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Penokee-Gogebic Region, Michigan: [specimens] 9155-9330. No. 36 July and August, 1885

Van Hise, Charles Richard, 1857-1918

[s.l.]: [s.n.], July and August, 1885

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 36

July and August, 1885.

Penokee-Gogetic Region.

Michigan.

C. R. Van Hise.

9155-7330

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

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left hand page place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. In all cases where there is the least doubt about the true bedding directions, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue line as 100 paces, and twenty of these spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left hand side of the page.

2. On the right hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section, and the dip and strike when observable, for instance: 4025 | 250 N., 300 W., *Strike*, N. 6° E., *Dip*, 50° E. Then follow with as full a description of the ledge as possible.

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

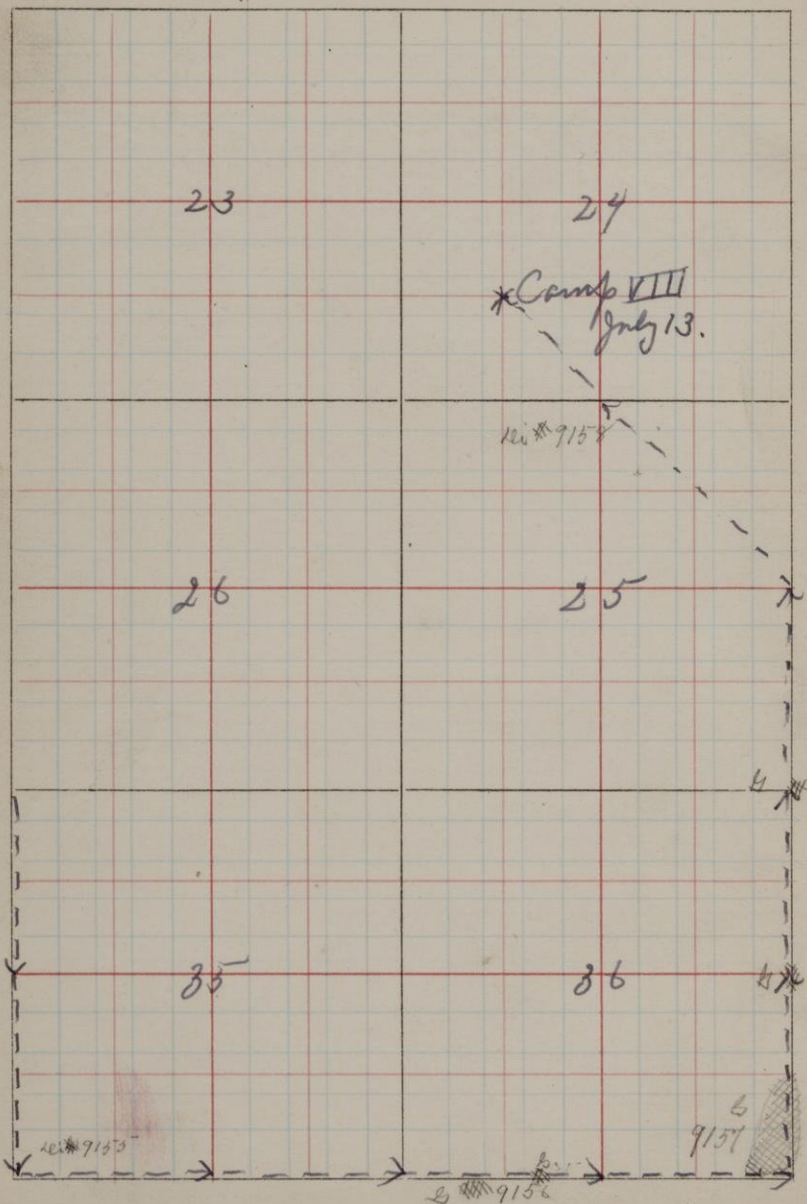
4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with a note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples, trimmed to a uniform size of $2\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ inches will be allowed, but in all other cases *large sized specimens*, trimmed to a size of $3 \times 4 \times 1$ inches, must be selected, in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. All specimens are to have numbers painted on them, in white on a black background, in the field.

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

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

T. 46 N

R. 2E. Nio



1

Monday, July 13. 1885
Ran from camp at the Sogo-
goashagun to the S. W. corner
of Sec. 26 T. 46 R. 2 E. Ariz;
thence to the S. W. corner of
Sec 35; thence East to the
S. E. corner of Sec 36; thence
north to the east $\frac{1}{4}$ post of
Sec. 23; thence N. W. to
camp in the center of S. W.
 $\frac{1}{4}$ Sec. 24, it having been
moved during the day.

9155 Diabase. 140 N. 75° W. of S $\frac{1}{4}$
post Sec. 35. Northern exposure.

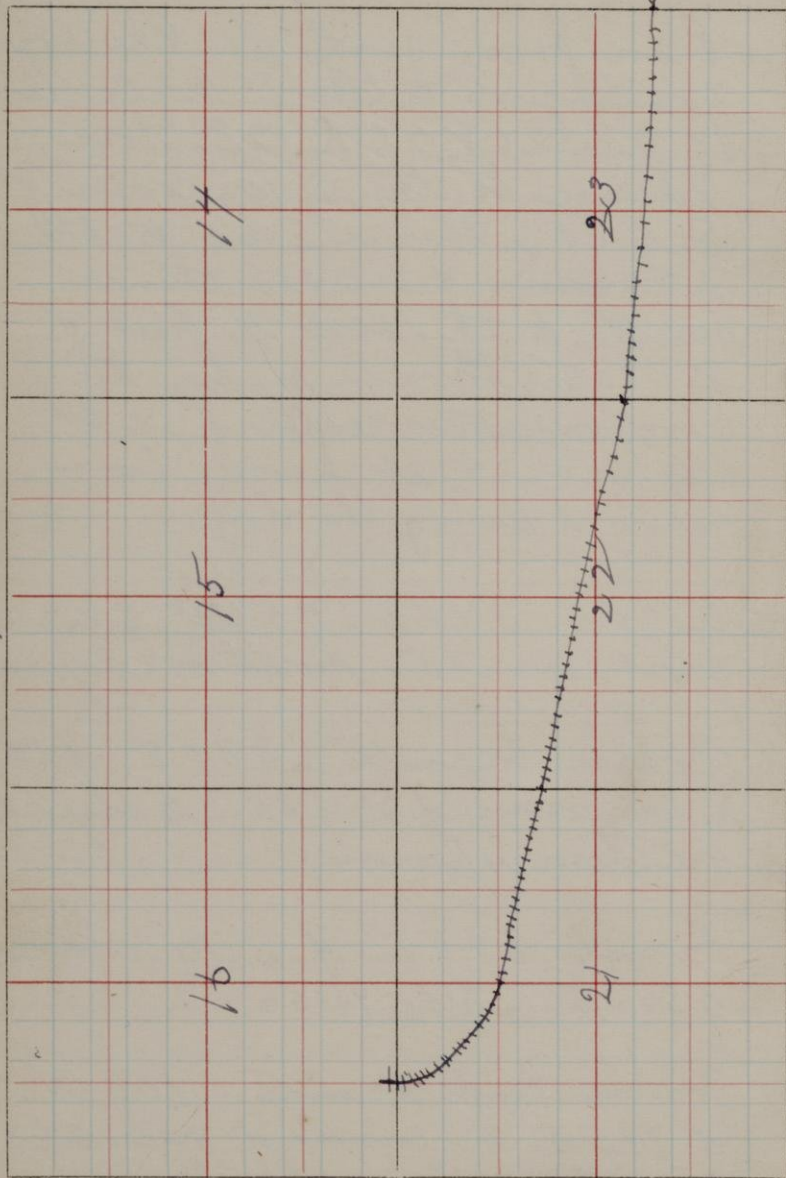
9156 Coarse Granite. 330 E. of the
S. W. corner of Sec 36. Large
northern exposure.

Granite 620 E. of S. W. corner
of Sec. 36. Like 9155.

9157 Coarse Pink Granite. 150 W.
of the S. E. corner of Sec. 36.
The ledge is a large one

T. 46 N

R. 22, Wip.



ledge upon it being noted at
 160 ft. of the S. E. corner sec 36.
 260 ft. " " " " " "
 360 " " " " " "
 500 " " " " " "

At 360 ft. of the corner the hill
 is at its highest point and in
 passing to 500 ft. a descent of
 100 feet is made.

Granite. $E \frac{1}{4}$ post sec 36,
 Like 9157

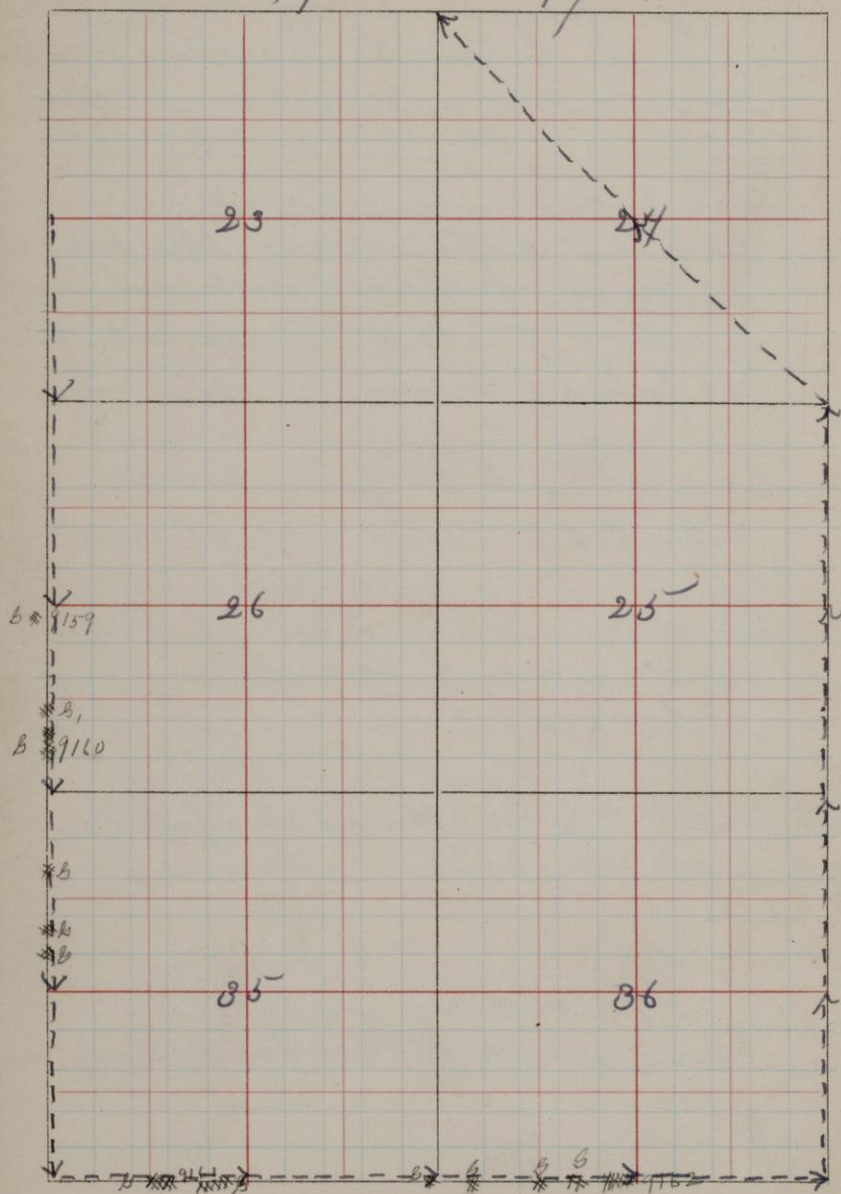
Granite. 50 E. 50 ft. of the
 N. E. corner of sec. 36.
 Like 9157

9158 Limestone. 300 W. 200 S. of $N \frac{1}{4}$
 post sec. 25.

Tuesday July 14.
 Rain; so went to Bessemer after sup-
 plies.

T. 47 N

R. 47 Mich.



Wednesday, July 15, 1885.
 Starting at the NW $\frac{1}{4}$ post Sec 23.
 T. 47. R. 47. Mich, ran south
 to the S. W. corner of Sec. 35;
 thence east to the S. E. corner
 of Sec 36; thence north to the
 N. E. corner Sec. 25; thence
 north west to the N. W. corner
 of Sec 24; thence to trail and
 camp.

9159 Coarse granite. 65 S. 50 W of the
 N. E. corner Sec. 27. Eastern exposure.

Coarse granite. 55 S. of NW $\frac{1}{4}$ post
 Sec. 26.

9160 Coarse granite. 670 S. of NW $\frac{1}{4}$ post
 Sec. 26. Large bare Western exposure.
 Extends to 800 S. 25 E.

Granite, 375 S. of N. W. corner Sec. 35.
 Some 675 S " " " " "
 " 800 S " " " " "

9161 Coarse Granite. 460 E. of the S. W. corner sec. 35, extending to 560 E.

Granite. 750 E. 35 S. of the S. W. corner sec. 35, ledges on some large hill at 770 E., 840 E., and 900 E.

Granite. 50 W. of the S. E. corner of sec. 35.

Same. 150 E. of the S. W. corner sec. 36. Same 500 E. & 700 E.

9162 Coarse ^{pink} Granite. Bare Western exposure, beginning 160 W. of the 8 1/4 post sec 36. and extending to it.

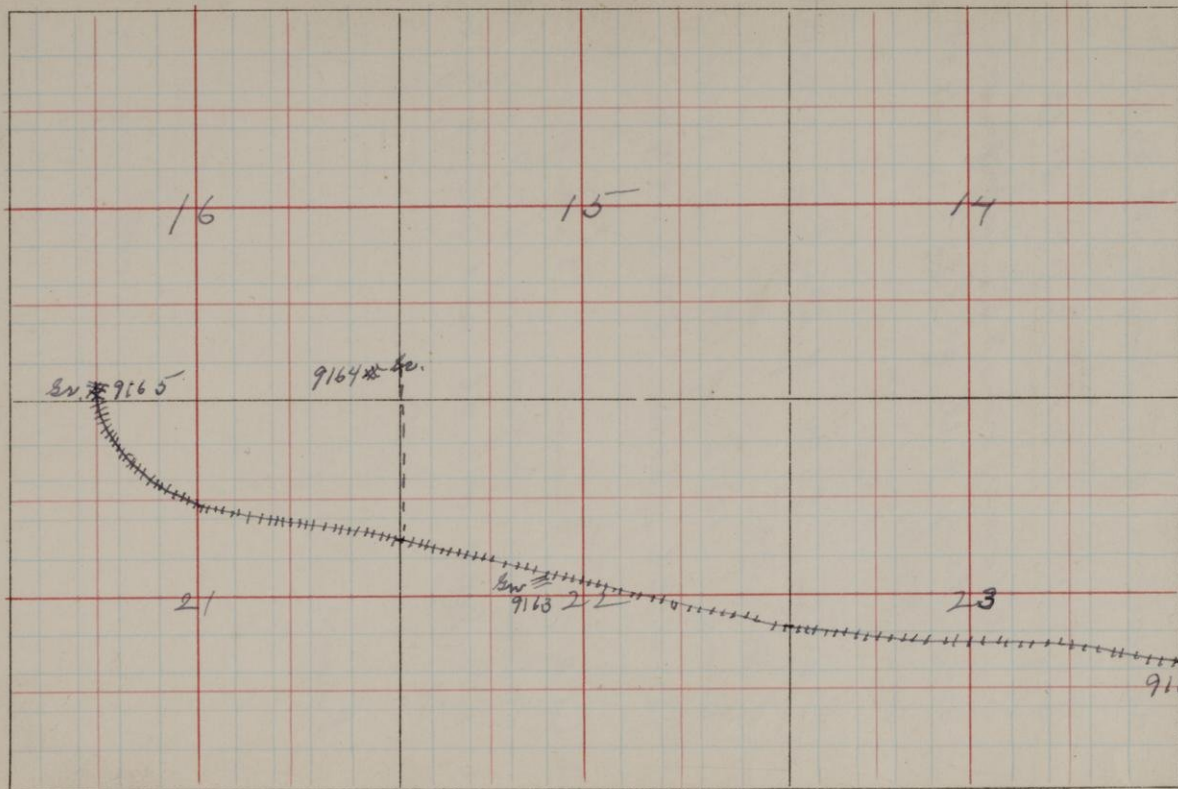
Rain.

T. 46

R. 23

Miss

916



Thursday, July 16, 1885.

Forenoon, rain.

In the afternoon followed rail-road from Hurley to the point where it crosses the Sagogash-mogun River near the middle of the south line of the S. W. $\frac{1}{4}$ Sec. 16 T. 4 R. 22. Then ran north from the railroad along the east line of Secs. 21 + 16 until trap was found.

9163

Greywacke. Near center of sec. 22, T. 4 R. 22. Eaddy. Rail-road crosses east line of sec. 22 27 rods south of $\frac{1}{4}$ post. From this point the road bears 5° N. of W. magnetic and 105 rail-lengths (1315 feet) west brings us to a point 25 paces north of the ledge. Strike W 27° S. dip 80° N. Good chance for determination R. R. cross. W. line 700 S. of N. W. corner.

9164

Greenstone, Northern trap. 175 N. 125 W. of the S. E. corner of sec 16. T. 4 R. 22.

9165 Brunstone, Northern exp.
Rail road cut 100 feet wide
north and south. South end
50 N. 50 E. of S. W. corner
Sec. 16.

9166 Black slate, 715 N. 30 E. of
S. W. corner of Sec. 24.
Strike W. 23 S. dip 80 N.

Friday, July 17, 1883.
Went to as Harley, Wisconsin
for Professor Irving

Saturday, July 18, 1883 -
Professor Irving arrived at
12 N. In the afternoon moved
to the Bogoyashugen River
Camp IX. Rain

T.

R.

9167 to 9172 plotted upon map in
previous book.

Sunday, July 19, 1885

The junction of the siliceous slate and lower schist at the Sogoshugun was found by uncovering the few feet of the surface of the ground separating the two formations. Conglomeratic junction debris like that at Potato River was found, the fragments being mostly from the lower green schist but also containing Jasper pebbles. The strike of the junction or near as could be made out from the small surface exposed is N 30° S.

9167 Specimen showing gradation from slate into conglomeratic junction debris, two feet across strike from lower schist.

9168 Specimen of junction debris one foot from schist.

9169 Specimen of junction debris 8" from schist containing pebble from the green schist

9170 Junction debris of greenschist.

9171 Junction Specimen showing green schist pebble.

9172. Green Schist. The specimen shows the manner of weathering. The rock has harder parts which upon the weathered surface are of a lighter color than other parts of the rock, project beyond them and give the it a gneissic appearance.

The contact is 175 ft 35 W. of S $\frac{1}{4}$ post of Sec. 27, T46 R 22E.

For further notes in reference to the Bogoskugum River, see previous note book.

In the afternoon, we moved to the W $\frac{1}{4}$ post sec 1. T45. R 22E. Camp X. Intended to move farther west, but were stopped by rain.

Monday, July 20, 1885.

We moved to the Potato River
and camped at our old ground
N. E. $\frac{1}{4}$ S. E. $\frac{1}{4}$ Sec. 19, T467E,
Camp XI. The most of the
distance was traveled through
a pouring rain.

Tuesday, July 21, 1885.

A large part of the forenoon was spent with Professor Irving in studying the Conglomerate at the junction of the Siliceous slate and green schist at Potato River. Specimens 9173 & 9181 inclusive were taken by Professor Irving and noted by him.

The ledge from which specimens 9082 and 9114 are taken was run across in two directions. The ledge is touched at 250 W. 20 N. of $E\frac{1}{4}$ post of Sec. 19, T46 R1E. Run to 250 W. 72 N. Also to 230 W. 72 N. Strike W. 10° S. dip 75° N.

Ledge of green schist from which 9106 is taken was located at following localities. Distances being from $E\frac{1}{4}$ post Sec 19, T46 R1E.
 850 W. 180 S.
 320 W. 150 S.
 280 W. 195 S.
 300 W. 180 S.

9182 Green Schist. From ledge west
of Potato River, near its bank.
Ledge located at following points:
235 W. 1155. of $2\frac{1}{4}$ pole sec 19
225 W. 1195 " " " " "
260 W. 1405. " " " " "

9183 Ferruginous Inazite. 270 W.
50 N. of $2\frac{1}{4}$ pole sec. 19.
Northern exposure.

9184 Jasper Pebble or Concretion from
above exposure.

9185 Ferruginous Inazite. Test
pit. 800 E. of N. W. corner of
Sec. 15 T 45 R 12.

Ferruginous Inazite. Test
pit 800 E. 90 S. of N. W. corner
of Sec 15.
Same 925 E. 90 S.

Ran four lines for a distance
of 700 paces south of the north
line of Sec 15 at 680, 750,
825 and 925 east of the N. W.

Sec 12 T. 45

R. 12

9187 x H. 96.

9189 x 700. 2.

9182 x 700. 2.

12

corner of the section, searching
for limestone ledge plotted in
the atlas of the Wisconsin Reports,
but did not succeed in finding
it.

In the afternoon, Camp moved
to 2002 50th R. of the S. W.
corner of Sec 10, T45 R1E,
Camp XII

Sec 6 T. 40-

R. 22

Bldg 9191-2
72 x 9190

6

Wednesday, July 22, 1885.
 Moved camp from Sec 10,
 T. 45, R. 12. to the boggy-
 gashung River, locating vari-
 ous various test pits upon
 the way. Camp XIII

- 9186 Drill Cores. 700 E. 250 N.
 of the S. W. corner of Sec. 10.
 T. 45 R. 12. Location only an
 approximate one.
- 9187 Banded Hematitic slate. Test
 pit 170 E. 50 S. of the N. W.
 corner of Sec. 12, T. 45 R. 12.
- 9188 Banded (very) Ferruginous Quartzite
 200 E. 160 S. of the N. W. corner
 of Sec 12, T. 45 R. 12.
- 9189 Typical Ferruginous Quartzite
 170 E. 80 S. of the N. W. corner
 of Sec. 12, T. 45 R. 12.
- 9190 Typical Ferruginous Quartzite
 175 S. 825 W. of the N. E. corner
 of Sec 6. T. 45 R. 2 E.

Sec 33 T. 46

R. 22

9198 x H. 22

2.7, 21

2.7, 21

33

9191 Black slate. Test pit 150S.
820W of the N.E. corner of
Sec 6. T46 R 2E.

9192 Jasper Nodule, found in black
slate 9191

46-2E Typical Ferruginous Quartzite
Test pits at 315E. 100N.,
320E. 75N., 310E. 175N.,
283E. 215N. of N. 1/4 part
of Sec. 83, T46 R 2E.

46-2E 9193 Banded Hematitic Schist
Test pit 300E. 270N. of the
N. 1/4 part of Sec 83 T46 R 2E.

46-2E Thursday, July 23, 1885.
Went to old dumping ground
at the center of the S. W. 1/4 Sec.
24, T46 R 2E, near Hurley,
and prepared to run a Sofieir
Locke the following day.
Professor Irving started for Ashland
Camp & IV. Rain.

Sec 13

T. 47

R. 47

Mich

91.95-91.97 ^{R. 47} ~~SL~~ BL SL, ~~BL SL~~

13

Friday, July 24, 1883.
 Walked along the rail road
 from Hurley to Bessemer looking
 for exposures; from that place
 took train to Bogebie; thence
 walked to Bogebie Lake; thence
 went by boat to the Lake
 shore in the N. E. $\frac{1}{4}$ Sec 17,
 T. 47, R. 42 Mich. Comp. 27.

9194 Black slate, Rail road cut
 East end 200 N. 140 W. of the
 center of Sec. 13, T. 47, R. 47. ^{Maid}
 The cut extends 50 W. from this
 point. Strike W. 28° S. Dip 72° N.
 An excellent opportunity to de-
 termine strike and dip is given
 by this cut.

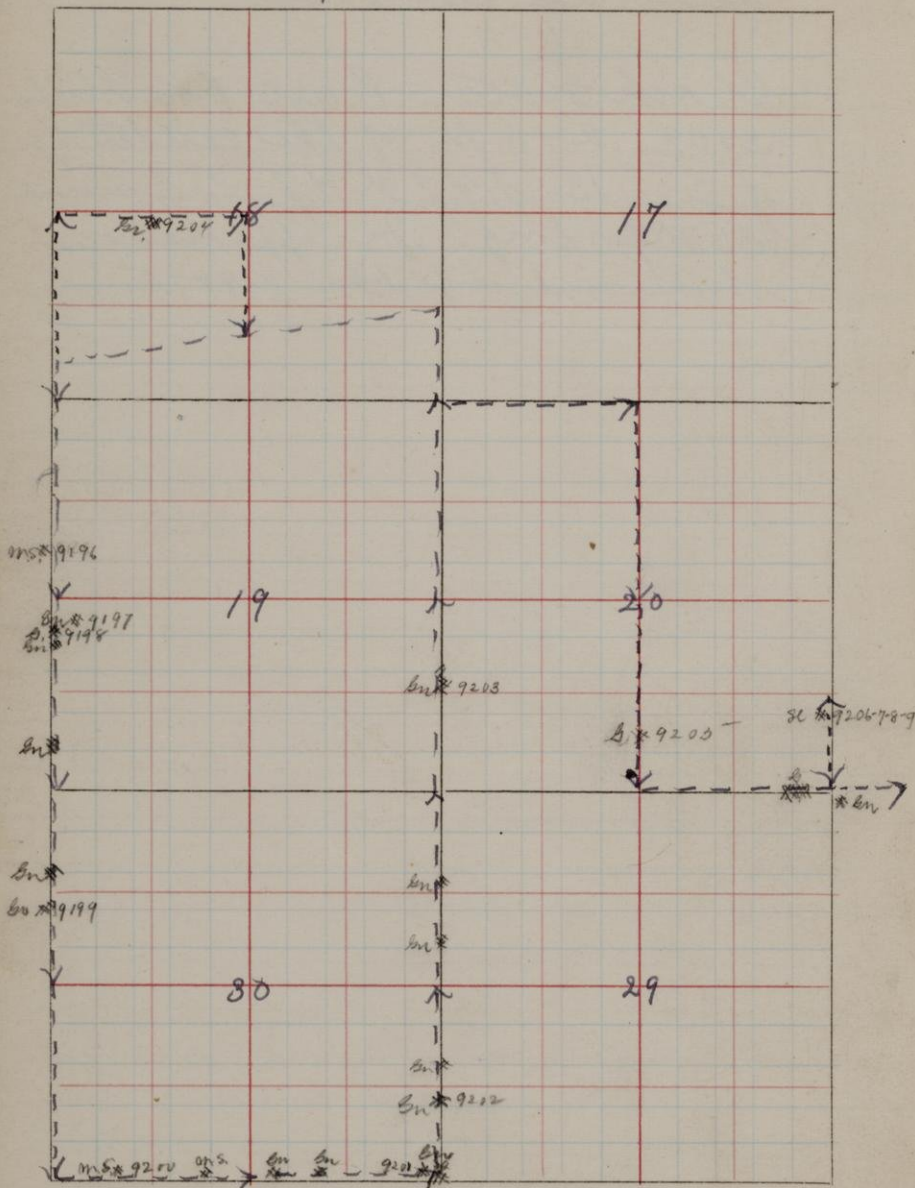
9195 Specimen showing the more
 highly laminated nature of a
 large portion of the rock of
 the cut. This specimen is
 now however from the most
 highly laminated portion,
 the rock here cleaving into

thin leaf like sheets.

Black slate. Rail Road Cut
2002, 240 ft. of the center
of Sec. 13, T. 47 R. 47. Exposure
30 steps long. In appearance,
strike and dip like 9194-5

T. 47 N

R. 42 W. Mich



Saturday, July 25, 1885.
 Followed trail to the range
 line between Townships 42
 + 43, 47 N. of 200 N. of the
 S. W. corner of sec 18; thence
 on to the S. W. corner of sec
 30; thence east to S. E. corner
 of the section; thence north
 to trail 500 N. of the S. E.
 corner of sec 18; thence on
 trail to camp.

9196 Coarse Micaceous Schist. 250 N.
 15 W. of the $E\frac{1}{4}$ part of sec 24,
 T 47, R 43 N.

9197 Gneiss. Low ledge 100 S. 100 E
 of W $\frac{1}{4}$ part of sec 19, T 47, R 42.

9198 Granite. Low ledge 170 S. of W $\frac{1}{4}$
 part of sec 19, T 47, R. 42,

Gneiss 250 S. of W $\frac{1}{4}$ part sec.
 19, T 47, R. H 2

Same from 650 S. to 700 S.
 " 400 S. of the N. W.
 corner of sec 30 T 47 R. 42

9199 Greenstone. Low ledge 600 S. 15 N.
of the N. E. corner of Sec. 25
T. 47 R. 43 W

9200 Crasse Mica Schist. 320 E. 60 N.
of the S. W. corner of Sec. 30, T. 47 R. 42.
Same 750 E. 20 N.

Grains 125 E. 20 N. of $S\frac{1}{4}$ post
Sec. 30, T. 47 R. 42.
Same 360 E. 20 N.

9201 Grains 900 E. 25 N. of the $S\frac{1}{4}$
post of Sec. 30, T. 47 R. 42

Grains at S. E. corner of Sec 30
T. 47 R. 42. E from a line
east, west and north from
this point in each direction
40 steps.

9202 Grains 425 N. of the S. E. corner
Sec 30, T. 47 R. 42.
Same 600 N.

" 200 N. 240 N. of $E\frac{1}{4}$ post
" 550 N. of $E\frac{1}{4}$ post.

9203 Granite. From 500 ft. to 575 ft.
of the S. 2. corner of Sec. 19,
T. 47 R. 4 2,

Sunday, July 26, 1885.
 Followed trail to 200 ft. of the
 S. W. corner of Sec 18, T 47, R 42;
 thence north to N $\frac{1}{4}$ post Sec 18;
 thence east 1000 to center of section;
 thence south to trail; thence
 on trail to east line of section
 500 ft. of S. E. corner; thence
 south to S. E. corner; thence
 east to the N $\frac{1}{4}$ post Sec 20;
 thence south to $3\frac{1}{4}$ post; thence
 east to S. E. corner; thence north
 500 and back to corner; thence
 east to Lake Bogie's upon the
 south line of Sec 21.

9204 Greenstone. Northern trap
 500 E. 305. of the N $\frac{1}{4}$ post of
 Sec 18, T 47, R 42.
 Continue to 575 E 0 S and
 " " 615 E 305.

9205 Granite. 1750 S. of N. $\frac{1}{4}$ post
 Sec 20, T 47, R 42.

Granite. From 120 ft. to 250 ft. N.
 of S. E. corner Sec. 20, T 47, R 42

9206 slate. 425 N. 50 W. of the S. E.

9209 corner of sec. 20, T 47, R 42.

This exposure is quite large, is in a ravine and is unmistakably in place. The slate is consolidated, contains minor part of calcite. No satisfactory chance to determine strike and dip.

9207 slate. Small exposure a little

9208 lower down in the ravine in which 9206 and 9209 are found. No opportunity to determine strike and dip with any accuracy.

The strike appears to be southerly east and the dip north.

Gneiss. Large northern exposure 752. 835. of the N. W. corner of sec 28, T 47, R 42.

Sec 23 T. 47

R. 43

14

*9213-4-5-6-7-8-9

*9221-2-3-4

C3

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9300

5 *9273

23

Monday, July 27, 1885.

Followed trail west to the
N. E. corner of sec 23, T 47, R 43;
thence south to the S. E. corner
of sec 26; thence west to the
S. W. corner; thence north to
the N. W. corner sec. 23,

9210 Gneiss. Low exposure 600 S. of the
N. E. corner of sec 26, T 47, R 43.
Very evenly bedded. Strike W. 10° S.
dip 80° S.
Gneiss 700 S.

9211 Greenstone 420 S. 10 E. of the
W. 1/4 post sec 26, T 47 R 43

Coarse granite from 400 S. of
E. 1/4 post sec 26, T 47 R 43 to
540 S. 15 W.
Same to 80 S. of E 1/4 post
Gneiss 820 S. " " "

9212 Greenstone 330 W. of S 1/4 post
sec. 26, T 47 R 43

Sec 26 T. 47

R. 43

26

Gr #9210

Gr

Gr #9211

Gr

Gr

Gr

Gr

Gr

Gr

Gr #9212

to 300 ft
 Greiss, 240 ft. N. of the S. W.
 corner Sec. 26,

Some 570 ft.

" 730 ft.

Specimens 9213 to 9218 inclusive
 are taken from south to north
 along the face of the ledge from
 which 7368 to 7372 were taken

9213 Flinty Quartzite

9214 Flinty Conglomerate

9215 Red Quartzite

9216 Black Flint or Hornstone

9217 Galena Bearing Rock.

9218 Foliated Phos. rock found at
 northern extremity.

The exposure is so massive as to
 make the determination of strike
 and dip impossible. The exposure
 is not continuous as to make
 the variation from Phos. rock
 into the other very quick. In fact
 this variation appears to be most
 irregular

9219 Black Hornstone. From above
 ledge.

Sec 15th T. 47

R. 43

7B

SC ²⁵ 9270-1
75

86° SE
870°S

868 9220

SC ²⁵ 9228

SL * 9228-17

ms. 109230
Y. 9229

← - - - - - < 29 - - - - - < - - - - -

9220 Black Slate 470 N. 20 W. of the
S. E. corner of sec 15, T47, R43.

Slate. Like last 500 N. 400 W.
Strike W 35° S. dip 70° S.

Slate 1115 W 575 N of the
S. E. corner sec 15, T47, R43,

Comp moved to ^{near} the N. W. corner
sec. 23, T47, R43, Camp XVI
Heavy rain in the evening.

Tuesday, July 28, 1885
 The day was chiefly spent
 in re-examining and collecting
 specimens from exposures
 visited last summer. The
 only new line run was from
 the $2\frac{1}{4}$ post of Sec. 22 N
 47, R. 43 to the $W\frac{1}{4}$ post and
 in Sec. 17 from the S. E. corner
 800 W; thence 400 N.; thence
 200 S; thence 483 E.

The east line of Sec 22 was
 blazed out for some distance,
 stakes set and variation de-
 termined as 4° E.

The large exposure of slate
 conglomerate, the N. W. corner
 of which is 640 W. 80 S of the
 $W\frac{1}{4}$ post of Sec. 23, T 47,
 R 43 was examined carefully
 as to strike and dip. This ledge
 has a bare western face
 about 75 steps long, and the
 top of the cliff is some ninety
 feet above the ground to the

northward. Soft portions of the exposure are interlamina-
 ted with hard portions. The
 lamination of the slate, the
 interlamination of harder and softer
 parts, the directions of the
 rows of pebbles, and the
 greatest dimensions of the peb-
 bles all correspond and give
 strike and dip as before deter-
 mined.

9221 Matrix of softer portion of conglomerate.

9222 Matrix of harder portions.

9223 Conglomerate, from place where
 the pebbles are small.

9224 Portion of a large pebble.

9225 Portion of a large pebble. This
 is the prevailing variety of pebble.

9226 Slate, from Slate Conglomerate.
 170 W. 15 S. of the N. E. corner
 of Sec 22, T47, R43.
 Small western exposure.
 No opportunity to determine
 strike and dip.

9227 Pebble from above conglomerate.

9228 slate from slate Conglomerate
500 W. 80 N. of the S. E. corner
Sec 16. T 47, R 43
Strike W 25° S. Dip 55° S.

9229 Mica Schist. Small northern
exposure 400 W. 120 N. of the $E\frac{1}{4}$
part of Sec. 22, T 47, R 43.

9230 Mica Schist 485 W. 140 N. of
the $E\frac{1}{4}$ part Sec. 22, T 47, R 43.
Strike W 10° S. Dip 80° S.
Northern exposure.

The afternoon was spent along
the slate belt in the $S\frac{1}{2}$ of Secs
16 & 17. Although many ledges
were visited no sign of any
lamination different from
that seen at first sight could
with one exception be made
out.

Sec 16 T. 47

R. 43

16

86⁰⁰ 9231-2
60⁰⁰ 9233
86⁰⁰ 9233
60⁰⁰

9231 Slate. S. W. corner of a large
 exposure 150 E. 220 N. of the
 S. W. corner Sec. 16, T 47 R 43.
 Strike W 30° S. Dip 60° S.

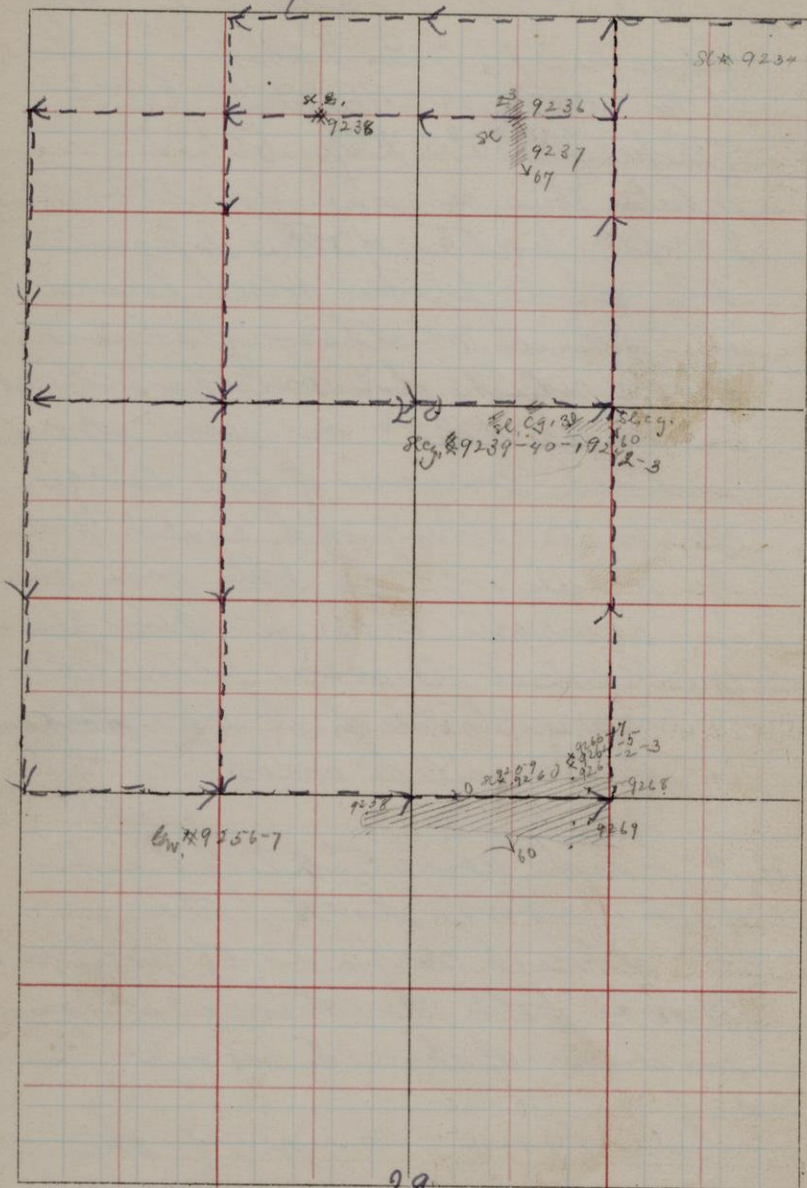
While this is true for the
 large portion of the exposure,
 two small places were found
 in which weathering shows
 lines which dip northward at
 an angle of 80° as seen upon
 inclined surface of the ledge.
 Strike to correspond could not
 be made out so this may not
 be accurate. Even in these places
 the general cleavage follows the
 ordinary strike and dip, except
 in very limited areas.

9232 A hard quartzitic phase
 of the above slate, the
 weathered surface of which
 shows both directions of line-
 ation spoken of above.

Slate. 120 E. 190 N. of the
 S. W. corner Sec 16, T 47, 43.
 Strike W. 150° S. Dip 50° S.

Sec 20 T. 47

R. 43



- 9233 Slate. 390 E. 175 N. of S. W.
corner sec. 16, 47, 43.
Strike W 20° S. Dip 50 S.
- 9234 Speckled slate. 210 W. 100 S.
of the N. E. corner sec. 20, 47, 43.
Middle of bar northern face
100 steps long. For strike and dip
see notes on 9297.
- 9235 slate. 800 W. 400 N. of the
S. E. corner sec. 17, 47, 43.
Strike W 20° S. Dip 50° N.
Upon, a rather near, West bank
of Presque Isle River
- 9235a slate. 870 W. 200 N. of the
S. E. corner sec 17, 47, R 43.
Small exposure upon west
bank of Presque Isle River.

Camp moved to the W. Bank
of Presque Isle River in the S. E.
corner sec 17, 47, 43. Camp XVIII

Sec 17 T. 47

R. 43

17

SL 92 30

SL 92 30 W

Wednesday, July 29, 1885.
 In the forenoon started 500 W.
 of the N. E. corner Sec 20, 4743.3
 ran south 230; thence west to
 west line of section; thence south
 to west $\frac{1}{4}$ post; thence east to
 150 E of $\frac{1}{4}$ post; thence north
 to north line of section.

The afternoon was spent in visiting
 ledges previously examined and
 collecting specimens from them

- 9236 Coarse slate. 250 S. 750 W. of the
 N. E. corner Sec 20. Strike W.
 230 S. Dip 67 S. The opportunity to
 determine strike and dip was good.
 From the above location the
 exposure extends 250 N and 125 S.
 At the latter, the south side
 of the hill the rock is more
 massive and quartzitic and here
- 9237 slaty marzite is taken

- 9238 Slaty marzite, 250 S. 1250 W.
 of the N. E. corner Sec 20.
 This northern exposure is too small
 and massive to give strike and dip.

9239 Slate Conglomerate. North side of hill 1080 E. 80 S. of W $\frac{1}{4}$ post sec 20. The exposure extends 50 steps farther south.

9240 Shows weathered surface of this conglomerate

9241 A portion of one of the prevailing pebbles. The conglomerate is very thickly studded with these pebbles, they varying in size from minute to those 6" to 8" across.

Slate Conglomerate (like last)
1200 E. 23 S. of W $\frac{1}{4}$ post sec 20.
Strike W 220 S. Dip South.

A large northern exposure.

Same 1300 E of W $\frac{1}{4}$ post sec 20
Strike W. 220 S. Dip South.

Slate Conglomerate. The West end of this large bore northern exposure is 1375 E. 50 S. of W $\frac{1}{4}$ post sec 20. The ledge extends 100 E. from this point.

Strike W 80 S. Dip 60 S.

Lamination, and greatest dimensions of the pebbles correspond

Sec 21 T. 47

R. 43

15
10
10
20
10

2, 7, 0 x 9252-3-4-5

2L x 9251

0+3L x 9249-50

CLSL x 9248

2 ¹⁵⁰/₂₀

9244-5-6-7

21

- 9242 Matrix of oborr conglomerate
 9243 Matrix bearing pebbles.

A low southern exposure of quartzite 460 W 100 N of the E $\frac{1}{4}$ part of Sec 21, T47, R43. appears to have a northern dip. The ledge is quite massive, but if one judges of the dip by the nature of the rock, it is sometimes being finely crystalline and coarsely crystalline the dip is North. As thus determined. Strike W. 20° S. Dip 50 N.

- 9244 Is from a coarsely crystalline part.
 9245 Is from a finely crystalline part.
 9246 Portions of the thinly laminated
 9247 part of the ledge.

- 9248 Chloritic slate 510 W. 170 N. of the E $\frac{1}{4}$ part Sec. 21. Other portions of the schist are very ferruginous.

The test trench from which 7899 is taken was again examined and the strike and

dip or their determined appear
to be correct.

9249 slate, Test pit 450 W. 210 N. of
E. $\frac{1}{4}$ post sec 21.

9250 Loran Ore from same pit

9251 slate. Test pit 450 W. 270 N.
of E $\frac{1}{4}$ post sec. 21

Test pit 570 W. 815 N. of the
E $\frac{1}{4}$ post sec 21 and from this outcrop

9253 Vitreous quartzite

9252 Semi vitreous quartzite

9254 Ferruginous felsite

9255 Loran Ore

Starting 500 E of N $\frac{1}{4}$ post sec 21
Run south to find ledge of mag-
netic quartzite from which 9426 is
said to be taken. No ledge was found.

500 E. 100 S. Mag. At. 15° E.

500 E. 200 S " " 10° E.

500 E. 300 S " " 20° E.

500 E. 400 S " " 15° E.

Thursday, July 30, 1885.
 Starting at the N. E. corner of
 Sec 26, ran west 1500; thence
 south 1000; thence separating
 ran south 1000 farther. Aley
 from above place ran west
 500 to W $\frac{1}{4}$ post 20; thence
 south to S. W. corner; thence
 east meeting one and one together
 running to 1500 east of the
 S. W. corner; thence north to
 the north line of the section.
 The afternoon was spent in
 visiting old localities.

- 9256 Fine grained compact Greywacke.
 9257 High northern exposure 4252.
 1000 S. of the N. W. corner Sec 29,
 T. 47 R. 43. The exposure is
 too massive to give strike and
 dip.

From 125 W. 405. of the
 north $\frac{1}{4}$ post of Sec. 29, 47, 43.
 to 500 E. of the $\frac{1}{4}$ post, extending
 at 400 E. of the $\frac{1}{4}$ post 50 to and
 120 S. is a large exposure

after 100 feet high of greywacke slate, greywacke, slate and slate conglomerate. This exposure extends farther east, but how much I do not know as the road was not followed farther. From this exposure and adjoining test pits the following specimens were taken.

9258 Greywacke slate. 125 W 40 S of the N $\frac{1}{4}$ post Sec 29. The ledge is here to remain to give dip, but cleaves in the direction N 200 S.

9259 Speckled slate. From Test Pit 285 E. 50 N. of the S $\frac{1}{4}$ post Sec. 20.

9260 Greywacke slate 280 E. 50 N. of the S $\frac{1}{4}$ post of Sec. 20.

At 400 E 50 N. The ledge becomes a slate conglomerate.

or etc., the pebbles being red jasper. The rock is dotted with these pebbles most of them being 1" to 2" in diameter but many of them larger and some of them 8" to 10" in diameter. These pebbles are most often well rounded, but quite often angular. The strike is here $N 20^{\circ} E$, dip $60^{\circ} S$.

The dip and strike as determined are based upon the lamination of the schist and the direction of the greatest dimensions of the jasper pebbles, there being an exact correspondence between the two.

- 9261 slate from this conglomerate
 9262 slate bearing jasper pebbles.
 9263 fragments broken from jasper pebbles.

9264 Banded Quartzite. Test pit
 400 E. 75 N. of 8 $\frac{1}{4}$ post sec.
 20.

9265 Chloritic Quartzite - from same pit.

9266 Jasperly slate. Test pit 40 ft.
100 ft. of S $\frac{1}{4}$ post sec. 20.

9267. From same pit.

9268 Greywacke, full of minute red
Jasper: pebbles. 430 E. 20 ft.
of S $\frac{1}{4}$ post sec 20.

9269 Greywacke. 430 E 30 S. of N.
 $\frac{1}{4}$ post sec 29.

Slate 1145 W. 575 N. of the
S. E. corner sec 15, 47, 48.

This ledge shows a cleavage
in two directions in places
contiguous to each other.

One of these cleavages follows
the strike and dip commonly
seen along this slate belt,
while the other is very dif-fer-
ent from this. This unusual
strike and dip is the more
prominent one in this ledge
At only places the two cleav-
ages, with lines of weathering
about against each other at
right angles nearly as seen upon

the inclined face of the ledge.
Ordinary strike W 25° S. Dip 75° .
Unusual one N 25° W Dip 45° E

9270 Shows cleavage corresponding to unusual strike and dip

9271 Cleared along ^{planned} central strike and dip.

From 600 E. 400 S. to 350 W. 200 S. of the north $\frac{1}{4}$ post of Sec 23 there is a continuous high northern hill with almost continuous rock exposure. This hill is about 125 feet high and Granite, Gneiss, Conglomerate, Quartzite, Micaceous Schist and Limestone are all found in various positions along this northern slope.

9272 Gneiss 590 E 400 S of $\frac{1}{4}$ post

9273 Conglomerate. 480 E. 350 S of $\frac{1}{4}$ post.

The pebbles of the conglomerate are chiefly granite and gneiss

9274 Quartzite. 410 E. 50 S.

Continuous to 380 E 50 S.

The ledge is here a high one
At 215° E. 50 S. the Conglomerate

ate is again found.

9275 Gneiss. 260 S. 100 E. of $\frac{1}{4}$ post.

This ledge is 75 feet (estimated) higher than the preceding ones.

9276 Compact Limestone or Marble. 160 S. of $\frac{1}{4}$ post. This exposure is not large, exhibiting perhaps an area of limestone 15 feet long east and west and 10 feet north and south. Its height is about six feet. Five steps south of this higher up the hill gneiss is found 25 steps south and 15 W of this limestone about 20 feet higher up the hill a contact of mica schist and chloritic gneiss is seen. The strike of the contact as near as could be made out is W 20° S, dip vertical.

9277 Gneiss in contact with mica schist.

9278 Gneiss 10 feet south of ore contact.

9279 Mica Schist at contact with gneiss

9280 Mica Schist 2 feet north of contact.

9281 Mica Schist 35 S. 35 W. of Limestone e.g. 190 S. 35 W. of $\frac{1}{4}$ post. Here contact of gneiss

and mica schist is again seen.

Mica Schist 1905. 33° W of $\frac{1}{4}$ post

9282 Mica Gneiss 1605 135° W of $\frac{1}{4}$ post.

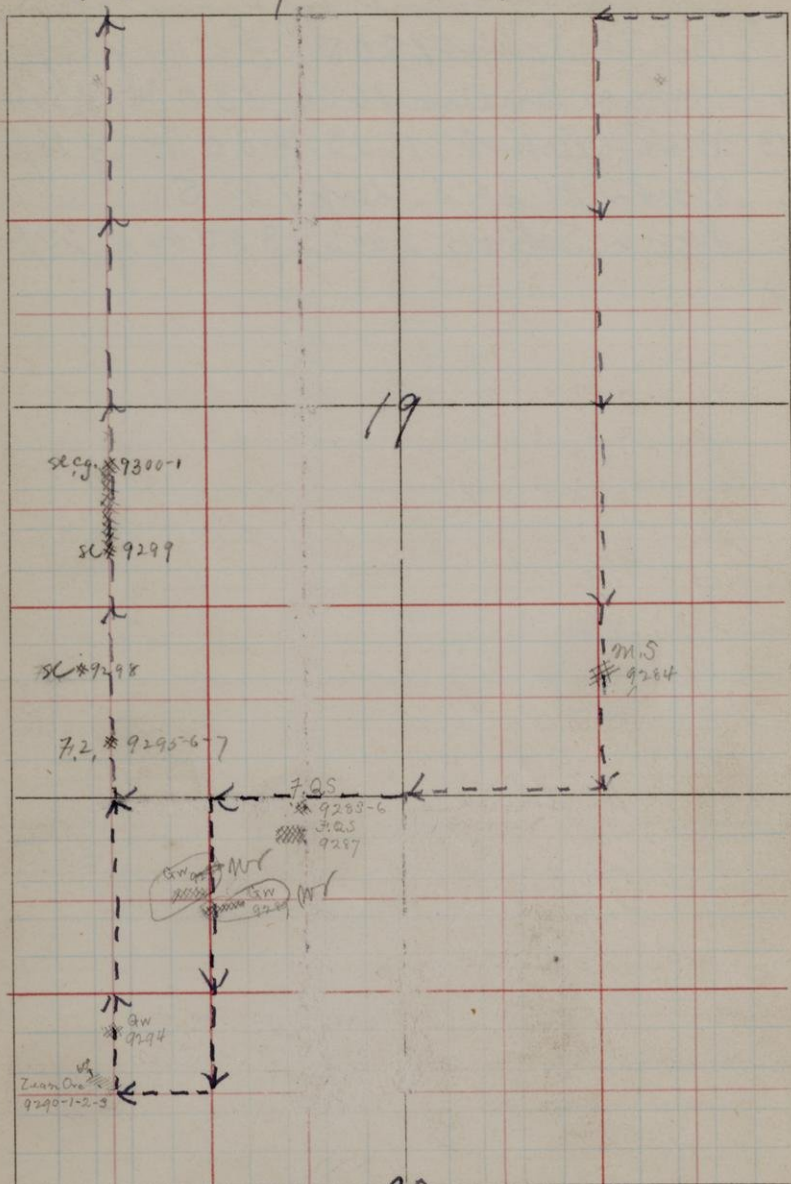
9283 Mica Schist 1605. 285° W. of $\frac{1}{4}$ post.

Strike W 20° S. Dip 70° S.

Mica Schist 2005. 850 W of $\frac{1}{4}$ post.

Seco 19+30 T. 47

R. 43



Friday, July 31, 1885.
 Starting at the N. E. corner
 of Sec. 19, we ran west 500; then
 south to south line of section;
 thence west to 500 W. of $8\frac{1}{4}$ post;
 thence south 700 from the north
 line of Sec 30; thence west 200;
 thence north to the north line
 of Sec 19. ~~thence west 500; thence north~~
~~to the north line of Sec 19~~

9284 Micaceous Schist. Very small
 northern exposure. 500 W. 1700 S.
 of the N. E. corner of Sec 19.
 It is very probable that this
 is but a partly buried fold,
 but it may be a ledge in place.

9285 Ferruginous Quartz Schist ^(exposed)
 300 W. 25 S. of the $N\frac{1}{4}$ post
 of Sec 30. The ledge continues
 to 800 W. 20 S. where

9286 Less Ferruginous Quartzite is
 found. The ledge is too massive
 to give strike and dip.

9287 Ferruginous Quartzite 390 W.
 60 S. of the $N\frac{1}{4}$ post Sec 30.

This ledge extends 502 + 25 W.
from this point and is 50 steps
across on a north and south line.
This ledge shows a highly ferruginous
portion like 9280.

9288 Fine grained Greywacke. 500
W. 440 S. of N. $\frac{1}{4}$ post sec 80.
Low northern exposure. From
this point the ledge extends
100 W.

9289 Greywacke 480 S. 500 W. of
the N. $\frac{1}{4}$ post sec 80. The
ledge from this point bears
100 paces E 80° N.

At 730 S. 770 W. of the N. $\frac{1}{4}$
post of sec. 80 a large outcrop
of lean banded magnetic
iron ore is found. From
this point the ledge runs
100 paces in the direction N.
10 W. and extends east 50 steps.
The strike of the mass of the
ledge is E 22° S. dip 60° N.

At the point first located the dip is much higher, being 80° to 83° N. The bandings are more or less contorted in places and sometimes brecciated, although in general they are quite regular. The ledge is mostly lean banded or although in places it loses its banded character. The ore is mostly gray ore, but in places becomes jaspery.

9290 Lean Ore

9291 Lean Ore showing ordinary banded character.

9292 Quartzite Ore. The most quartzitic that could be found.

9293 Fragments of jaspery ore

9294 Fine grained Seywacker ^{exposed SH}
6005. 775 W. of N 1/2 sec
Sec 80

An exposure of ferruginous quartzite containing numerous parallel seams from one to two inches in width of brown ore is found 100 ft.

200 E of the S. W. corner of Sec.
19, T47, R43. The exposure
is of coarsely conglomeratic the
pebbles being mostly gneiss,
although white quartz and green
schist pebbles are also contained.
These pebbles are usually not
more than one or two inches
in diameter, although one gneiss
and one white quartz pebble
were seen 10" in diameter.
The strike and dip determina-
tions are based upon the
seams of lean ore.

Strike N 20° W. Dip 20° E.

As the place in which a horizon-
tal strike could be seen is
small and the dip low, these
determinations may vary some-
what from the truth.

9295 Ferruginous Magnetite

9296 Lean Ore seams from above

9297 Fragments of large gneiss pebbles.

9298 Magnetite Slates 340 N. 180 E. of the
S. W. corner of Sec. 19, 47, 43.
Small exposure at top of high hill

9299 slaty quartzite 600 N. 250 E. of ✓
the S. W. corner of Sec. 19.

This ledge continues to 800 N. 250 E.
where it becomes

9300 slaty Conglomerate. Matrix of.
9301 Portions of the conglomerate bear-
ing pebbles. It is difficult
to get specimens showing clearly
the conglomeratic nature of the
rock although it is clearly seen
upon the weathered surface.
Cavities rounded were seen,
and the small white quartz
pebble was broken from the
rock in trying to obtain the
schist about it with the
pebble. The common pebble
like the slaty conglomerate
before seen is a more compact
quartzitic schist or greywacke.
These are of the same size and
nature as before noted. In fact
the rock is in every way iden-
tical with ledges of slaty
conglomerate heretofore found.

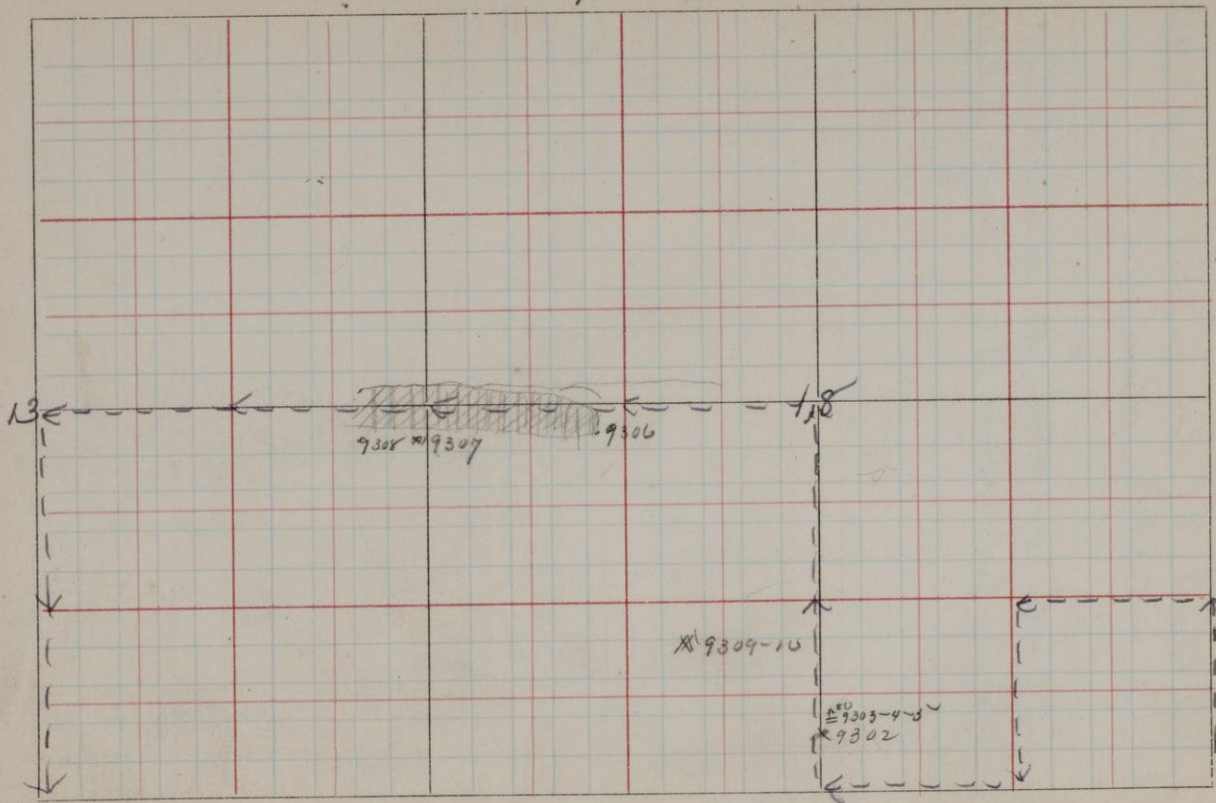
9302 Micca Schist 1830 N. 825 W.
of the S. E. corner Sec 19, 47, 43.
(5) A northern exposure.

Camp moved to near the
S. $\frac{1}{4}$ part Sec 18. Camp ~~XVIII~~.

T. 47

R. 34344

N



Saturday, Aug. 1, 1883
 In the morning we started
 at the S. E. corner of sec 18,
 T 47, R 48; thence north
 500; thence west 500; thence
 south 500; thence west to
 south $\frac{1}{4}$ post; thence north
 to center of section; thence
 west to the center of sec 13,
 T 47 R 44; thence 400 north;
 thence south to trail and
 camp.

9302 Lean Banded Ore. Test pit
 140 N. of the S. $\frac{1}{4}$ post sec 18
 47, 43,

9303 Banded Quartzite carrying
 narrow seams and one vein

18" wide of lean ore
 175 N. 25 E. 15 $\frac{1}{4}$ post 18. 8 tubs W 50 S. dip 50° N.
 9304 Quartzite with seams of ore

9305 Lean Ore from vein.

9306 Coarse Feldspar Porphyry,
 Northern Twp. 57 5 West,
 950 North of the S. $\frac{1}{4}$ post
 of sec 18. This & previous

4 lands north to the $\frac{1}{4}$ line.
Running west from this point
upon the greater lines of
118 and 13 the exposure is con-
tinuous some distance west
of the $\frac{1}{4}$ post between those
sections. At the center of
Sec 13, 47, 44, upon and north
of the $\frac{1}{4}$ line there is a high
ridge, but it shows no outcrops.

9307 Coarse Feldspar Porphyry 505,
802. of W $\frac{1}{4}$ post sec 18

9308 Banded Quartzite. 755 40 W.
of the east $\frac{1}{4}$ post sec 13, T47
R44. N. A small exposure 50
steps south of the trap range.

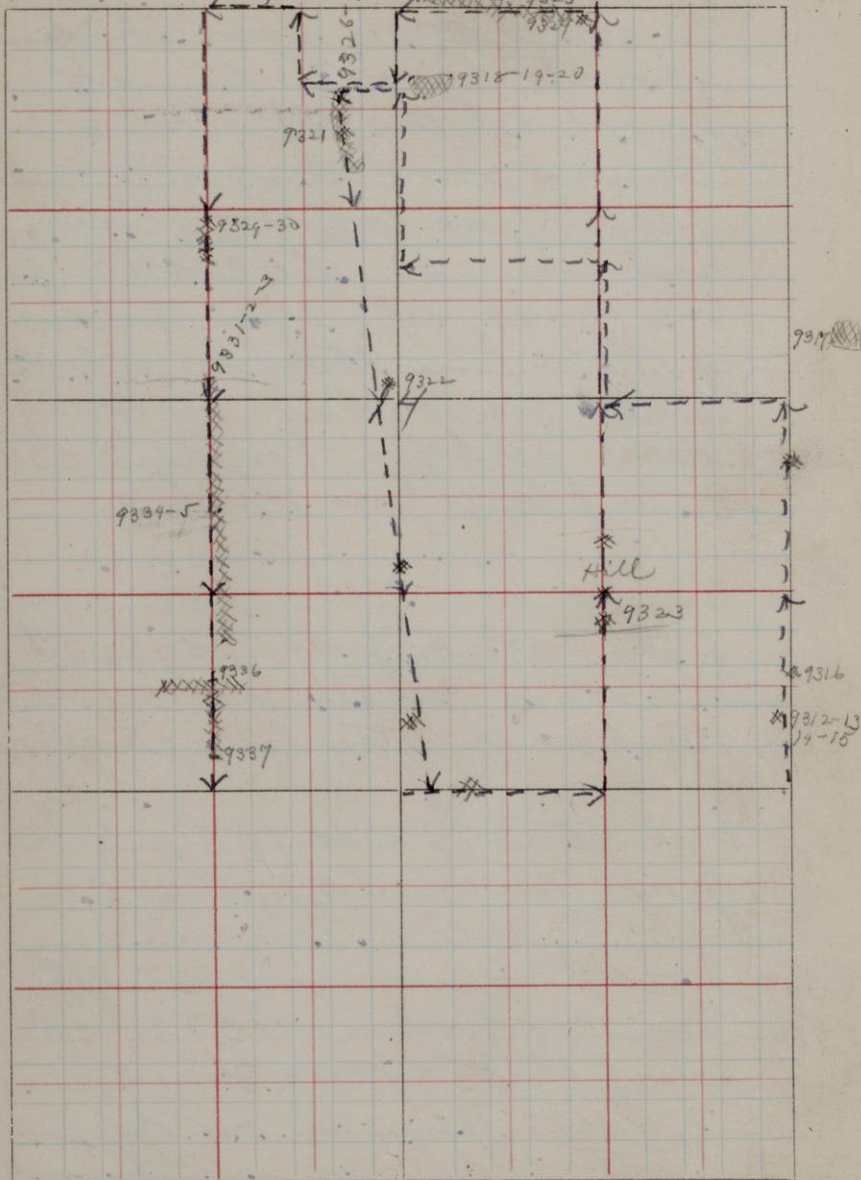
Greenstone 185-W 755 of E $\frac{1}{4}$
post sec 13, T47, R44.

9309 Banded Porphyritic Quartzite
9310 Small exposure 450 N. 350
W. of the S $\frac{1}{4}$ post sec 18,

47, 48. There is no oppor-
tunity to determine strike and
dip with any accuracy.

T. 47

R. 44



During the afternoon we ran from the S.E. corner sec 14, T47, R44 to the $E \frac{1}{4}$ post; thence west 500; thence north 800; thence west to the $N + S \frac{1}{4}$ line; thence north to 200 S of the $N \frac{1}{4}$ post; thence west 1000; thence east of south to 502 of the south $\frac{1}{4}$ post.

- 9311 Greywacke Conglomerate. Bare Northern Exposure 100 steps long. Center of face 650 E. 505 S. of the N.W. corner Sec. 24, T47 R44. (Picked up on trail)
- 9312 Greywacke Conglomerate, matrix
- 9313 of 190 N. - 20 W. of the S.E. corner Sec. 14.
- 9314 White quartz pebble from same.
- 9315 Fragment of the prevailing variety of pebble.
- 9316 Fine grained Compact Limestone 390 N. of S.E. corner sec 14. Same 880 N. & after is a small exposure.

- 9317 Greenstone. Northern dip. A
large western exposure. 115 N.
125 E of the NW $\frac{1}{4}$ post sec. 13.
- Greenstone, like 9317. From 420
N. 860 to 575 N. 360 N. of the
2 $\frac{1}{4}$ post sec. 14. A large fan
southern exposure.
- 9318 Lelan Ore and Ferruginous
- 9319 Quartzite. The N. W. corner
9320 of the ledge is 1755. 23 E. of
the N. $\frac{1}{4}$ post sec 14. Contin-
ued from this point east 100 and
south to 2235. 30 E.
- 9321 Greywacke and Greywacke Con-
glomerate. 800 S 140 N of the N $\frac{1}{4}$
post sec 14,
- 9322 Greywacke slate, 50 N. 1035
N of the S $\frac{1}{4}$ post sec 14.
- Greywacke Conglomerate. 575 N.
of the S $\frac{1}{4}$ post sec 14.
Same 166 N 80 E of S $\frac{1}{4}$ post.
From the place at which 9322

is taken to this last location,
the course is over a very high
hill with numerous ridges on
the right and left. The exposure
is practically continuous this
entire distance

Camp moved to the S.E. $\frac{1}{4}$ S.E.
 $\frac{1}{4}$ Sec. 13, 47, 44 XX upon
bank of Little Presque Isle
River.

Sunday, Aug 2, 1885.
 Starting at 500 E. of the $5\frac{1}{4}$ post
 of Sec 14, T47, R.44, we ran north
 to the north line of the section;
 thence west to $R\frac{1}{4}$ post; thence
 south 200; thence west 200;
 thence north to section line;
 thence west 200; thence south
 upon $\frac{1}{16}$ line to the south line
 of the section

Greywacke Conglomerate, 140 E.
 of $5\frac{1}{4}$ post sec 14.

- 9323 Compact Greywacke slate, con-
 taining nodules of flint &
 chalcidony. South side of top
 of hill 500 E 488 N. of the $5\frac{1}{4}$
 post of Sec 14.
 Same at north brow of hill
 500 E, 500 N.
 Same at north fork of hill.
 500 E, 640 N.

- 9324 Greenstone, Northern Twp.
 Low exposure in coal woods
 105. 480 E of $R\frac{1}{4}$ post sec 14.

The ledge is continuous to

9325 Greenstone, northern Prop. 260 E. of N $\frac{1}{4}$ post of Sec 14.

This greenstone continues to the N. $\frac{1}{4}$ post of 14, the face of the cliff being from a few feet to 30 north of the line.

9326 Greywacke, three phases of.

9327 200 S. 150 W. of the N $\frac{1}{4}$ post

9328 Sec 14. E. from continuous to 400 S.

120 W. of $\frac{1}{4}$ post. This is the extreme northern point at which the greywacke a conglomerate is seen. The specimens are taken a few feet apart from north to south upon the face of the ledge, but their relation cannot be made out, as the uncovered areas are so small.

9329 Greywacke and Greywacke Con-

9330 glomerate. Bare Western of - from 500 W. 510 S. of N $\frac{1}{4}$ post Sec 14. The ledge continues to 500 W. 620 S. Dip south

