Penokee Iron Region, Wisconsin: [specimens] 9000-9154. No. 35 June and July, 1885

Van Hise, Charles Richard, 1857-1918
[s.l.]: [s.n.], June and July, 1885

U.S. GEOLOGICAL SURVEY

Field Section Book.

No. 35

June and July, 1885

PENOKEE IRON REGION.

WISCONSIN

C.R. Van Hise.

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.)

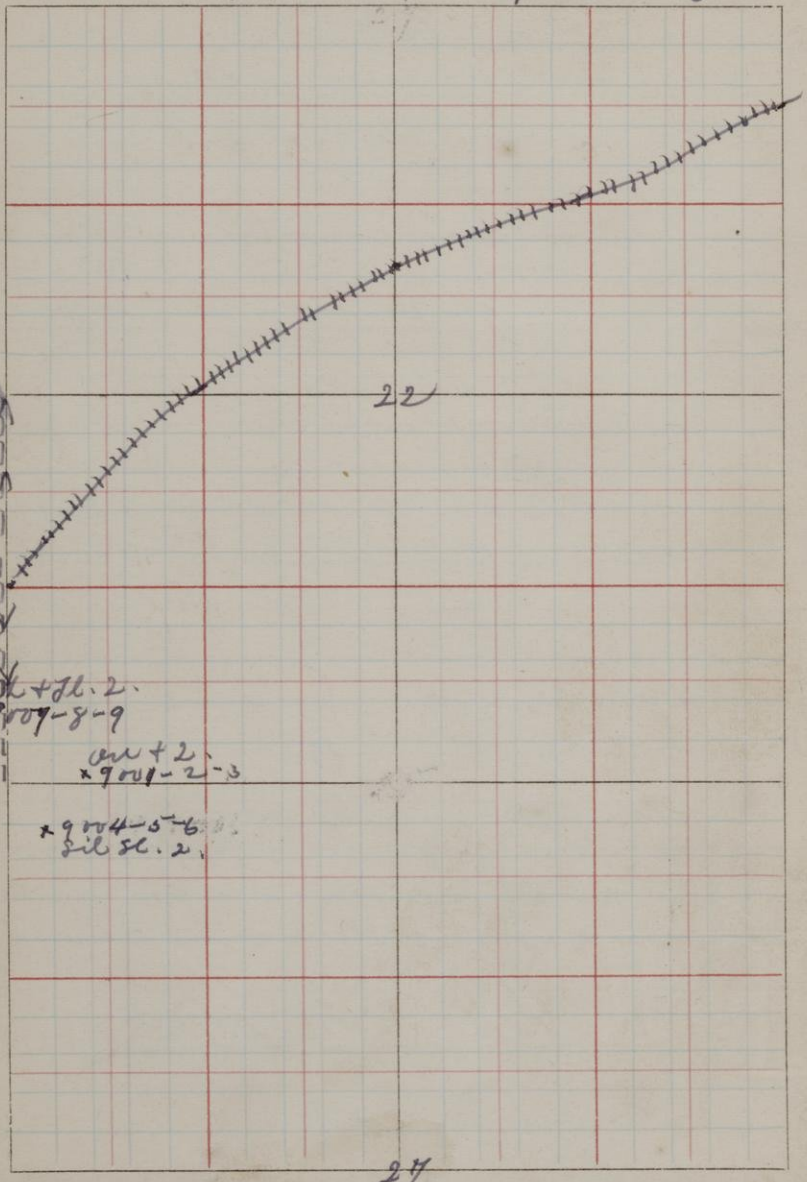
4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked 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 2x2½x¾ inches will be allowed, but in all other cases *large sized specimens,* trimmed to a size of 3x4x1 inches, must be selected, in accordance with ¾ 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.

#35

T. 47 R. 47 Mich.



Hurley, Wisconsin 2

Saturday, June 27, 1885.

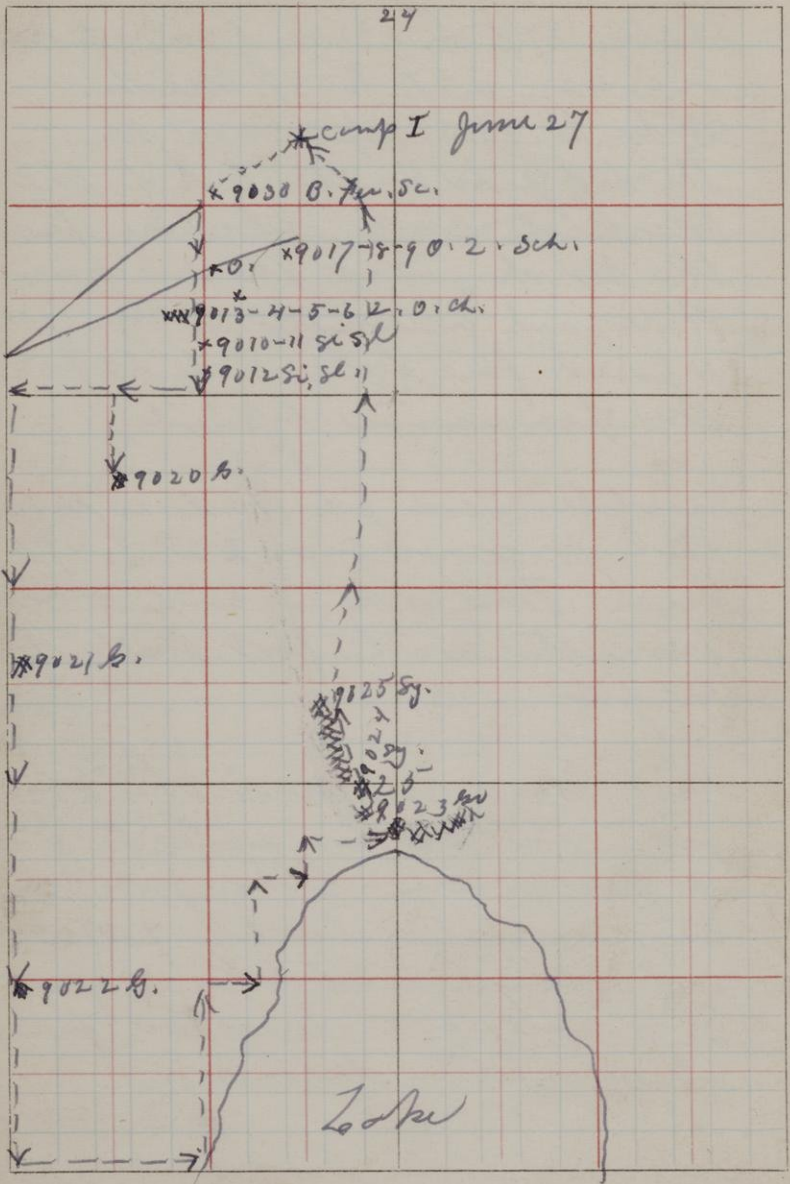
9000 Slate. 27° N. 29° W. of W ¼ post Sec. 22, T. 47, R. 47, Mich. Strike N. 43° E. dip 80° to 85° N. The ledge is in the bed of the Montreal River, extending from the Michigan to the Wisconsin Shore, and across the strike, being exposed for a distance of 20 feet. The specimen is typical.

9001 Ironstone. Test pit 175 E. 25 N. of
9002 the S. W. corner Sec. 22, T. 47 R. 47 Mich. This rock is said to come from the south foot wall of the pit.

9003 Rich Hard ore from the above pit. This bed is said to be 8' feet wide. Other pits containing materials like 9001, 9002 and 9003 are located in a general S. W. and N. E. directions from it at a little distance

9004 Siliceous Slate. Test pit. 90 E. 120 S.
9006 of N. W. corner Sec. 27. T 47. R. 47. Mich.

T. 46 R. 2 E. Mis.


24
Camp I June 27
9030 B. Fm. Sc.
9017-18-9012 Sch.
9013-14-5-6 L. & Ch.
9010-11 Sc. Sh.
9012 Sc. Sh.
9020 B.
9021 B.
9025 Sy.
9024 Sy.
9023 Sy.
9022 B.
Lake

9005 Quartzite. From same pit.

9007 Cherty and Flinty Quartzites.
9008 160 ft 100 ft. W. of the S. E. corner of
9009 Sec. 21. T. 47. R 47, Mich
This stone is in the bed of the
Montreal River extending from
the Michigan to the Wisconsin
side. The ledge is of some size,
the water making slight falls
over it. Dip & Strike could not be seen.

9010 Siliceous Slates. From test pits 500 E.
9011 100 ft. of the S. W. corner of Sec. 24.
T. 46, R. 2 E. Wisconsin

9012 Siliceous Slate. Test pit 500 E.
60 ft of the S. W. corner of Sec. 24,
T. 46. R. 2 E. Wis.

The Germania Mine, 400 E
to 475 E. 200 ft of the S. W. corner
of Sec 24. T. 46, R. 2 E. Wisconsin
has a thick bed of pitch ore.
This ore is mined by merely
stripping off the surface drift,
which is here of but little thick

ness. The south, foot wall of the mine is a quartzite, often more or less impregnated with iron oxide, but never containing nodules of rich iron ore, nor vein of the sort. It is in fact a coarse grained, often iron impregnated, semi-siliceous, varying to siliceous upon the one hand and to sandy upon the other, quartzite. The line of separation between the ore and quartzite is an abrupt one. The North, hanging wall, is a cherty or flinty quartzite, and unlike the foot wall contains veins and bands of ore. In some places the ore predominates in others the rock. It follows from this that the variation from ore to rock is irregular and ill defined. The foot and hanging walls at the Ashland mine are said by Mr. Hayes, the superintendent of both to have the same characters. Specimens 9001-3 are from the Ashland Mine.

9013 Coarse magnetite. Typical rock
9014 wall of the Germania.

9015 Flinty and ferruginous quartzite,
9016 from Hanging Wall of the Germania.
9015 represents the rock when free
from shots or bands of ore, 9016
when these are present.

Hurley, Sunday, June 28 1885.

9017 Hydrostatica Schist. Test pit 720E 360N of the S. W. corner of Sec. 24 T. 46 R 2 E Wis.

9018 Cherty Ironstone, from above pit.

9019 Rich Hard Ore. from some pit.

Pit with rich ore 525 E. 820 N of the S. W. corner of Sec 24. T. 46 R. 2 E. Wisconsin

The line upon which these pits and others in the same general direction is about 80 feet north of that upon which the Germania and the test pits in line with it are located. There seems here to be two beds of iron ore at different horizons.

Pit containing rich ore "Germania bed" 260 N. 575 E. of S. W. corner Sec. 24. T. 46 R. 2 E.

Sec 11 T. 47 R. 47 Mich

11

BW
#9028

9020 High Granite Knob. 275 E. 215 S. of the N. W. corner of Sec. 25 T. 46, R. 2 E.

9021 Black Hornblende Granite 700 S 30 E. of N. W. corner of Sec. 25, T. 46 R. 2 E.

9022 Coarse Pink Granite, cut by Fine Grained Diabase, 15 25 S., 20 E of the N. W. corner of Sec. 25 T. 46. R 2 E.

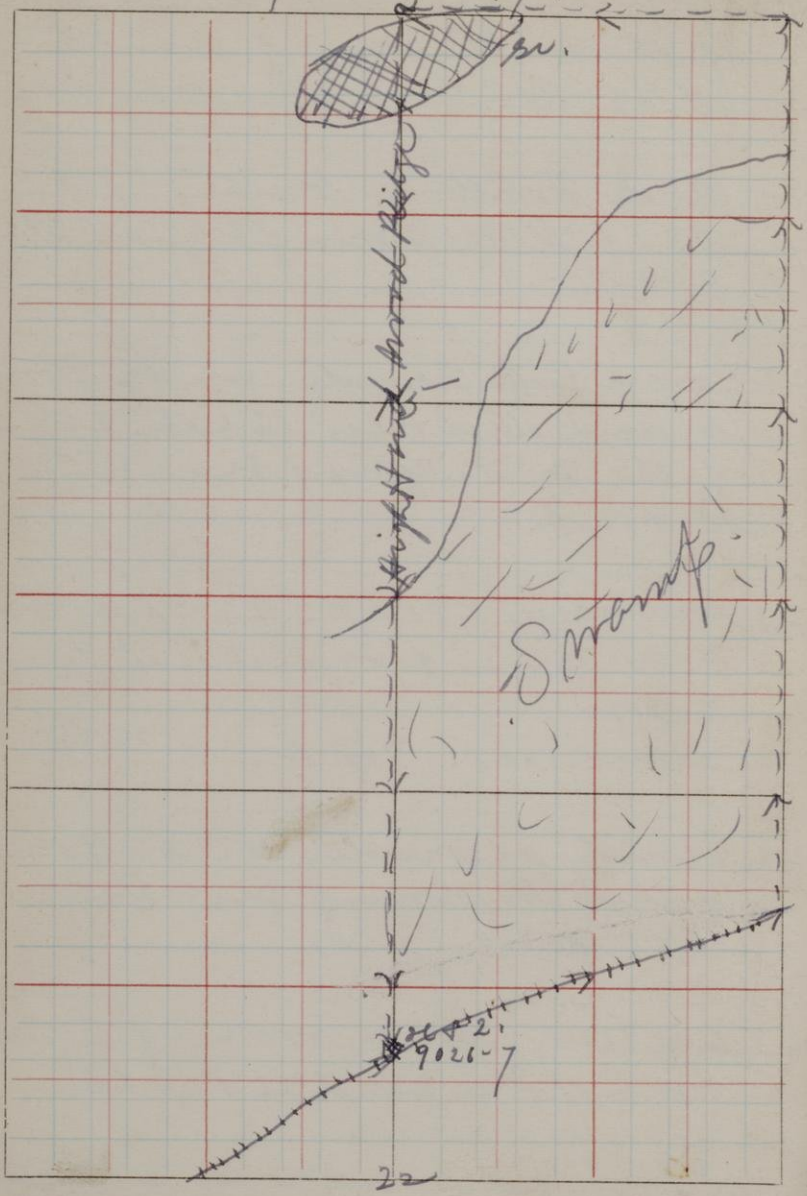
9023 Greenstone. 900 E, 930 N. of the S. W. corner of Sec. 25, T. 46 R. 2 E.
Same 1000 E. 900 N.

9024 Granite or Syenite. 1000 N. 900 E. of the S. W. corner of Sec. 25. T. 46 R. 2 E.

9025 Like 9024. 1200 N. 870 E. of S. W. corner of Sec. 25. T. 46 R. 2 E.

A high ridge curves in a direction opposite to the shore of the Lake

Secs 15 & 22 T. 47 R. 47 Mich



found upon the south line of Sec. 26. At 9002. 930. the two cuts are nearly tangent to each other. Upon this continuous ridge 9023-4-5 are found.

9026 Quartzitic slate, varying in places into a black cleaved slate. Small cut on R.R. about 1000 W. 650 S. of the N. E. corner of Sec. 22. T.47 R.47 Mich. The exposure is so small as to make the determination of strike and dip impracticable.

9027 Slaty Quartzite. From above cut. This specimen with 9026 represents the varieties of rock found in this cut.

9028 Greenstone - Northern trap. 100 N. 100 E. of the S. W. corner of Sec. 11, T.47 R.47 Mich. The specimen is taken from the southern side of the trap range.

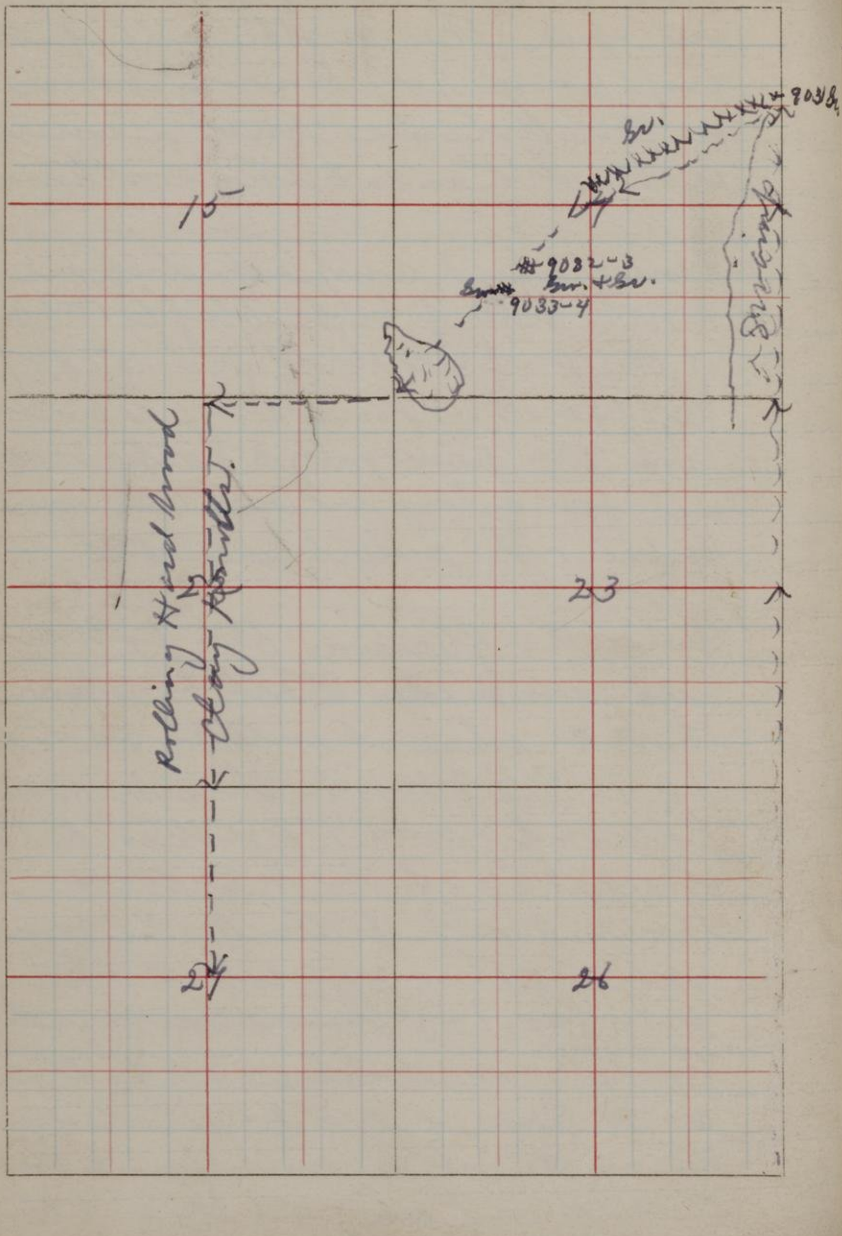
Running West 770 from

the N. E. corner of Sec. 15, we are upon the north side of the trap range, it having borne in this distance west a considerable distance to the southward.

9029 Fine grained compact diabase. North side of high bluff 1000 W. of the N. E. corner of Sec. 15. T. 47 R. 47 Mich. This bluff extends from this point fully 300 steps south and for a long distance in a general easterly and westerly direction.

During the afternoon the following run was made. Starting upon the R. R. where it enters Sec. 22 T. 47. R. 47 Mich, this it was followed across the section to about 2500 S of the N. E. corner thence north to the N. E. corner Sec. 15; thence west to the N. 1/4 Sec. 15; thence South until the R. R. is struck 650 S of the N. 1/4 post of Sec. 22. During this run the only ledge formed was the rail road cut, and those of the trap range.

T. 46 R. 2 E. Wis



Monday. June 29, 1885.

9030 Banded Ferruginous slate. Just
pit 530 N. 530 E. of S. W. corner
Sec. 24. T. 46, R. 2 E. Wisconsin.

9081 Greenstone, Northern Jr cp. 1600 N.
50 W. of the S. E. corner of Sec. 14.
T 46, R. 22. Wisconsin. Dr ge
bluff. Foot of trap range at
center of Sec. 14

9032 Fine grained Graywacke or impure
ile 400. S. W. of the center of
Sec. 14. T. 46 R. 2 E.

9033 Fine grained Greenstone. from
the above ledge.

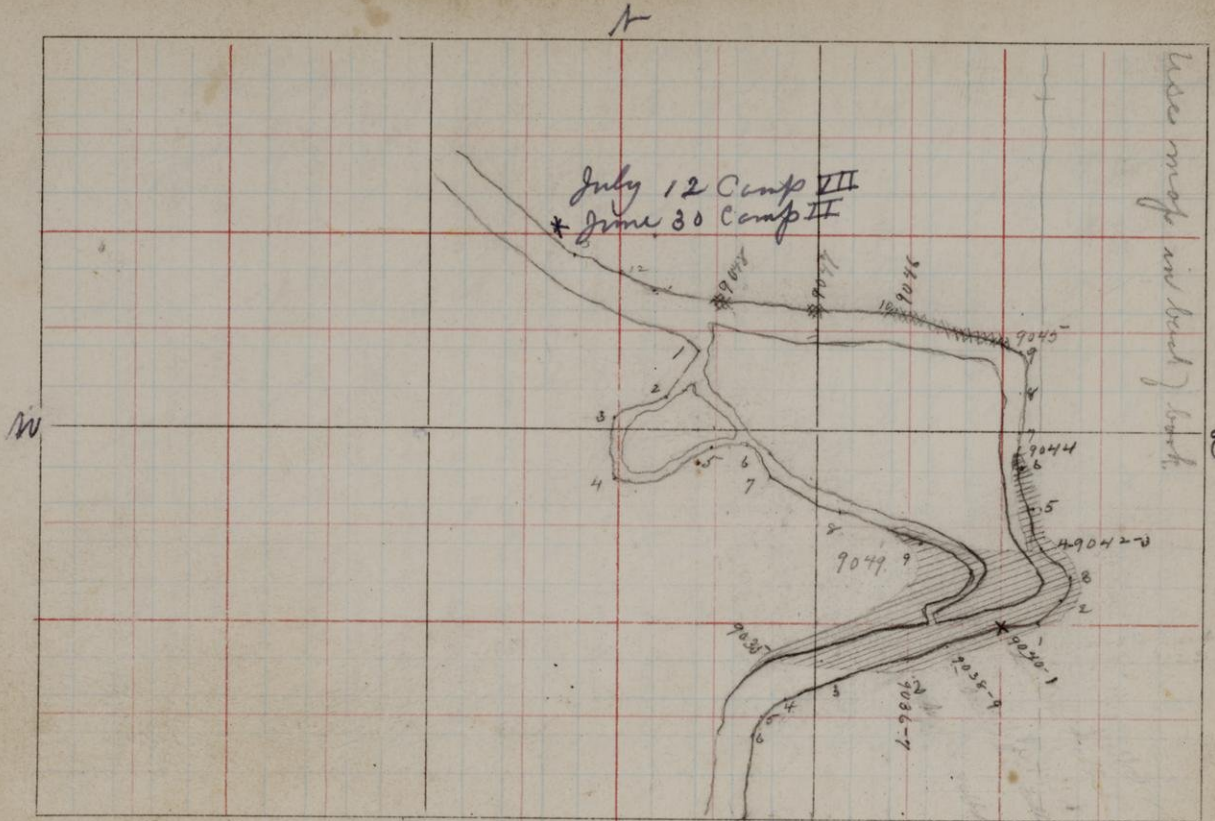
9034 Graywacke. from ledge 630 S. W.
9034 of the center of Sec. 14, T. 46, R. 2 E.

During the day the following
run was made no 4 pruned
being seen & except those above
noted. Starting at the S. E.
corner of Sec. 23. T. 46. R. 2 E, Wis,
thence North to 1600 N of the
S. E. corner of Sec. 14; thence

to the center of Sec. 14; thence S. W. to the S. W. corner of Sec. 14; thence to the N. 1/4 post of Sec. 22; thence S. to the center of Sec. 27; thence to comp.

The ground between the iron and trap ranges, west of the Montreal as well as East of this River, between it and the Black is mostly low, level and often swampy. Somewhere, in the journey from one range to the other a swamp from a half mile to a mile or more in width is sure to be encountered.

Between the Montreal and Gogebic Rivers, at times the ground rises somewhat higher, is rolling, the knolls being apparently of clay. Ground of this sort is heavily timbered with maple. No sign of any pioneer was found except near the trap range.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* June 30 Camp II
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S
Use magk and brush both.
Small Squares = 20 steps.
* Starting Point 220 N 20 W S1/4 P. X

Gogogashagun River.

Tuesday. June 30, 1885.

The day was spent in a study of the bowlders upon the Gogogashagun River in the S½ of Sec. 27 T46. R.22. Wis.

The lower falls were first located at 220 ft 20 W. of the S¼ post of the section. From this point stations were established up and down the river and also upon its west branch which encloses an island. These stations are always upon the bank of the river and are numbered from the starting point both north and south.

Station	1 S.	10 S. 31 W.	starting point.
"	2 S,	10 S 31 W	Station 1
"	3 S,	10 S 29 W	" 2
"	4 S,	10 S 28 W	" 3
"	5 S,	10 S 11 W	" 4
"	6 S,	10 S 2 W.	" 5.

From this point the river runs nearly due South for some distance

Station	1 N.	10 N 20 E	Starting point
"	2 N.	13 N 10 E	Station 1

Station	3 N.,	12 N.	5 E	Station	2
"	4 N.,	15 N.	18 W	"	3
"	5 N.,	20 N.		"	4
"	6 N.,	20 N.	8 W	"	5
"	7 N.,	20 N.		"	6
"	8 N.,	20 N.		"	7
"	9 N.,	20 N.		"	8
"	10 N.,	20 N.	45 W	"	9
"	11 N.,	10 N.	145 W	"	10
"	12 N.,	10 N.	20 W	"	11
"	13 N.,	10 N.	25 W	"	12

From this point the river for a short distance bears nearly north west.

Station 13 N. was located directly from the S 1/4 post of the sec. and its location thus determined is 424 N. 185 W. Reckoned from the above stations its location is

Upon the West fork of the river Station 1. was located from Station 13 as a starting point.

Station	1	60 S.	70 E	Station	13 N.
"	2	15 W	27 S	"	1
"	3	27 W	16 S.	"	2
"	4		80 S	"	3

Station	5	50 E.	28 N	Station 4
"	6	20 E		" 5
"	7	10 E	15 S	" 6
"	8	30 E	20 S	" 7
"	9	42 E	15 S	" 8
"	10	20 E	12 S	" 9
"	11	10 W	14 S	" 10
	12	10 E	10 S	

The main & spurs up and down the river from the starting point and also upon the island and west branch is very uniform in character, it being a red or gray fine & medium grained siliceous slate. Its strike is also very uniform several measurements varying from W. 33° S to W. 38° S. magnetic. The dip is from 55° & 65° north. The detached & spurs farther down the river are massive and the rock of a different character.

For more accurate map. See cross section paper at end of book
Also for remainder of work see last pages of book.

9036 Fine grained gray siliceous slate SE. 10 ft. Station 45. corner to bank of river opposite point from which specimen was taken.

9037 Fine grained gray siliceous slate Station 28. Upper Rapids

9038 Fine grained gray siliceous slate, Opposite side of river from 9087

9039 Red siliceous slate. At Station 18. Upper Falls

9038 Red siliceous slate. Opposite side of river from 9089

9041 Fine grained red siliceous slate. Starting Point, 220 ft. 20 W of S ¼ post Sec. 27

9040 Gray and red siliceous slate Opposite side of river from 9041

9043 Coarse grained gray siliceous slate. Station 4 ft.

9042 Coarse grained gray siliceous slate. Opposite side of river from 9043

9044 Fine grained gray siliceous slate 10 N. Station 6 N. From the southernmost point of which the rock is seen to the location of 9044, the exposure upon one bank of the river or the other, and most of the space upon both, is continuous. ~~Here~~ The exposure ~~ceases~~ of upon W. side of stream continues to station 7 N on East side

9045 Red Quartzite. Exposure upon East bank of stream 17 N. 7 W. Station 9 N. Continues to

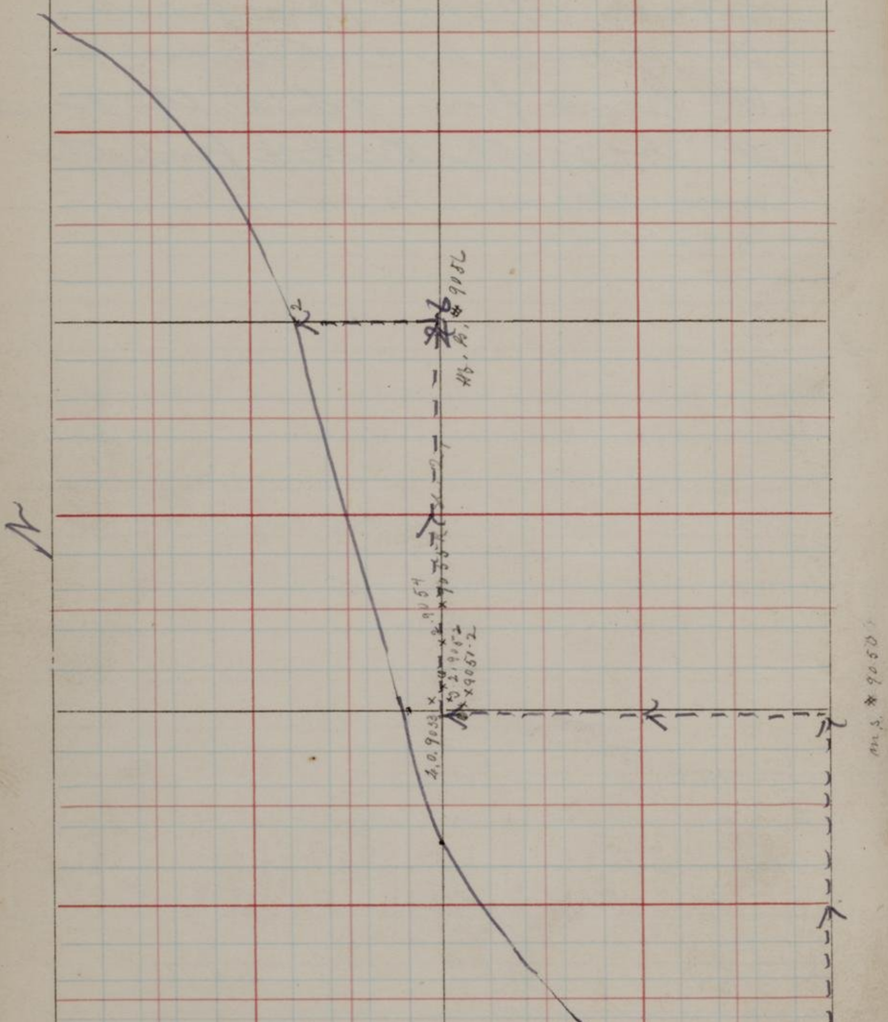
9046 Ferruginous Quartzite. At Station 10 N. where the exposure ends.

9047 Cherty Quartzite. Small exposure upon East bank of stream 10 N 40 W. of Station 10 N

9048 Quartzose Chert. Small exposure upon East bank of stream, 35 E. Station 11 N.

9049 Siliceous Slate. 11 W. 6 N. of Station 9. Upon the west branch. From this point the strata is continuous to the point from which the branch at the south broke from the main stream.

Secs 21+27 T. 46 R. 2E Mi.



Gogogashagun River,
Wednesday, July 1, 1885.
During the forenoon the following run was made. Starting at the S. W. corner Sec. 27, T 46 R 2 E. Wis; thence east, crossing the river 125 W. of the 1/4 post, to the S. E. corner of the section; thence north to the E 1/4 post of 27; thence east to the center of Sec. 26; thence north until this line crossed the trail at about 300 N of the center; thence along the trail west to camp.

9050 Mica Schist. 1305. 15 E. of the N. W. corner of Sec. 35 T. 46 R 2 E. Low Western Exposure.

9051 Quartzite. Just 505. 28 E. of W. 1/4 post Sec. 26. Typical South or "Foot Wall" of ore bed.

Rich Ore. Pit 40 S. 10 E. W 1/4 post Sec 26.

9052 Jaspery Quartzite. Just pit 20 E. 15 S. of W. 1/4 post Sec. 26. Typical North

or "hanging wall" of ore bed.

9053 Ocean Jaspery and Quartzitic Ore Test pit 23 E. 26 N. of W. 1/4 post Sec. 26.

Rich Ore. Test pit 62 E. of W. 1/4 post Sec 26.

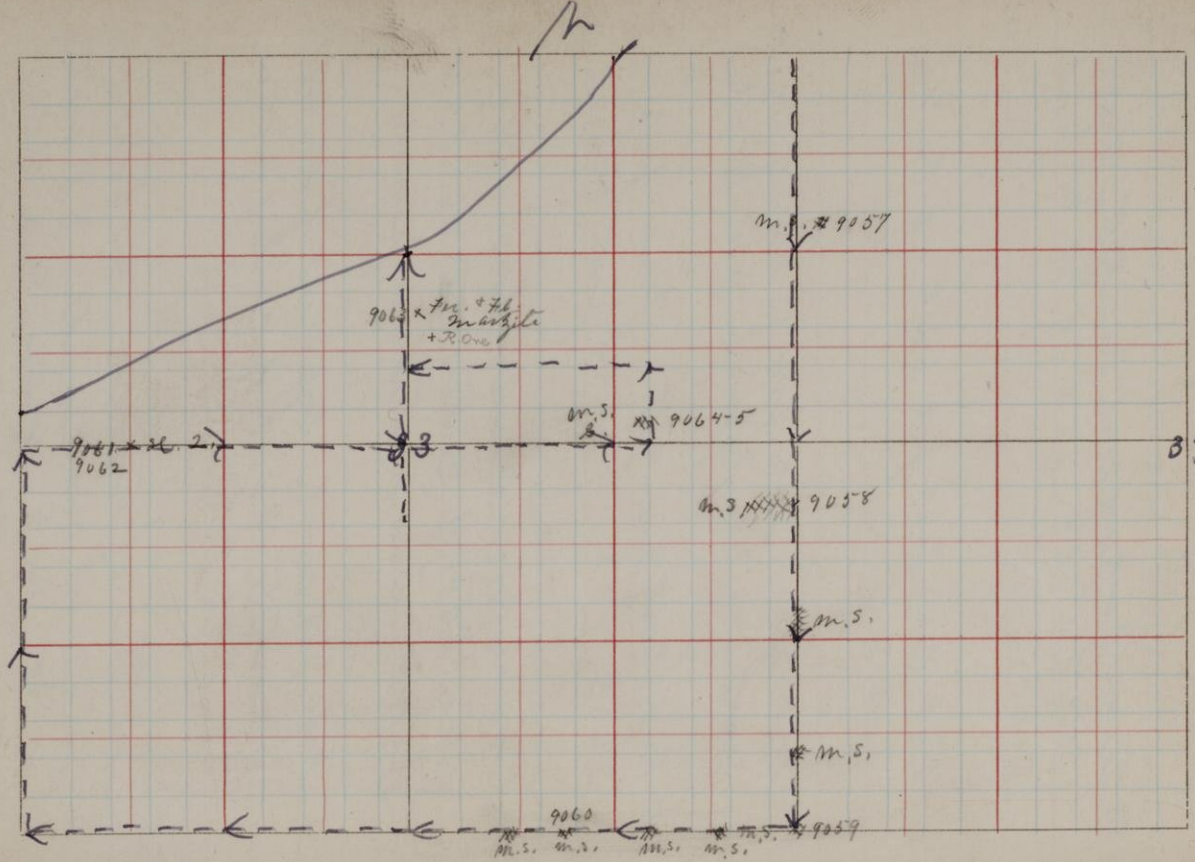
9054 Quartzite. Test pit 162 E. of W. 1/4 post Sec. 26. Typical Foot Wall.

9055 Red Slaty Quartzite. Test pit 260 E. 10 N. of W. 1/4 post Sec. 26.

9056 Coarse Hornblende Granite. 35 E. 85 S. of center Sec. 26. T 46 R 2 E. Low western ridge.

Test pit with typical foot wall quartzite 380 N. of center of Sec. 26. T. 46 R. 2 E.

In the afternoon the following run was made. Starting at the N. E. corner Sec. 33 T. 46 R 2 E Mis.; thence South


Fe a 83°34' T. 46
R. 2, E, Mrs.
m.s. 9057
9063 + Fr. + Fl. Marzili + R. One.
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9064-5
1
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9061 9062
m.s. 9058
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9060
m.s. m.s. m.s. m.s. 9059

to S.E. corner of the section; thence west to the S. W. corner of Sec 33; thence north to the W. 1/4 post; thence east to the center of the section; thence north to the trail 500 ft of the center of Sec. 33. Granite was not found where marked by Rominger, although a thorough search was made in every direction for a fourth mile or more. Thursday morning this search was renewed with the result of finding mica schist, containing granite veins of considerable thickness quite a distance east and a little south of where the granite according to Rominger should be.

9057 Mica Schist. 420 S. 50 E of the N. W. corner of Section 34. Ledge on top of high hill.

9058 Mica Schist. 150 S of E. 1/4 post of Sec. 33. This ledge is at the foot of a high hill.

composed of this same rock, the crown of which is 150 steps West of this point.

Mica Schist. Continuous exposure from 4305 of E. ¼ post of Sec. 33 to 5005.

Mica Schist. 800 S of E ¼ post Sec. 33.

9059 Mica Schist at S. E. corner of Sec. 33

Mica Schist 225 W. of S. E. corner Sec. 33
Same 400 W.

9060 Mica Schist 625 West of S. E. Corner Sec 33.
Same 770 West of corner.

9061 Slaty Anarkite. From test pit 260 E of W ¼ post Sec. 33.

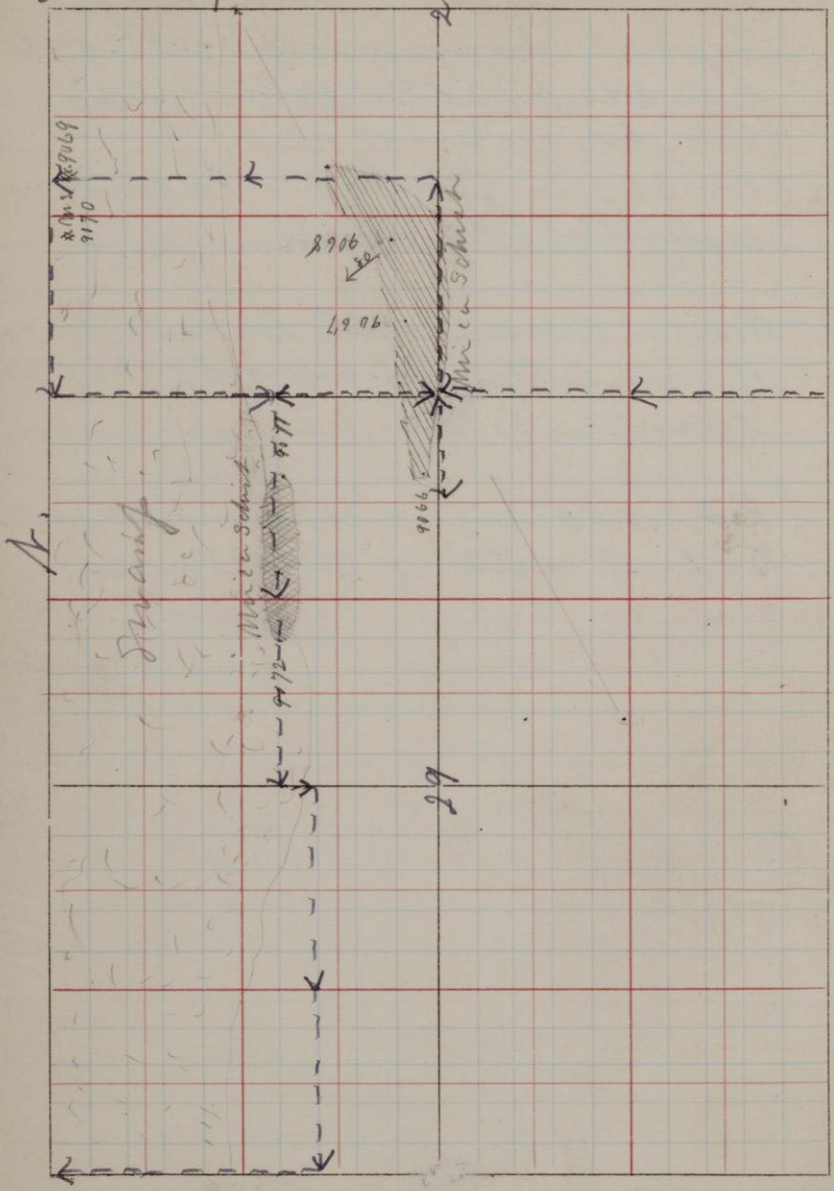
9062 Slate, from above pit. This is the rock thrown out most plentifully

9063 Ferruginous and Siliceous Ironstone. Typical "hanging wall" rock. Test pit 340 ft. 25° E. center Sec. 33. Pit also contains ore.
Pit 365 ft ∠ center Sec. 33 contains materials like above.

9064 Mica Schist with Granite veins
9065 of some little thickness 580 E. 50 ft of center of Sec. 33.

Pit containing rich ore 285 ft 50 E. of center of Sec. 33.

Secs 28 + 29 T. 46 R. 2E



Thursday. July 2. 1885.
To day the following run was
made. Beginning upon the
West line of Sec. 33 T. 46 R 2 E
where crossed by trail 100 N of
the W. 1/4 post; thence north
to the W 1/4 post of Sec. 28; thence
500 E and back; thence 600 E;
thence north to north line of
Sec. 28; thence west to N. W.
corner; thence south 600; thence
west to 1/4 line; thence south 100;
thence west to west line of Sec. 29;
thence north to N. W. corner;
thence west to the N. W. corner Sec.
30; thence South to 700 S of the
N. W. corner of Sec 6. T. 46 R 2 E;
thence to trail and camp. In crossing
Sec. 29 the swamp lay in sight
north of us all the time, and we
crossed two or three small gore-
tions of it.

9066 Quartzite Mica Schist. Suite a
large northern 4 prism. upon
bank of small creek. 160 W. 40 N
of E. 1/4 post Sec. 29. Strike

N. 37° S. dip 80° W.

9067 Mica Schist. 217 E. 75 ft of W. ¼ post Sec. 28.

9068 Mica Schist. 440 E. 115 ft of of W. ¼ post of Sec. 28. Strike N. 30° E. Dip 80° W. A cliff of bare rock with a single slightly curved surface 40 feet high and fully 100 long is exposed, the cliff facing the north. This face corresponds to bedding and therefore gives dip and strike.

Mica Schist. 600 E. 115 ft of W. ¼ post Sec 28.
Same 620 E. 275 ft. of ¼ post.

The specimens from 9066 to 9068 inclusive are all from one large exposure, as are also the other ledges mentioned and located. The easternmost and northernmost ledges and the exposures in those directions. The exposure also extends south to the

quarter line of the section about 500 E. of the ¼ post. How much farther south and west the ledge extends is not known.

9069 Mica Schist. 600 E. 950 N. of W. ¼ Sec. 28. Low ledge at edge of swamp which lies to the north ward.

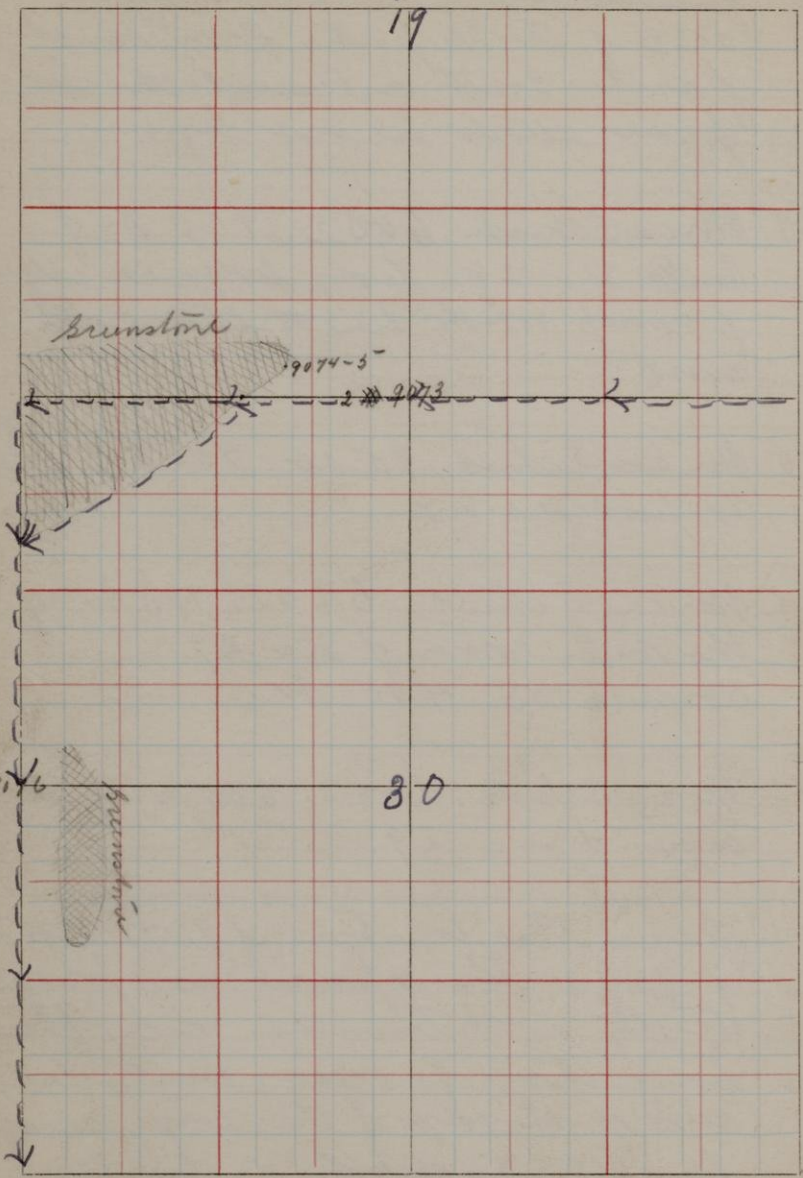
9070 Mica Schist 95 N. 460 E. of W. ¼ post Sec. 28.

9071 Mica Schist. 620 S. 180 W. of the N. E. corner of Sec. 29. Some 600 S. 470 W.

9072 Mica Schist. 600 S. 605 W. of N. E. corner of Sec. 29.

From the location of 9071 to that of 9072 the ledge is practically a continuous one, there being three or many small ledges each at the edge of the large swamp, lying to the north of the line of travel.

Sec 30 T. 46 N R. 2E. Wis.



9073 Red Quartzite. 1100 N. of the N. E. corner of Sec. 30. Low eastern spur.

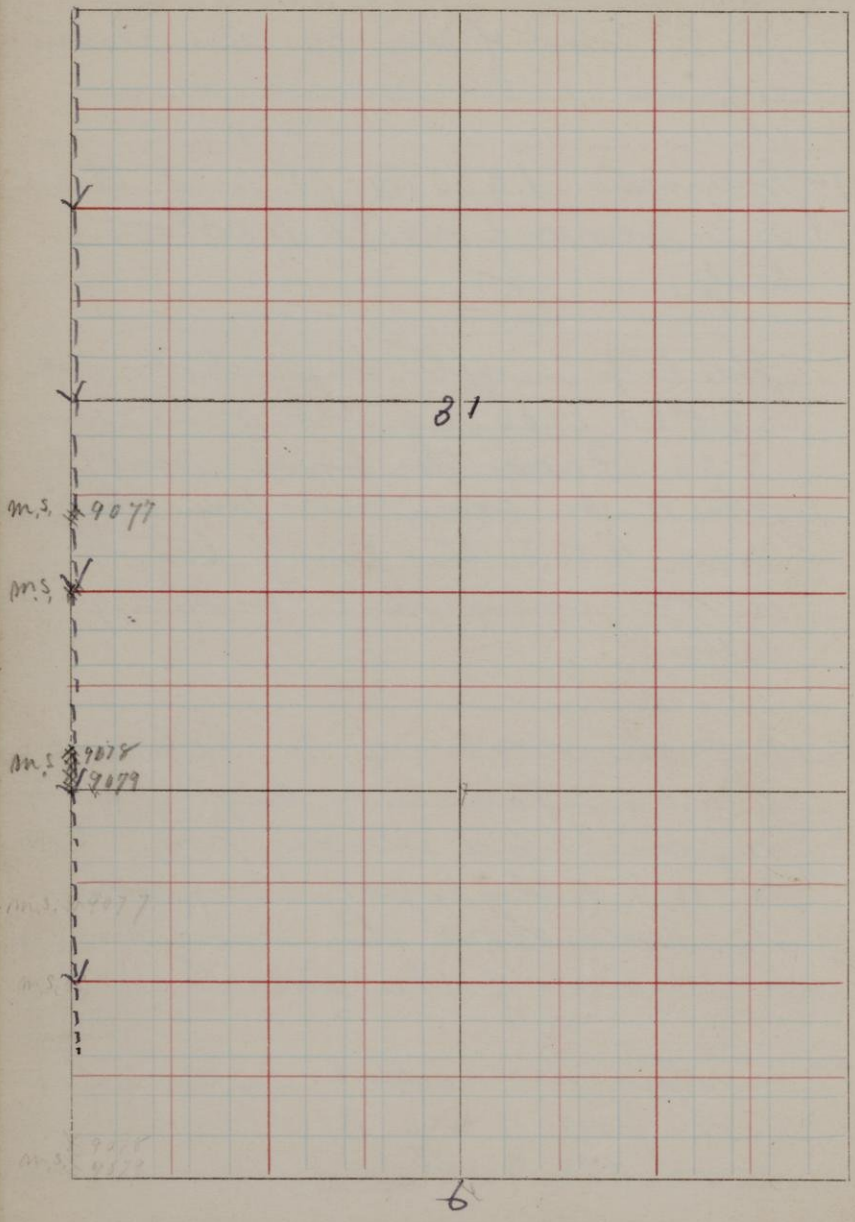
9074 Greenstone. 1330 N. 75 W. of the
9075 S. E. corner of Sec. 19. Northern trap.

The trap is on the line between Secs. 19 & 30 1480 N. of the N. E. corner of 30. From this point west to the N. W. corner and from the corner 400 S. the line of travel is over continuous trap hills.

9076 Greenstone 100 E. of W. ¼ post Sec. 30. This is a trap western spur which extends from 100 N. to 400 S of the ¼ post being all the time about the same distance east of the line.

9077 Quartzose Mica Schist. 300 S. of W. ¼ post of Sec. 31.
Same 500 South

Sec. 31 T. 46 N. R. 2E.

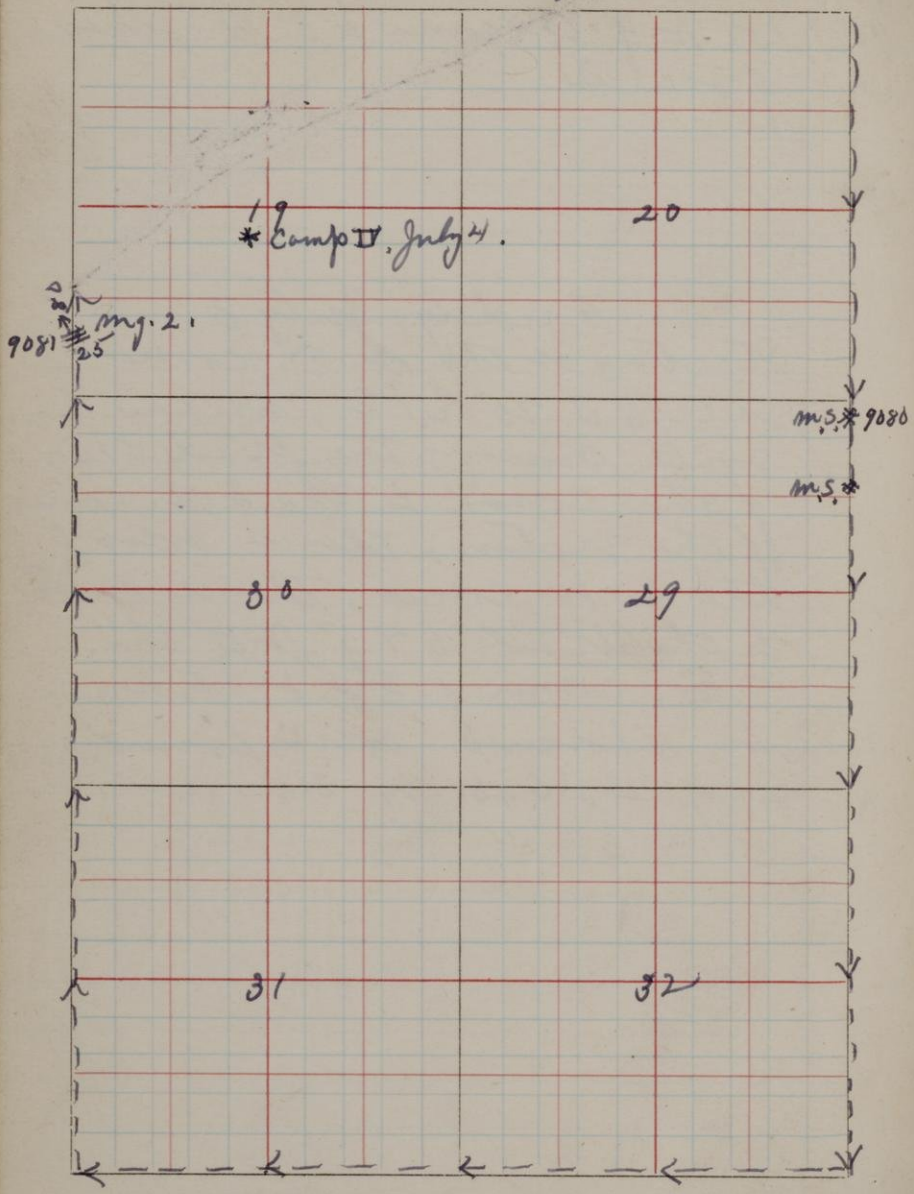


9078 Mica Schist. Ledge extends from
9079 100 N. of the corner & S. W. corner
of Sec. 31.

Friday. July 3.

Starting at the N. E. corner
Sec. 16 T. 45 R. 12 E, we run
south, crossing the trail 30 S.
of the corner, & the S. E. corner
of the section; thence west &
the S. W. corner; thence north
& the trail 645 N of the
S. W. corner of the section.
No stones were found.
Camp III, S. W. 1/4 Sec. 16

T. 45 R. 12. W.



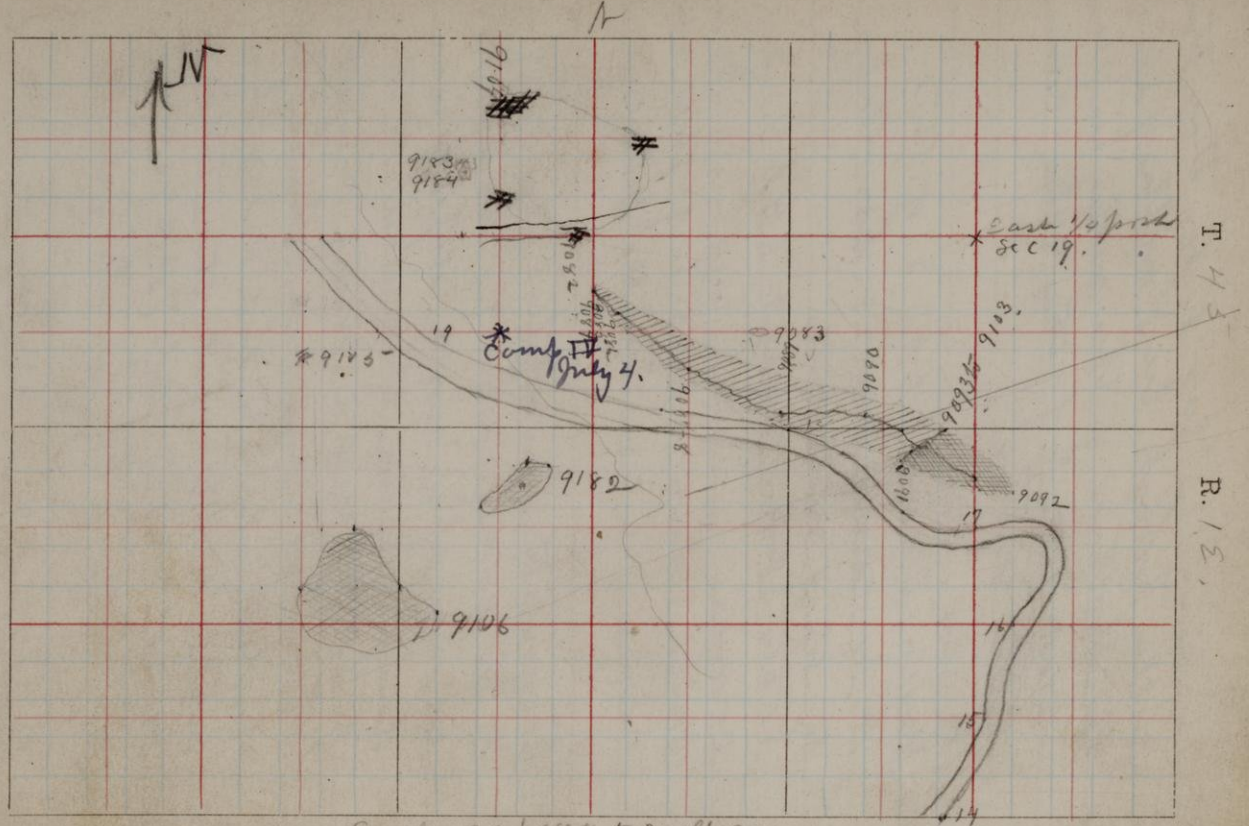
Saturday, July 4, 1885.
Starting south where the trail crosses the West line of Sec. 16, T. 40 R. 12. Wisconsin, 640 ft of the S. W. corner ran south to the S. W. corner Sec. 33; thence West to the S. W. corner of the township; thence north on the range line to the point where the trail crossed the west line of Sec. 19. 210 North of the S. W. corner. During this long run only two 4 posts were found, one upon the iron range, the other south of it South of the iron range the ground is level with numerous small swamps. Upon this general level are numerous knolls, some of them of considerable size, but mostly small. With a single exception none of them 4 posted any rock. The iron range where first crossed is of unusual height, the crest of the range at the South West corner of sec.

16 being 175 feet higher than the valley which lies north of it. The bottom of this valley is reached about 700 N. of the S. W. corner of the section.

9080 Mica Schist. 650 S. of the N. W. corner Sec. 28. Low ledge on top of small hill.
Potato River crossed 640 S. of corner.
Mica Schist. 725 S. of the N.W. corner Sec. 28. Small ledge.

9081 Magnetitic Quartzite. 140 N. of S. W. corner Sec. 19. Low northern spur upon north slope of iron range. From the corner to this point there are strong magnetic attractions. Iron was shining fairly at short intervals and as nearly could be determined the Strike is N. 20° ± 25° E. Dip 75° ± 80° N.

Sunday. July 6th, 1884.
Rain. Settled preliminary work at Potato River.



Scale 20 paces to small square.

100 steps = 1 in

J.R.C. 7-1095

Potato River, Monday, July 6, 1885.
As a preliminary work the east line of Section 19, T. 40 N. R. 1 E. was blazed through and each fifty steps a tree blazed and marked 1, 2, 3 &c beginning with 1, 50 steps north of the S. E. corner of the section and ending at 20 at the east quarter post. From these stations lines were run east or west as required to the river, the position of the brow of the cliff and the river being marked. This work was begun at station 20 and continued to station 13, some 200 paces south of the point where the most southern exposure of rock is to be found.

Station	20,	Ledge	210 W	River	340 W.
"	19,	"	180 W	"	290 W.
"	18,	"	40 W	"	100 W.
"	17.			"	W. Bank
"	16			"	20 E.
"	15			"	7 E

Station 14 River 15 W.
" 13 " 35 W.
As mapped the river between stations 17 and 16 takes a swing to the east of some 45 steps east of 17.
The river and the trend of the diff were also located at certain other points as given below in speaking of specimens taken.

9082 Coarse quartzite 210 W. of E ¼ post of Sec. 19. Low ledge. Taken to be Irving's "Formation IV" To the south upon the same ledge this runs into ferruginous quartzite which phase of rock is represented by a subsequent number.

9083 Specimen of ledge running west from station 19. 60 S. 180 W. of E. ¼ Sec. 19

9084 Compact, fine grained, massive quartzite. 305. 10 E. of 9082. This specimen is from

the north-west end of the long ledge by the river, and is the rock which is found nearest to 9082. This ledge is here low. The graywite is interlaminated with the thin slaty layers characteristic of "Formation III" but the specimen represents the character of the greater part of the ledge at this place.

9085 Siliceous Slate. Ten feet from 9084 in a south east direction across the strike. This slate continues along the face of the ledge to 40S. 20E. of 9082 where the rock becomes

9086 Medium grained Quartzite. 40S. 25E. of 9082. This quartzite is coarser than most of the rock found in formation III and has upon and through it narrow seams of iron oxide

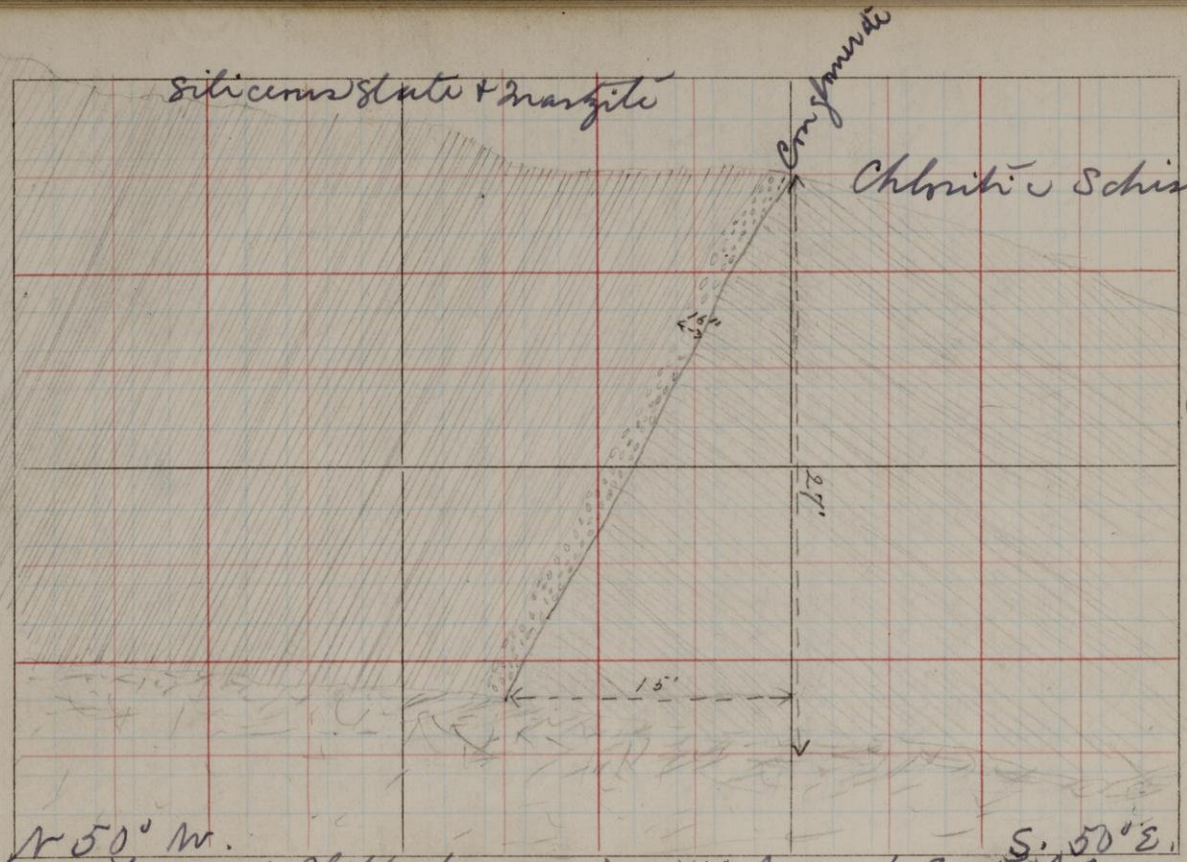
9087 Siliceous Slate and Quartzite.
9088 From 40S. 20E of 9082 to

705. 60E. the ledge is alternately 9087 and 9088.

9089 Purple Siliceous Slate. 105 W. 90S. of E. ¼ post sec. 19. Here the rock has all the preceding varieties with the addition of 9089.

9090 Purple Siliceous Slate. 60 W. 90S. of E ¼ post sec. 19. This variety is interstratified with preceding ones. Here the ledge approaches close to the river and begins to rise rapidly in height until the ledge rises to 100 feet above the river. Heretofore the ledge has been no more than 25 feet high and commonly not more than 10 to 15 feet.

9091 Chloritic Schist or Gneiss. 40 W. 125 S. of E ¼ post sec. 19. Between the preceding specimen and this one, the junction between the Huronian and Laurentian systems has been crossed.



Face of Cliff bears N. 50° W. and S. 50° E.
Projected forward upon perpendicular plane.

9092 Chloritic Schist. 130S. 20W of E. ¼ post Sec. 19. This is the farthest point up the river at which the Laurentian rocks are found.

As before stated an unconformable contact of green schists with the siliceous slate heretofore described is seen upon the face of the cliff a little way East of the river. This junction is exposed for a few feet near the top of the cliff, some 70 feet above the river and again upon a bare face of rock at the base of the cliff 27 feet high. As the characters of the two junctions are precisely alike the specimens and descriptions all refer to the lower visible junction.

Data.

The top of upper junction is 70 feet above the river and is located 16 W. 102S of E.

¼ post Sec. 19
The top of the lower junction is 40 feet above the river and is located 35 W. 112 S of E. ¼ post Sec. 19.
Base of Lower Junction 18 feet above river.
Perpendicular let fall from top of lower junction to base 15 feet along face of cliff from junction at base
Looking at the face of the cliff and taking no account of its recession it makes an angle of 40° with the horizon.
Strike of Siliceous Slate at Junction N 20° E. dip 70° N.
Schist has no proper strike or dip, but its fibres about almost perpendicular to the plane of the junction.
The plane of lamination of the siliceous slate is almost or quite parallel to the plane of the junction

The Siliceous Slate near the junction needs no description as it is in every respect like the slate described along the cliffs to the south west.

The Conglomerate is upon an average 16" wide and varies but little from this thickness throughout the whole junction. It is thickly studded with pebbles of the green schist, of quartz and of jasper, the former being much the most abundant. The break between the schist and conglomerate is abrupt, a hand specimen showing to a fraction of an inch the point where the schist ends and conglomerate begins. The transition from the conglomerate to the slate is rapid, usually occurring within two inches, and in a space of four inches both the conglomerate and slate show their normal character. The pebbles are mostly

from one to three inches in diameter, but pebbles 8" to 10" in diameter are seen.

The schist is green & readily breaks, fibrous, and is cut by cleavage joints in every direction.

The face of the cliff as a whole is very irregular, both receding containing depressions and large projecting blocks, but to represent this is beyond my skill.

9093 Junction Specimen of Schist and Conglomerate.

9094 Specimen showing transition from Conglomerate to Siliceous Slate

9095 Peculiar phases of schist at
9096 junction of schist and conglomerate

9097 Conglomerate

9098 Conglomerate Pebbles.

9099 Slate. Three feet across strike from junction

9100 Slate. Six feet from junction

9101 Slate. Twelve feet from junction

9102 Schist. Six feet from junction

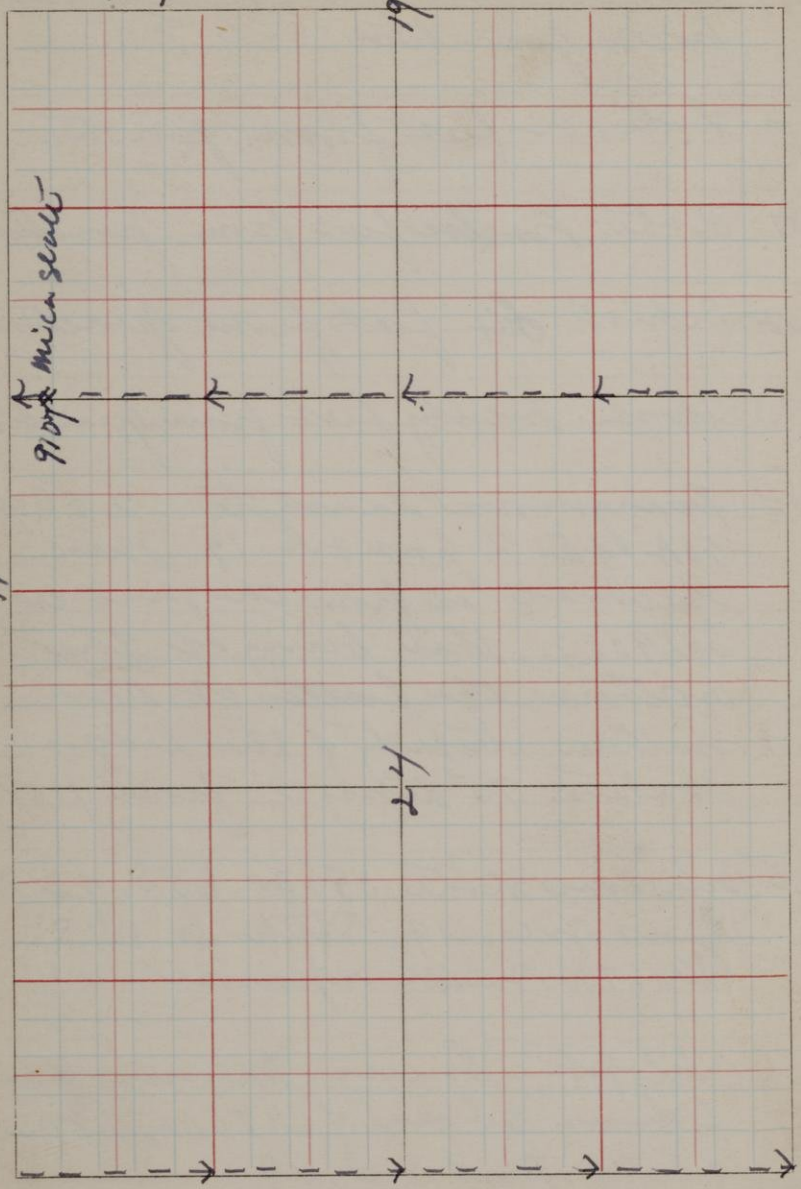
9103 Schist. Twenty feet from junction

9104 Ferruginous Quartzite. 250 W 50 N of E. ¼ post Sec. 19. This specimen is from the same ledge as 9082, this being at the northern, the latter at the southern extremity of the ledge. It strikes 75° steps E. from 9104

9105 Siliceous Slate 350 W. 65 S. of 2 ¼ post Sec. 19. Strike W 30° S. Dip 67 W. Small exposure

9106 Chloritic Gneiss. Massive and fibrous phases of. 370 W. 180 S of E. ¼ post Sec. 19. Rain

Sec 24 T. 45 R. 14 W. Min



Potato River, Tuesday, July 7, 1885.
Starting at the point where the trail crosses the east line of Sec. 24. T. 45 R 1 W, 210 ft of the S. E. corner run north to Potato River 890 ft of the S. E. corner of Sec. 12; thence south to S. E. corner; thence west to 940 ft. of S. E. corner Sec. 12; thence north 660; thence west 260; thence south 200; thence west 150; thence south 100; thence west 140; thence south 60; thence west 85; thence south 100; thence west 125; thence South 20; thence west 300 to west line of Sec. 12.; thence north 500 to 670 ft of the S. W. corner of Sec. 12; thence south to where trail crossed the west line of Sec. 25, 600 S. of the N. W. corner of the section; thence on trail to comp.

9107 Mica Slate 925 ft 10 E. of W. 1/4 post Sec. 19. T. 45 R. 1 E.
Small northern exposure

Sec 13 T. 45 R. 1 W

12

1/4 post

m. 2. 9109

m. 2. 9108

m. 2

1/4 post

13

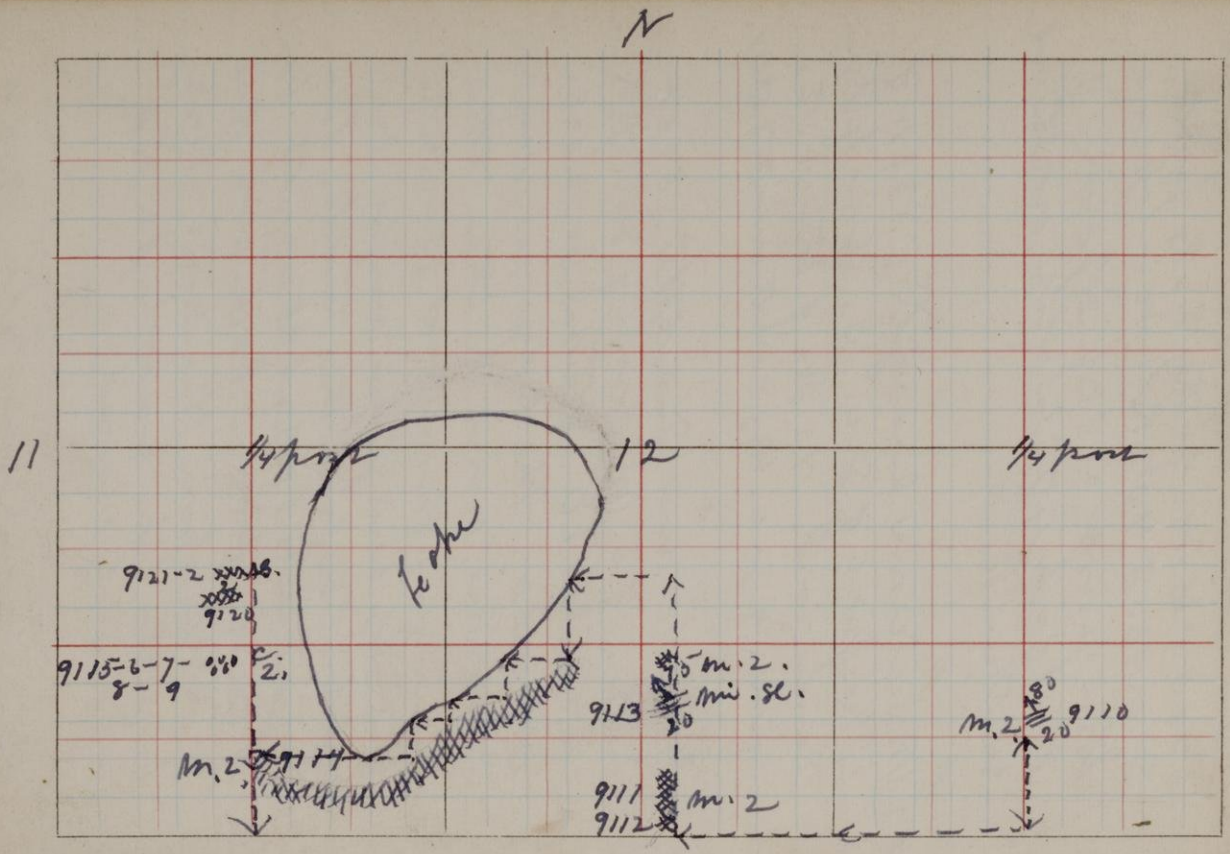
1/4 post

9108 Fresh Coarse Diabase or Gabbro. 640 ft. 15 W. of the E. ¼ post Sec. 13. T. 43 R. 1 W. From this point a large exposure of the rock extends west, north and south.

9109 Micaceous Quartzite. 800 ft of E ¼ post of Sec. 13. Low ledge. Same rock 40 W. of the N. E. corner of Sec. 13; continuous 100 W.

9110 Micaceous Quartzite. 890 ft. 20 E. of S. W. corner of Sec 7 T. 40 R. 1 E. Strike W. 20° S. Dip 80° N. The ledge is very massive, more so than the specimen shows and the strike and dip here given might be quite far from the truth. This exposure is upon the south bank of Potato River. Rock was also visible upon the north bank but the river was high and not easily crossed.

Micaceous Quartzite. 900 W


N
Sec 12 T. 45 R. 11W.
11
1/4 post
12
1/4 post
Lake
9121-2
9120
9115-6-7-8-9
m. 2.
9114
m. 2.
9113
mi. sc.
m. 2.
9111
9112
m. 2
m. 2.
9110

35°S. of the N. E. corner of Sec 13. Strike N 20° E. dip 75° N these determined from small outcrop of rock. Eastern terminus; rock like preceding

9111 Micaceous Quartzite. 940 W.
9112 85 N. of the S. E. corner Sec 12. Ledge continues to 170 N. 9111 is laminated, 9112 massive.

9113 Banded Micaceous Slate 940 W 300 N of the S. E. corner of Sec. 12. Ledge extends to 840 N. the Eastern terminus being upon a steep northern hill. Strike N. 20° E 25° S. dip 75° N.

Micaceous Quartzite. 930 W 440 N of the S. E. corner Sec. 12 Western terminus.

At 660 N. 1200 W of the S. E. corner of Sec. 12 a lake is struck. From its shore the trap range can be seen to the northward at an estimated distance of one half mile

Micaceous Quartzite 465 N. 1200 W. of the S. E. corner of Sec 12.

Lake 465 N. 1350 West.

Banded Micaceous Quartzite 365 N 1350 W. of S. E. Corner of Sec. 12.

Lake 865 N. 1490 West.

Micaceous Quartzite 300 N 1490 W. of the S. E. corner of Sec. 12.

Lake 300 N. 1570 W.

Micaceous Quartzite. 200 N 1570 W. of S. E corner of Sec. 12.

Lake 200 N 1700 W.

9114 Micaceous Quartzite 190 N. 1970 W. of the S. E. corner of Sec. 12. Ledge & tundra west to line All the bedrock of micaceous quartzite from the 930 W. 440 N of the S. E. corner of Sec 12

to 9114 are upon a single high hill with northern slope lying south of the lake, and together constitute a single exposure.

9115 Conglomerate. 470 N. 30 W. of
9116 S. E. corner of Sec. 11. This is a high hill rising towards the west from the line and showing beautifully the coarse conglomerate. The pebbles are mostly of white quartz some of them being eight or ten inches in diameter. Flint and black hornstone pebbles are very plentiful also. The specimens are from the matrix of the conglomerate

9117 Pebbles from above conglomerate

9118 Coarse Quartzite. 80 West
9119 of 9115, 16, 17. Going up the hill from 9115 ~~west~~ the ledge becomes a compact granite A boulder was seen upon the side of the hill which was quite sandy in character.

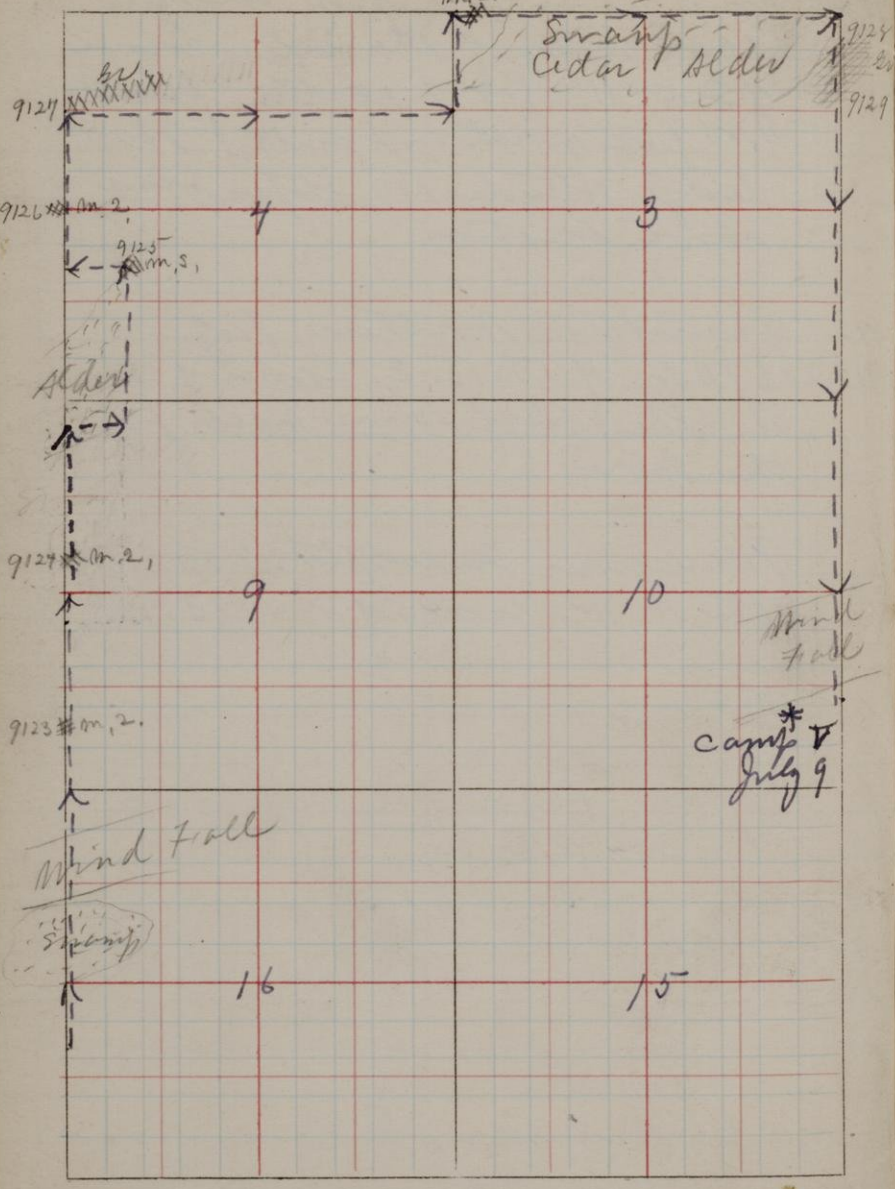
9120 Fine grained compact Quartzite. 610 ft. 30 ft. W. of the S. E. corner of Sec. 11. Bold eastern face 100 feet north and south. The ledge extends 100 steps west of above location

9121 Sandstone. Northern Trap.
9122 670 ft. W. of the S. E. corner of Sec. 11. The bluff runs west from the line

Micaceous Quartzite. 700 S. of the N. W. corner of Sec. 13.

Potato River, Wednesday July 8.
Rain all day.

T. 45 N R. 12 W. 5th



Thursday, July 9, 1885.

Starting upon the trail 645 N. of the S. W. corner Sec. 16, T45 R. 1E. run north to 850 N. of W¼ post of Sec. 9; thence east 300; thence north to 700 N of the south line of Sec. 4; thence west 300 to west line of section; thence north to 500 N of W¼ post; thence east to east line of section; thence north to N. E. corner of section; thence from the N. W. corner of Sec. 3 east to the N. E. corner; thence south to 500 S of E. ¼ post of Sec 10 to trail; thence to camp.

9123 Micaceous Quartzite 300 N. of S. W. corner Sec 9. T45 R. 1E.

9124 Micaceous Quartzite. 200 N. of W. ¼ post of Sec. 9.

9125 Mica Schist. Containing garnets. 300 E. 700 N. of the S. W. corner of Sec 4.

9126 Micaceous Granite. 55 W. of W 1/4 post of Sec 4.

9127 Fine grained greenstone. Northern trap. 500 N. of W 1/4 post of Sec 4. The range from this point heard northward but is visible as one travels eastward 500 S of the north line of the section for a full fourth mile.

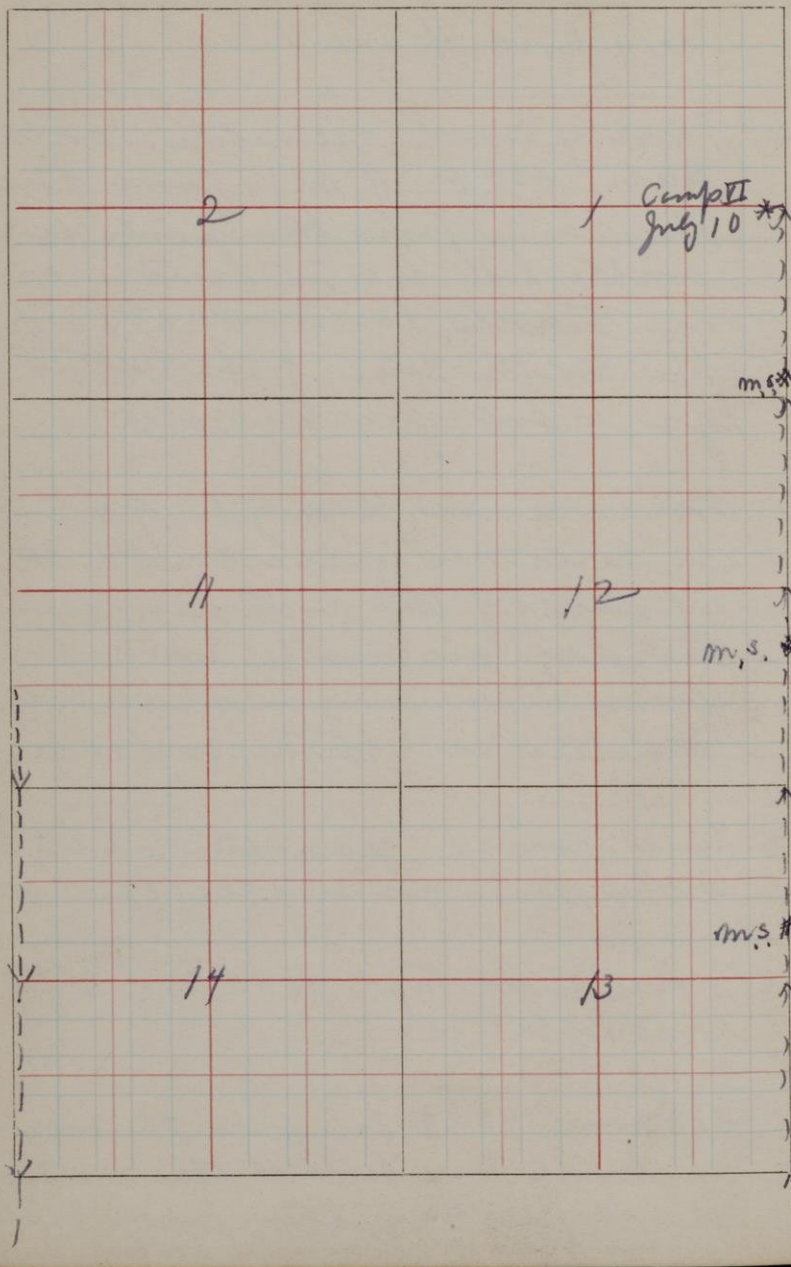
Micaceous Granite 90 E of N. W. corner of Sec 8. All the exposures of this rock seen during the day are small, none of them furnishing an opportunity to determine strike and dip.

9128 Fine grained greenstone. 220 S of the N. E. corner of Sec 8.

9129 Coarse Greenstone, 440 S. of N. E. corner of Sec. 8.

9128 and 9129 are from the same rough hill, one being at the northern the other at the southern brow. Hill begins to rise at corner and is 200 feet high.

T. 45 N R. 1 E.



Friday, July 10.

Starting 500 S of the W. 1/4 post Sec. 11, T. 45 R 1 E. ran south to the S. W. corner of Sec. 23; thence east to the S. E. corner Sec. 24; thence south to East 1/4 post of Sec 1. upon trail. when comp was made. No specimens were found until the East 1/4 post of Sec. 13 had been passed.

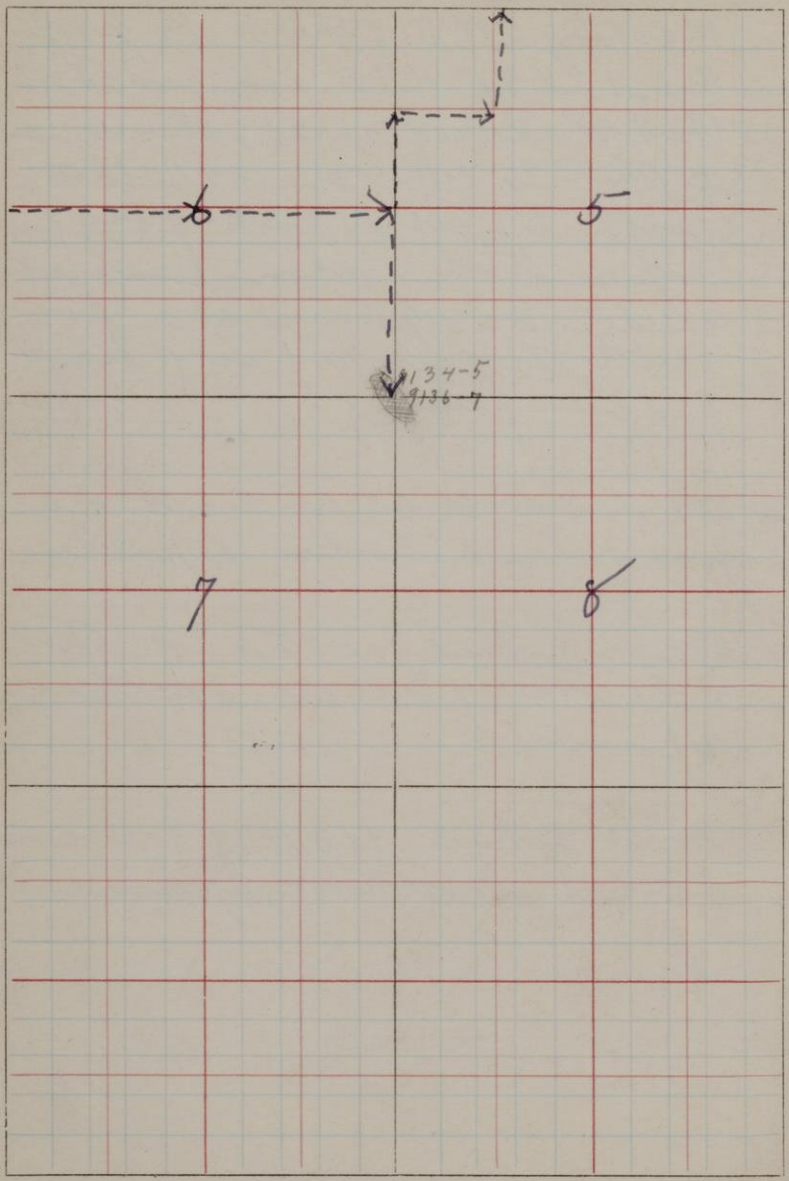
9130 Mica Schist. 260 ft W. 25 W. of E. 1/4 post of Sec. 13. Eastern exposure

9131 Mica Schist. 700 ft. of the S. E. corner of Sec. 12. Southern exposure

9132 Mica Schist. 110 ft of S. E. corner of Sec. 1. Northern exposure

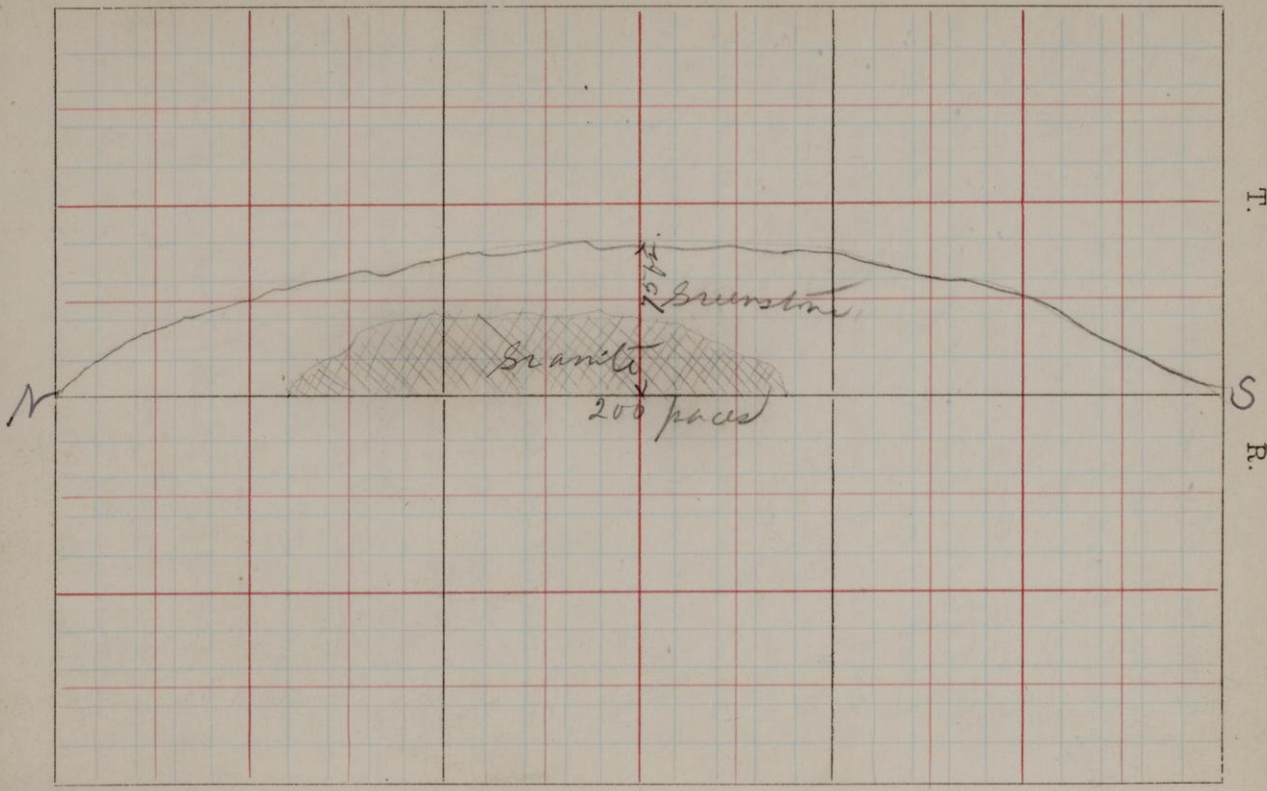
Rain.

T. 45 N. R. 22 W.



Saturday, July 11, 1885.
During the forenoon the following
survey was made. Starting at the
W 1/4 post of Sec 2 T 45 N R 2 E thence east
east to E 1/4 post; thence south
to S. E. corner; thence north
to 500 N. of E. 1/4 post; thence
east 500; thence north to
500 N of S. line of Sec. 32
T 46 R 2 E. The afternoon
was spent in locating test pits
and ledges in the west half
of Sec 6 and the east half of Sec
1. T 45 R 1 E.

9133 Siliceous Slate. 400 E of W 1/4
post Sec 6. T 45 R 2 E. Exposure
extends east from above point
100 steps and the north face
of the ledge bears and extends
from the line of crossing in
directions south of west and north
of east. Strike and dip as
determined at two points
Strike N. 30° S. dip. 70° N
Strike N. 25° S dip. 60° N.

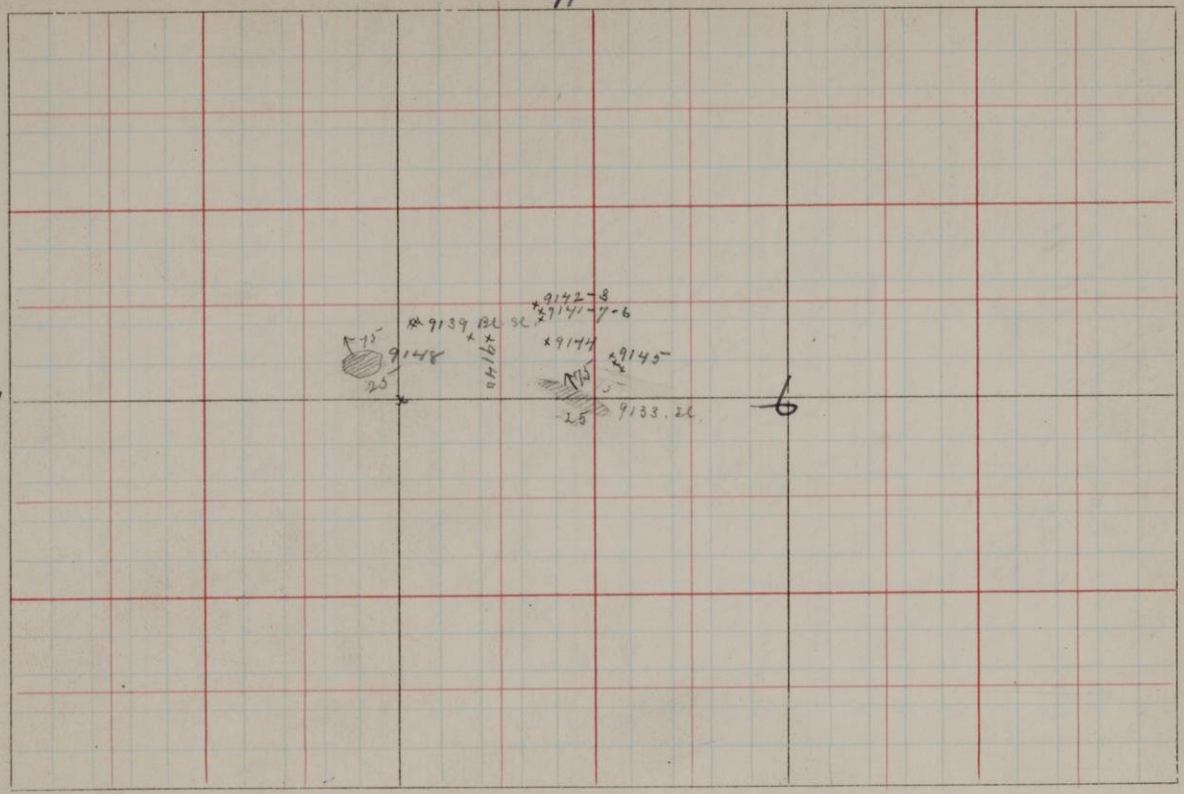

N
S
T.
R.
Brunston
Granite
200 paces

The South east corner of Sec 6 T. 46° R. 2E is upon a ledge of rock twenty-five feet high. this ledge extends 100 north and 100 South from the corner bearing west in Section 6 toward the north and east into section 8 toward the south. The ledge is composed of greenstone and granite, the greenstone making up the entire ledge at both the north and south ends, but serving as a capping for coarse granite at the corner, and from this point 60 N. and 20° S. Where the granite is thickest the greenstone makes up about one half the height of the ledge.

9134 Specimens from the "greenstone"
9135 above described

9136 Porphyritic Granite. From the north end of granite ledge

9137 Granite. South end of ledge


N
T. 45 N
R. 12 E.
1
6
9139 BL SC.
9148
9140
9142-8
9141-7-6
9144
9145
9133.2C
25
25

9138 Siliceous Slate, 700 E. 200 N. of the S. W. corner Sec. 32 T46 R 2 E. Strike W. 230 S. dip 60° N. Northern Extension.

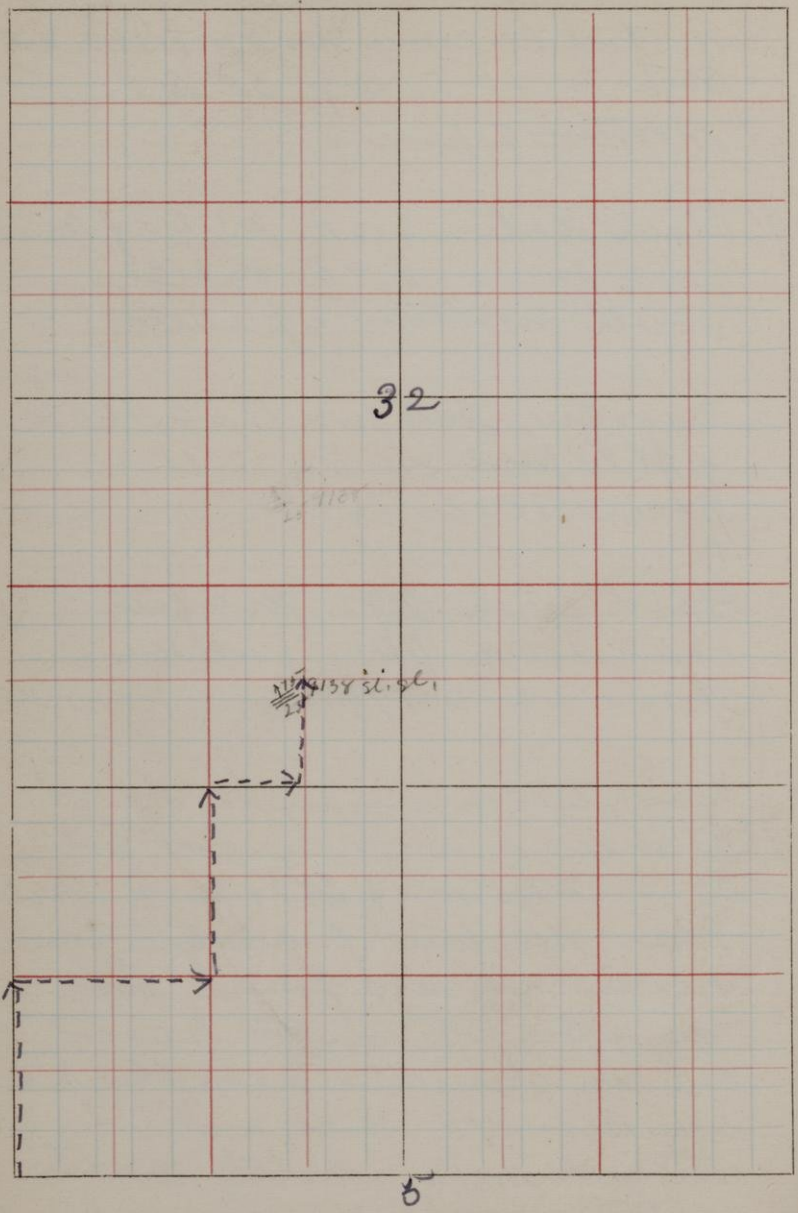
9139 Black Slate. 200 N 25 E. of W 1/4 post Sec 6. T. 45 R 2 E. Small northern extension.

Iron Ore, Test pit 175 E. 170 N. of NW 1/4 post Sec. 6. 45-2E
Same 185 E. 160 N

9140 Hard Iron Ore. Test pit 225 E. 180 N. of NW 1/4 post Sec. 6 Same 225 E 170 N.

9141 9147 Quartzite containing bands and nodules of iron ore. Test pit 340 E. 225 N. of NW 1/4 post Sec 6. This mixture of quartzite and ore is not only found in many test pits in this locality, but in connection with the pits near Bessemer, Mich and in the rock immediately north of the most ferruginous part

T. 46 N R. 2 E.



of the belt in many localities between here and the Black River Falls. The specimen is selected from a rather granitoid portion of the rock as thrown out. All gradations are found, in every locality where this granulite is present, between quite large bodies of almost pure ore & bodies as large composed almost wholly of granulite.

Test pit. Granulite and Ore 840 E 215 ft of W. 1/4. post Sec. 6.

9142 Banded Ferruginous Schist. 20 ft across strike from 9141.

9143 Hydro-mica schist. Test pit 10 ft. of 9142.

9144 Chert. Test pit 870 E. 150 ft. of W. 1/4 post Sec 6. Pit contains chiefly lean ore and granulite as in 9141.

Iron Ore and Quartzite as in 9141
450 E. 110 N. W¼ post Sec. 6.
Same 490 E. 260 N.

9145 Quartzite. Test pit 465 E. 90 N.
of W. ¼ post Sec 6.

Iron Ore and Quartzite as in 9141
455 E. 100 N. of W¼ post Sec 6.

9146 Ferruginous Hydro-mica schist.
340 E. 235 N. W¼ post Sec 6.
Pit also contains material like
9143 as well as iron ore and granite.

9148 Black Slate. 100 N. 40 W. of E¼
post Sec 1. T 45 R 1E.
Strike N. 25° S. Dip 75° N.
Location middle of east side
of spring. From this point
the ledge extends 100 West and
at middle is 75 steps wide.

Sunday. July 12, 1885

Today camp was moved to the Bogoslofgashuguin. and the work there completed.

The lower chloritic schist was not found in contact with the siliceous slate although in one place the slate is but three steps from the schist.

The contact of III and IV was found nearly where mapped by Chamberlain and Conrow.

In order to locate ledges upon the island lines were run west from the various stations east of the river to the west coast of the island

From 4 St to west side Island 40
" 5 St " " " " 115
" 6 St " " " " 123
" 7 St " " " " 160
" 8 St " " " " 150

9149 Chloritic Schist 45 S. 15 W.
9150 Starting point. Extends 40 S. 5 E. Ledge projects above level of muskeg but three or four feet and was

nowhere found in direct contact with the siliceous slate. As near as could be determined the schist strikes N 45 with a dip 70° E.

The junction of III and IV is at the point where line from 6 N. strikes the west branch of the river 123 W. of 6 N. From this point the slate stands about 25° E and the quartzite 15 W. The transition from the slate to the quartzite is a gradual one the slate losing its cleavage little by little and becoming at the same time coarser and more quartzitic until the rock becomes a massive quartzite.

9151 Slate. Most quartzitic part few feet east of junction

9152 Quartzite at junction

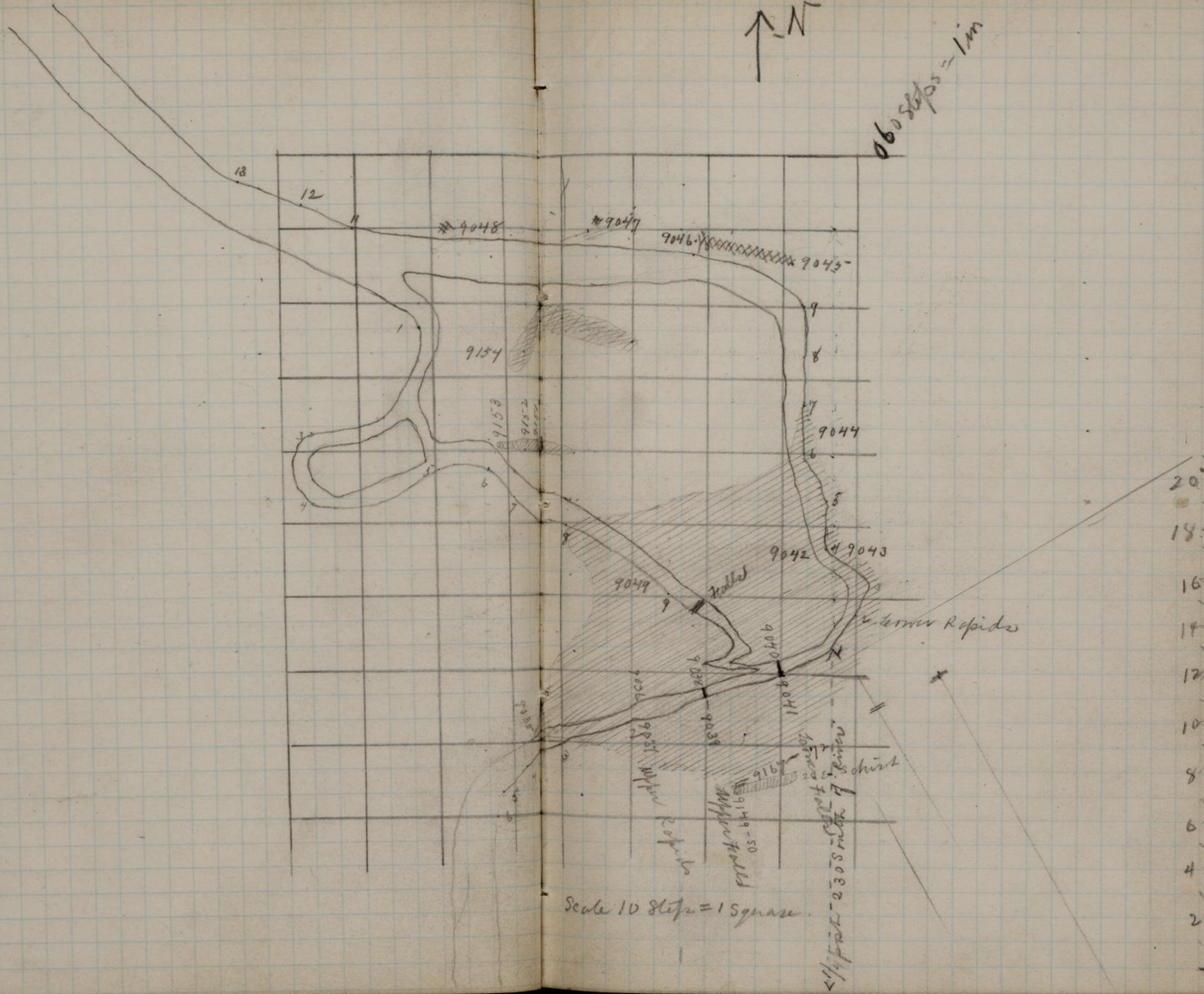
9153 Quartzite at western end of 4 poms

9154. Hermosa quartzite, 122 ft.
Station 8 ft. This ledge runs
from this point S 100 W. 15 ft.,
and from here S 70 W. 5 ft.

Station 24. at lower rapids.
Lower Falls at Station point
Upper Falls just above Station
25.
Upper Rapids at Station 25.
Falls on West Branch between 9 & 10

Rain.

C. R. Van Hise



N
60 Steps = 1 in
9048
9047
9046
9045
9154
9153
9044
9042
9043
9049
Falls
Lower Rapids
9040
9041
9039
Upper Rapids
Upper Falls
9149-50
Schist
Scale 10 Steps = 1 Square
20
18
16
14
12
10
8
6
4
2