450 N.

(8) 1560 N.

(9) 1600 N. 75° E.

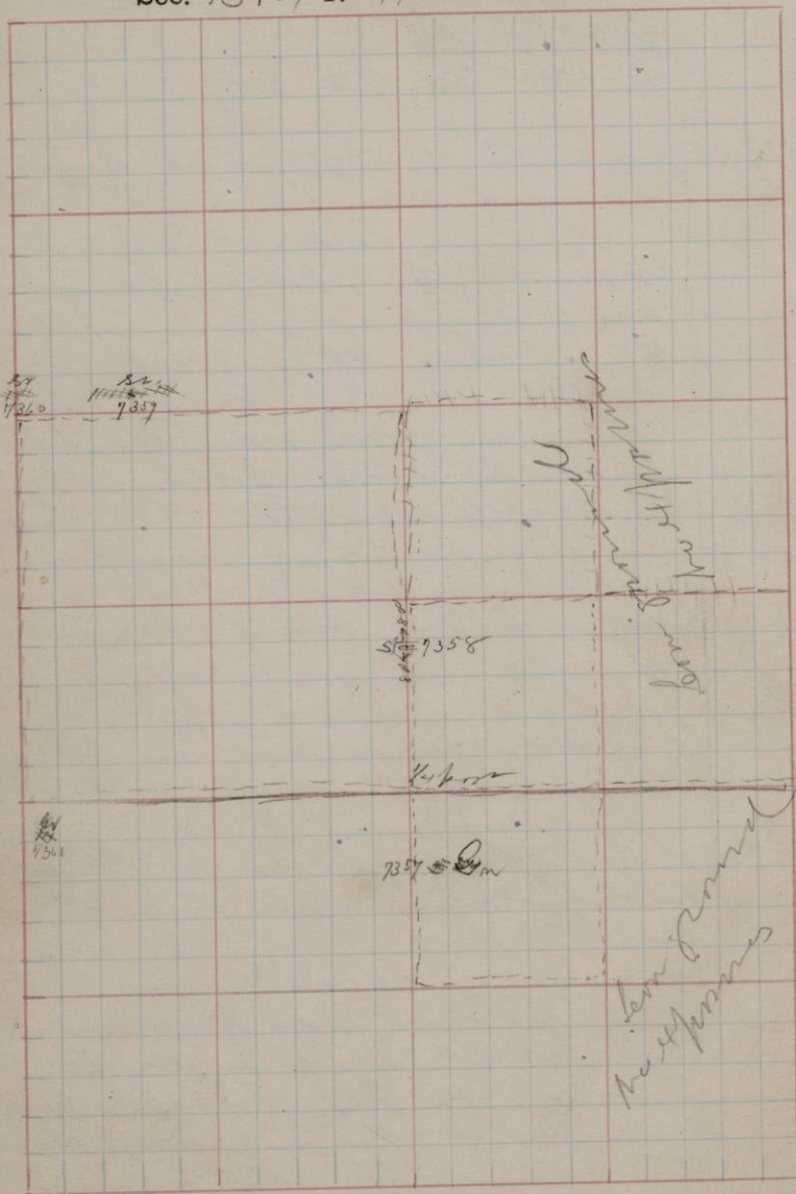
7355 Granite. 165 steps W. of N.E. corner of sec. 29.

Many of the above exposures are very large, some of them being more than 100 feet wide and long. Many other exposures were seen farther from the line followed, but not visited. The rock is of a massive uniform variety, in which 7358-4-5 represent. All of these might have come from any one of the summits exposed - so constant is the character of the rock.

7356 Slate. Three phases of. Small outcrops upon north side of large hill 440 N. 50 W. S.E. corner of sec. 20 T. 47 R. 42. The dip could not be accurately determined, but is not far from 50° N. The strike is near East and west. In places near the surface the slate is so soft as to be easily dug out with a pick.

Sec. 13+24 T. 47

R. 43



- 7357 ^{gneiss} ~~Granite~~. Tuesday, July 15-1884
 From bluff 930 steps
 N. 1705 of the N.E. corner of
 Sec. 24, T. 47, R. 43.
- 7358 Siliceous Slate 370 steps N. of
 $\frac{1}{4}$ post. 370 steps N. of $\frac{1}{4}$ post
 between sec. 13 & 24. Outcrop
 upon north side of hill. In a
 test pit an attempt was made
 to determine dip and strike,
 but the results may be quite
 far from the truth upon ac-
 count of the smallness of the
 exposure. Strike east & west.
 Dip from 80° N. to 80° S, the
 layers being much contorted.
- 7359 Greenstone. From south side
 of high ridge extending east
 and west as far as the eye
 could penetrate the woods.
 50 N. 8002. of the $\frac{1}{4}$ post be-
 tween sec. 13 & 14. T. 47, R. 42.
- 7360 Greenstone. From same ridge
 from which 7359 is taken
 150 steps N. of $\frac{1}{4}$ post be-
 tween sec. 13 & 14, T. 47, R. 42

Sec. 14+23

T. 47

R. 43

8th section
7374sl
7373

Swamp

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8002, sl. 2
7368-9-7370-2

7370-6 sl. Cg.

Neonotocope

1/2 pr

Cg 7372-3-4 2 + Cg
7373-5-6
7374-7-8
7375-9-10
7376-11-12
7377-13-14
7378-15-16
7379-17-18
7380-19-20
7381-21-22
7382-23-24
7383-25-26
7384-27-28
7385-29-30
7386-31-32
7387-33-34
7388-35-36
7389-37-38
7390-39-40
7391-41-42
7392-43-44
7393-45-46
7394-47-48
7395-49-50
7396-51-52
7397-53-54
7398-55-56
7399-57-58
7400-59-60

Em point

Swamp

- 7361 ^{Granite} Granite, from north side of high bluff. 71 steps E. 50 S. of N.W. corner of Sec. 24, T.47, R.43.
- 7362 ^{fine grained} Quartzite, from east and west bluff with northern exposure 680 steps W. 35 S. of the N.E. corner of Sec. 23, T.47, R.43.
- 7363 Quartzite, 200 feet west of 7362, showing it to be a metamorphosed rock; the fragments of which are from granite. At first look the rock might be mistaken for a granite, so similar is it in general appearance.
- 7364 Going farther west along the face of the bluff at 590 steps W. and 45 S. the quartzite has become a fine conglomerate, of which the pebbles are granite.
- 7366 ^{Granite} Granite. 600 steps west, 135 S. of the N.E. corner of Sec. 23, T.47, R.43. The shortest distance between the granite and quartzite is not more than 100 steps, and was undoubt

edly the source of the granite particles and pebbles which are so abundant in the quartzite.

7366. Conglomerate. Following the trend of the bluff from which 7362-3-4 are taken another low exposure is found at 720 steps W. 755. of the N.E. corner of Sec. 23 T.47 R. 43. a conglomerate is found in which the granite pebbles are often six inches in diameter, although the average is from 1 to 3 inches. The rather sparse matrix is quartzitic in character.

7367. ^{Mottled} Slate. From small exposure a short distance south of 7366 at 640 steps west, 1575. of the N.E. corner of Sec. 23, T.47 R. 43.

7368. Marble, with slate, jasper and red quartzite interlaminated with it in small quantities. Low exposure on east side of hill. 40 steps N. 14 E. of the S. W. corner of Sec. 14 T.47 R. 43. A portion of the exposure is massive and a portion laminated. Strike 2 + W. Dip north at

- angle varying from 45° to 75°
 75° at south end. 45° at N. end.
- 7369 slate, Red granite and Jasper^{2 in 1}
 interstratified with 7368.
- 7370 Jasper. From the location
 of 7368 to 58 steps N. 16 E. 7368
 is the prevailing rock, but
 from this point to the end of
 the exposure of 98 steps N. 60 E.
 the rock is chiefly Jasper +
 chert
- 7371 Jasper containing Galena, Malachite,
 and Bornite, taken from
 the above Jasper ledge. Has
 been worked for silver or silver
 vein.
- 7372 Slate. Loose material thrown
 out from top pit for silver
 in the above Jasper.
- 7373 Black slate. Low & porous
 on East side of Hill, 400 steps
 N. 80 W. of the S. W. corner of
 Sec. 14, T. 44 R. 43
- 7374 Greenstone. South of high
 range, running East and
 west as far as eye can reach

Sec. 15+22 T. 47

R. 43

821

821

821 7393

821 7395

821 7394

S 821

7395 1/2 sec.

S 821 7396

7397

1/2 sec.

SAV 103
ST 7397

SLCg
#7397

SAV 103
ST 7399

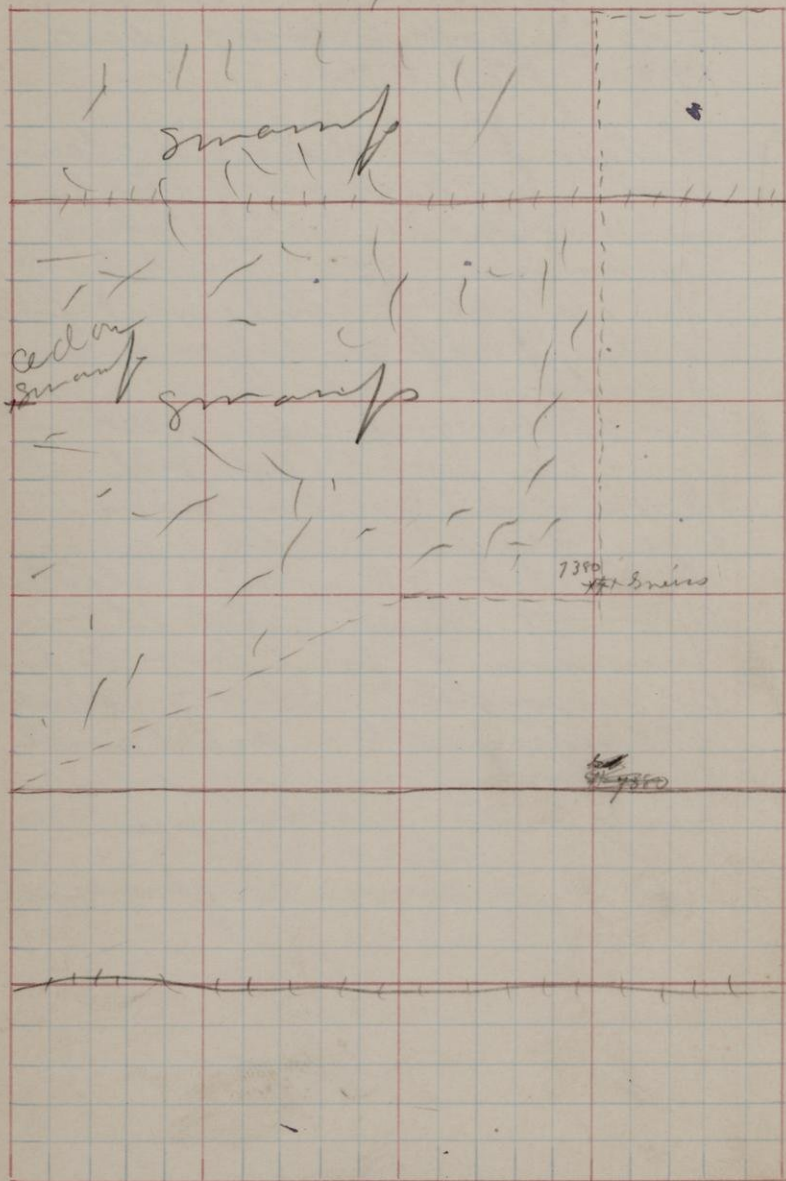
through woods. 130 steps
N. of $\frac{1}{4}$ post between sec. 14
14 & 15 T. 47, R. 43

- 7375 Slate - from Slate Conglomerate, N.W. corner of bluff in 640 steps N. 85° S. of $\frac{1}{4}$ post between sec. 14 & 23. Strike N. 30° S., dip 60° S. The west face of the bluff is exposed for a distance of 50 paces across the strike and rises vertically from the foot 90 feet high. The pebbles in the conglomerate are very abundant, averaging from 1" to 4" in size although some of them reach the dimension of four or five inches in diameter. Slaty quartzite or ^{granite} slate pebbles are much the most common, but a few granite pebbles are seen. ^{Partly of these}
- 7376 Pebbles in above conglomerate.

Sec. 22

T. 47

R. 43



Wednesday, July 16, 1894

- 7377 Slate Conglomerate. Low northern exposure. 180 steps N. 10 S. of the N.E. corner of Sec. 22. T. 47 R. 43
- 7378 Black slate. northern exposure. 500 N. 75 N. of the S.E. corner of Sec. 15, T. 47 R. 43. Strike N. 10 S.; dip 65° S.
- Schist*
7379 Slaty diorite. Small outcrop 1000 S. 480 W. of N.E. corner of Sec. 22 T. 47 R. 43. Strike N. 10 S., dip 80° S. north side of bluff.
- 7380 Breccia. Low northern exposure at 1475 S. 500 W. of the N.E. corner of Sec. 22, T. 47 R. 43
- 7381 Slate, at base of hill 200 feet high, upon north side. 400 W. 135 S. of N.E. corner of Sec. 28, T. 47, R. 43. One layer of this slate 3 feet wide is being worked for silver and gold. Specimens contain pyrite, chalcopryite & c = no rim, simple altered inter laminated layers. Strike N. 40° E. dip 62° S.E.

Sec. 21+28 T. 47

R. 43.

Swamp

7384
2.0
7383 2
7380
60 * 7380
2.0

7380
7381
sc
2.0

7382
#8w

Test pits at top of this bluff
a little farther north have
struck granite. it is sand

- 7382 ^{Granite} Granite. 80 E. 10 S. of the
N. E. corner of Sec 28. T47 R. 43
- 7383 Quartzite. From southern ex-
posure, 900 N. 460 W. of S. E.
corner of Sec. 21 T47 R. 42.
Strike N 40° E. dip 60° N. W.
- 7384 ^{Lean ore} From dump pile
of test pit. 1000 N. 75 W.
of the S. E. corner of Sec. 21
T47. R. 43
- 7385 Quartzite. From bluff which
rises one hundred feet above
the level of the main shaft of
Fobbers mine. 900 N. 750
W. of S. E. corner of Sec. 21. T47. R. 43
Strike W. 20° S. dip 60° South
7386. ^{Lean ore & Jasper} Samples of the different
of the different materials
taken from main shaft of Fo-
bbers mine. 80 feet deep.
950 N. 800 W. of S. E. corner
of Sec. 21. T47 R. 43

Sec. 16+21

T. 47

R. 43

Lat 7394

Lat 7393

Greenstone

7392

7391

SL 7389

SL 7388

SL 7387

SL 7386

7392

Gramp

Test pit at 1200 N. 480 W.
of the S. E. corner of Sec. 21,
T47. R 43 containing the
same material as 7386

7387 Marble slate. Southern ex-
posure. 230 N. 150 E. of the
S. W. corner of Sec. 16 T47 R43

7388 Slate. Western exposure.
880 N. 20 E. of S. W. corner
of S. W. corner of Sec. 16 T47 R43.

7389 Eastern exposure of slate
and staurolite granite 650 N.
50 W. of S. W. corner of Sec 16.
T47, R. 43,

7390 Greenstone. High southern
exposure. 50 N of 1/4 post
between sec 16 & 17, T47 R43.
This exposure is contin-
uous and almost due east
to

7391 Greenstone 800 E. 100 N. of
1/4 post between sec 16 & 17
T47 R43. From this point
the range extends easterly
far as eye can penetrate
woods.

Sec. 10 + 15 T. 47

R. 43

10

Low pond.

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7394

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7393

7395 br

Slate like 7387. North side of continuous ridge extending east and west from near Presque Isle River to $\frac{1}{4}$ post between secs. 16 and 21. 747R43. 7387 represents the western end of this ridge. At the following points this ridge was located and its strike and dip taken.

(1) 475 N. 130 W. of $\frac{1}{4}$ post between secs 16+21. Strike W. 15° S. dip 60° S.

(2) 400 N. 300 W. of $\frac{1}{4}$ post between secs 16+21. Strike W. 15° S. dip 70° S.

7392 (3) 500 W. 150 N. of $\frac{1}{4}$ post between secs. 16+21. Strike W. 15° S. dip 60° S.

Thursday, July 17/1884

7393

Greenstone, 830 S of the N.W. corner of Sec 15, T.40 N. R. 43. Going north on the line between Sec. 15 & 16 there are almost continuous exposures at or near the line.

7394

Greenstone, 50 N. of N.W. corner of Sec. 15, T.40 N. R. 43. At this point the high greenstone ridge which was first found at 7393 drops off rapidly toward the north, into low swampy ground with no exposures.

7395

Greenstone. From the N.W. corner of Sec. 15, traveled east along the line between Secs 15 & 10, and here the northern slope of the greenstone ridge trended slightly north until at the 1/4 post it was some 200 paces N of me. From this point ran south at the last exposure of greenstone noted was at 900 S of 1/4 post between Secs. 15 & 10. 7395 represents the latter point.

Secs. 13-2 T. 47

R. 43

15-

Bw. SL
*Bw. SL
*Bw. SL
*
1/396

*

*

slate.

7396 Running south from 7395,
a low exposure of slate is found
at 500 N., 90 W. of the $\frac{1}{4}$ post
between Sec 15 & 22 T47 R43.

Slate. 600 N., 450 W. of $\frac{1}{4}$ post
between Sec. 15 & 22 T47 R43

Slate 500 N., 700 W. of the S.E.
corner of Sec 16. T47 R43

The last two slates are pre-
cisely like 7396. In none of
these places was there a good
opportunity to determine dip
and strike, but at one is mar-
ked that the strike bears
S. of W. a few degrees, and
that the dip is 60° or 70° to
the south.

Sec. 17+20 T. 47

R. 43

17

8397
XXXXXX
SIL 20

20

7397

Friday, July 18, 1884.
 Speckled Siliceous Silt.

Bluff with vertical face
 thirty feet high and northern
 exposure. 200 W. 70 S. of the
 N.E. corner of Sec. 20 T. 47 R. 43.
 This exposure continues east
 until it strikes Presque Isle
 River at 140 W. 100 S. of the
 N.E. corner of Sec. 20. Ledge
 also extended west for some
 distance

The Presque Isle River was
 followed from the above exposure
 nearly to the point where
 it leaves Sec. 17 upon the
 left bank, but no exposures
 were found. The greenstone
 ridge which was located
 upon the section line between
 16 & 17 was seen to extend west-
 ward nearly to the river. The
 locality was not visited, but
 this high ridge which heretofore
 in each case has been
 greenstone was taken to be a
 westward extension of the
 same range.

Left bank of river at 525 N. of $\frac{1}{4}$
 point between Secs 17 & 20, also at

750 N. 500 W. of same post,
and 750 N. 700 W. From this
point the river again trends
northward.

Saturday, July 19, 1884.

7398 Siliceous slate. From north-
ern exposure at 500 ft. of $\frac{1}{4}$ path
between secs. 16 + 21, T47R43.
Strike nearly east and west, dip
toward the south. No chert
& no accurate measure-
ments. This is the last
of a series of numbers which
represent an almost con-
tinuous exposure of slate from
the Pieghead or River east
to the center of sec. 15, and
at numerous places from this
point to within a half
mile of the eastern side of the
township.

7399 Chloritic schist and Jasper
on opposite sides of test trench,
the Jasper being upon the
northern side. 1130 ft. 520
ft. of the S.E. corner of sec. 21.
Strike N. 25° S. dip 40° S. The
latter determination is a very rough
one.

7400. Spotted slate - Like 7397,
No lean ore. From test
pit down pit 1140 ft. 530 ft.
of the S.E. corner of sec. 21. T47R43.

Same materials thrown from
test pit 10 steps west of 7400.

7401

Chloritic schist and Jasper
ore from test pit 1200 N.
480 W. of S.E. corner of Sec. 21.
T. 47 R. 43

Lean ore in test pit 20 steps
south of 7401

Test pits at 1200 N., 500 W.
and 1200 N. 526 W. show ma-
terials like 7401.

Test pit 1240 N., 526 W. of
S.E. corner of Sec. 21. T. 47 R. 43.
show material like 7399

Test pit at 1260 N. 575 W.
show materials like 7399.

7402

Lean Jasper ore. From test
pit 1320 N. 615 W. of the S.E.
corner of Sec. 21 T. 47 R. 43

7403

Mica Schist, 50 N. of $\frac{1}{4}$ post
between Secs. 21 & 28. T. 47 R. 43
Strike N. 10 E. dip 800 W.
Northern exposure.

Secs 28 + 29 T. 47 R. 43

A. N.
X

m. Sec.
7105
7406 m. Sec.

29

7112 m. Sec.

7400 m. Sec.
7408 m. Sec.
7409 m. Sec.

28

7407 m. Sec.

7410 m. Sec.
7411 m. Sec.

X

- 7404 Mica ^{gneiss} quartzite, from south side of bluff from which 7403 is taken. 10 W. of $\frac{1}{4}$ post between secs. 21 & 28. T. 47 R. 43. Strike N. 15° E. dip 90° .
- 7405 ^{gneiss} Another phase of mica schist from same bluff, 10 S. 10 W. of $\frac{1}{4}$ post between secs. 21 & 28. T. 47 R. 43.
- 7406 Mica Schist, Low northern exposure 150 S. 20 E. of $\frac{1}{4}$ post between secs. 21 & 28. Strike N. 20 W. dip 80° west.
- 7407 Coarse Mica Schist or ^{gneiss} ~~gneiss~~ 1800 S. of $\frac{1}{4}$ post between secs. 21 & 28.
- 7408 Mica Schist ^{gneiss} 1100 S. 500 W. of $\frac{1}{4}$ post between secs. 21 & 28. Strike N 45° E. dip 70° S.E.
- 7409 Greenstone. High ridge running nearly N.E. and S.W. 1100 S. 650 W. of $\frac{1}{4}$ post between secs 21 & 28. T. 47 R. 43.
- 7410 Mica Schist cut by numerous granite veins. High

Sec 20 & 21 T. 47 R. 43

N
X

7416
Gur 12 bur sl.

20

7413
60

21

A 13
7414

A 13
7413

X

northern exposure. 600 ft. of
 1/4 post between secs. 28+29.
 T. 47 R. 43. Strike W. 20° S.
 dip 80° S.

7411 Greenstone. South side of
 bluff from which 7410 is taken
 up. Fully half of the ex-
 posure is composed of this
 material.

7412 Mica Schist or Gneiss
 containing black pieces
 of dense hard rock. Low south-
 ern exposure. 60 ft. of 1/4 post
 between secs. 28+29 T. 47 R. 43.

7413 Fine grained compact greenstone
 185 ft. 10 ft. of the S. E. corner
 of sec. 20. T. 47, R. 43.

7414 Fine grained compact greenstone
 300 ft. S. E. of the S. W. corner
 of sec. 21. T. 47. R. 43.

7415 State Conglomerate, and
 pebbles from same. Exposed
 in a bluff which rises 60 or 80
 feet vertically from the woods.
 These faces being found up-
 on all but the southern

side of the bluff. The ~~N.E.~~
 corner is located 75 N. 35 W.
 of the $\frac{1}{4}$ post between secs.
 20 + 21, Strike N. 15° W. dip
 60° S.

This same slate conglomerate is again seen in a
 large bluff at 40 N. 40 E.
 of $\frac{1}{4}$ post between Secs. 20 + 21
 T. 47 R. 43

7416 Greenstone, Low ledge in
 swamp. 170 S. 100 W. of the
 N.E. corner of Sec. 20 T. 47 R. 43

Sec 20+29 T. 47

R. 43

7419 SL 7417.8.2.
7418 SL 24.
7420 SL.
7421
7422

7423 SL 30.
29 7422 SL 2.
30
60

7424 SL
7425 SL 50.
7426 SL 50.

Sunday, July 20, 1884.

7417 Banded Quartzite. From
Lump pile of test pit
4002. 90 N. of $\frac{1}{4}$ pole between
Secs. 20 & 29. T. 47, R. 43

7418 State Conglomerate, con-
taining red Jasper pebbles.
From test trench on north
side of high ridge 20 steps
south of 7417. This slate
and slate conglomerate bluff
extends from this location
westward to the quarter
line. Strike W. 15° S. dip
80° S. (estimated) no chance
for measurement. From
trench traveled across
strike

7419 Slate - From test pit 200
steps west of 7417

7420 Compact slate. Going south
across the strike from 7418
at 40 steps south of it, the
rock changes from a slate
conglomerate to a siliceous
slate.

Slate. Like 7420 at 40 N.
400 E. of $\frac{1}{4}$ post between Secs.
20+29 J. 47 R. 43

Slate. Like 7420. 80 S. 400 E.
of $\frac{1}{4}$ post between Sec. 20+29

7421 ^{gneiss} Quartzite. 125 S. 400 E. of
 $\frac{1}{4}$ post between Secs. 20+29
J. 47 R. 43

7422 Micaceous Schist. Low north-
ern exposure. 1040 S. 230 E.
of $\frac{1}{4}$ post between Secs 20+29
J. 47 R. 43 Strike W. 30° S.
dip 60° S.

7423 Chloritic Mica slate. From
top of 9708. 90 E. of $\frac{1}{4}$
post between Sec. 20+29.
J. 47. R. 43

7424 Low exposure of gray quartzite,
cut by veins of white and
jaspery quartz. 150 S. 260 W.
of $\frac{1}{4}$ post between Secs 20
+29. J. 47 R. 43.

7425 Mica Schist. 152 S. 190 W.
of $\frac{1}{4}$ post between 20+29.
Strike W. 45° S. dip 50° S. E.

Secs 29+30 T. 47

R. 43

Mg. 2, ~~7436-7~~

30

29

7424

H6 SC.

7426

H6 SC.

H6 SC.

X

7426 Magnetitic Quartzite, ledge
south of slate belt, 500 E.
250 S. of $\frac{1}{4}$ post between Sec.
16 + 21. There are strong
magnetic attractions in the
vicinity

(Gneiss?)

7427 Mica Schist and Quartzite
Sed ridge running on
for a con see south west
from 250 S. 50 E. of $\frac{1}{4}$ post
between Sec. 29 + 30 T. 47 R. 43.

7428 Micaceous Quartzite, 800
S. ^{150 W.} of $\frac{1}{4}$ post between Sec.
29 + 30. Strike W. 250 S.

Mica Schist, like 7427
Low southern $\frac{1}{4}$ post
50 N. 150 W. of the S. E. corner
of Sec. 30. T. 47 R. 43

Mica Schist, like 7428
400 S of N. E. corner of Sec.
31. T. 47 R. 43

Gneiss

7429 Mica Schist. 660 S. of
N. E. corner of Sec. 31, T. 47 R. 43.

7430 Intrusion Granite in
contact with 7429

Sec. 33 T. 47

R. 73

N
X

*H 6.50.

7429-30

*
cl. 50. + 5.

7431 * cl 50.

7432 * 10 in.

3/.

32

X

7431 Mica Schist, 8405,
of N.E. corner of sec. 31, T. 47, R. 43.

7432 Low ledge of Greenstone,
9705 of N.E. corner sec. 31
T. 47, R. 43.

Secs 18+19 T. 47

R. 43

~~Sw~~ 7443

*7442 U. P.

18

~~Sw~~ 7441

*7444 U. P.
7445

cl. 2.

7433 60 mg. Sw.

20
7440 10, 8 min
7439 10
7438 2 P, 2.

X

X

7434 5 mg Sw.
45

19

7435 32 cl. Sw.
50

Monday, July 21, 1884.

7433

Ferruginous Jasper Schist.
 200 yds. 450 N. 350 W.
 of $\frac{1}{4}$ post between Secs 18 & 19
 of T. 47, R. 43, State N. 30° W.

7434

Magnetic quartz schist.
 500. 100. of $\frac{1}{4}$ post between
 Secs. 19 & 24, Range line
 of 43 & 44. Strike N. 80° E
 dip 45° E. Magnetic
 attraction 15° East. When
 the compass is placed in
 contact with the west
 side of the ledge, the needle
 places itself perpendicular
 to it.

At 755. 20 W. this
 being ten or fifteen paces
 from ledge the magnetic
 attraction is 25° East.

On section line between
 19 & 24, 100 steps south
 of the $\frac{1}{4}$ post, this being
 upon the top of the ledge
 the attraction is nothing.

On section line 200 S. of
 $\frac{1}{4}$ post the attraction is

10°. On section line 800
S of $\frac{1}{4}$ sec attraction is
5° E. Beyond this point the
attraction becomes impercep-
tible

7435 Chloritic schist. 426 S of
 $\frac{1}{4}$ sec between Secs 19 & 24
on range line of 43 and 44.
Strike N 80° E dip 50° S.

7436 Ferruginous quartzite,
large northern exposure.
580 E. 50 S. of N.W. corner
of Sec. 80 T4R43

7437 A less ferruginous phase
of quartzite from the 4-
point from which 7436
is taken.

7438 Ferruginous quartzite -
three phases of - from
top of 150 N of $\frac{1}{4}$ sec
between Secs. 18 & 19, T47R43.

7439 Jaspery iron ore, ferruginous
quartzite, and slate from
top of 180 N of $\frac{1}{4}$ sec
between Secs. 18 & 19, T47R43

- 7440 Vein of ore 10 in wide in outcrop of Jasper schist and ferruginous quartzite. 190 N. of $\frac{1}{4}$ post between Secs. 18+19 T. 47 R. 43. Strike of $\frac{1}{4}$ post E + W, dip 80° North. Rock like 7439.
- 7441 Greenstone. Low exposure 900 N. of $\frac{1}{4}$ post between Secs. 18 + 19. T. 47 R. 43.
- 7442 Greenstone. From high range running east and west 1000 N. 625 W. of $\frac{1}{4}$ post between 18+19.
- 7443 Greenstone. From same range as 7442 1000 N. 800 W. of $\frac{1}{4}$ post between Secs. 18+19. T. 47 R. 43
- 7444 Greenstone 900 N. 950 W. of $\frac{1}{4}$ post between Secs. 18+19.
- 7445 Banded Quartzite. 900 N. of the S. W. corner of Sec. 18 T. 47 R. 43. This rather small outcrop exposure is but 50 steps south of the greenstone ridge represented by 7441-2-3-4. The layers are often much contorted.

Sec. 513 + 24 T.

47
13

R. 43

Encl. 7446-7

Encl. 7447

Encl. 7448

Encl. 7449

Encl. 7449

Encl. 7450

24

Encl. 7451

7446 ^{Seymour} Tuesday, July 22 1884.
 Quartzite, black compact.
 108 W. 73 S. $\frac{1}{4}$ pole between
 Secs. 13 & 24, T 47, R. 44.

7447 ^{conglomerate.} Seymour, containing green-
 stone and quartzite pebbles.
 73 S. $\frac{1}{4}$ pole between Secs.
 13 & 24, T 47, R 44. This range
 4 tends + tends east and
 west 7446 being from it.
 At first look, the mi-
 nerals resemble a greenstone,
 in fact would perhaps be
 mistaken for one, there is
 not for the conglomeratic
 character of the rock appearance
 is doubtless due to the fact
 that the fragments come from
 the trap north - many of
 them being of considerable
 size and quite fresh.
 Just as a com-
 pound rock of which gneiss-
 ic fragments have been the
 most important constituents
 look almost like a granite.

Seymour Conglomerate - Apr
 7447 185 S. $\frac{1}{4}$ pole between
 Secs. 13 & 24, T 47 R 44

Graywacke

- 7448 Quartzite - two phases of -
2905. 202. $4\frac{1}{4}$ ft. between
Secs. 13 + 24, T. 47, R. 44.

Graywacke

- Quartzite, like 7448, 3505 $4\frac{1}{4}$ ft.
Quartzite, like 7448, 4005 $4\frac{1}{4}$ ft.

Graywacke

- 7449 Quartzite ledge full of green-
stone pebbles. 5205 $4\frac{1}{4}$ ft.
between Secs 13 + 24,
T. 47, R. 44.

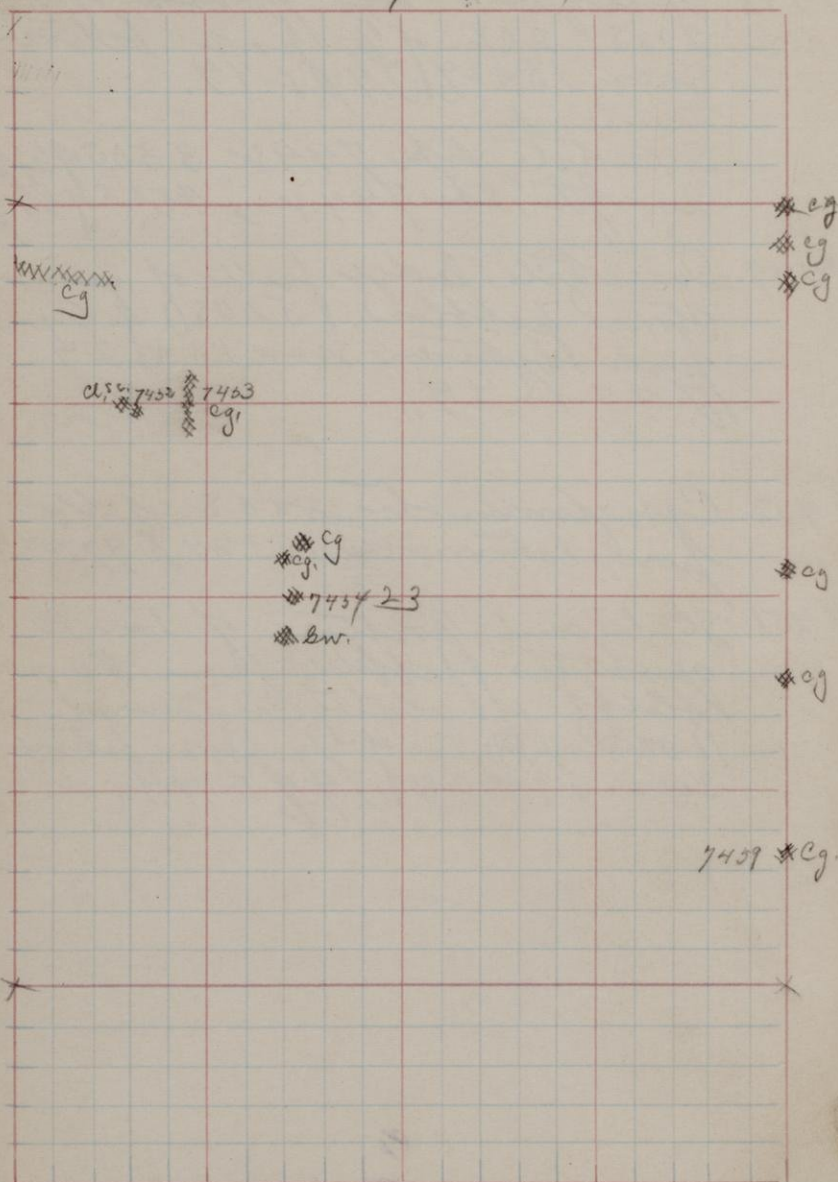
- 7450 Conglomerate. 800 S. $4\frac{1}{4}$ ft.
between Secs 13 + 24, T. 47, R. 44.

- 7451 Slate and portion of large
quartzite pebbles from huge
bluffs of slate conglomerate
11005. 150 E. $4\frac{1}{4}$ ft. between
Secs. 13 + 24, T. 47, R. 44.

Sec. 23

T. 47

R. 47



Wednesday, July 23 1884.

- 7452 Greenstone Schist, low
southern exposure 500S. 290E.
of the N.W. corner of Sec. 23
T. 47, R. 44.

Greenstone Schist - like 7452 -
208. 10S. of 7452

- 7453 Conglomerate from west face
of bluff 100 feet high - running
north and south as far as
can see through the woods.
500S. 46-02. of N.W. corner of
Sec. 23. T. 47, R. 44.

Conglomerate, like 7453, 860S
700E. of N.W. corner of Sec. 23.

Conglomerate. 900S. 700E.

- 7454 ^{greywacke} Greenish ^{greywacke} Diarzite, low exposure
1000S. 7100E. of the N.W.
corner of Sec. 23. T. 47, R. 44.

^{greywacke} Diarzite like 7454, 1100S
700E. Ramp here drops vertically
20 feet.

All the above specimens are
practically from one exposure,

Sec 21435 - T. 47

R. 44

Asc # 7453

Asc # 7456

Asc #

Asc #

7458 Asc #

Asc # 7467

Asc #

35

they being notes of a few out-
crops near the line of road
over the high ridge, num-
erous other exposures being
seen on the right and the
left, and for a long way there
being a continuous face
western face to the conglom-
erati. The ridge is com-
posed of the "greenstone"
conglomerate heretofore refer-
red to, until the greenish
quartzite is met, and this
is taken to be merely finer
debris from the same broken
greenstone bledges

7455 Greenstone Schist. Low north-
ern exposure 10865. 7002.
of the N. W. corner of Sec. 26.
T. 47, R. 44,

Greenstone Schist - like 7455 -
1200 S. 7002. of the N. W. corner
of Sec. 26. T. 47, R. 44,

7456 Greenstone. 1200 S. 970 E. of
the N. W. corner of Sec. 26. of
T. 47 R. 44

7457 Mica Schist and Quartzite.
6705. 1000 E. of the N. W. corner
of Sec. 35, T 47 R. 44.

Rock, like 7457. 1700 E. 6705.
of the N. W. corner of Sec. 35.

7458 Quartzite. Low southern
exposure. 475 S. of the N.
E. corner of Sec. 35, T 47, R. 44.

Quartzites, like 7458 at
400 S. of N. E. corner of Sec 35,
and at 1708. of same point.

7459 "Greenstone" Conglomerate
South end of high north and
south ridge, 345 N. of the
S. E. corner of Sec. 23, T 47, R. 44.

This same rock is found at
the following points, the dis-
tances being given from the
S. E. corner of Sec. 23, T 47, R. 44
800 N., 1080 N., 1800 N., 1900 N.,
2000 N. The exposures are
numerous at the right and
left of the section line, and
the ridge is practically a
continuous exposure of
this peculiar rock.

