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## **Township 43 north, range 32 west, specimens 31989-32000, 33101-33113. No. 278 Nov 9th 1891**

Finlay, J. R.

[s.l.]: [s.n.], Nov 9th 1891

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LAKE SUPERIOR SURVEY



# Indep<sup>t</sup> LAKE SUPERIOR SURVEY. INSTRUCTIONS.

**Topography.**—On the left-hand page map as much of the section as has actually been seen, counting each of the spaces between the blue lines as 100 paces, and 20 of these spaces to one mile, or 2,000 paces. The scale is four inches to the mile, and the heavier blue lines, outlining one inch squares, mark forties. Denote streams, lakes, swamps, marshes, etc., by the topographical signs annexed.

The geologist will consult with the compassman, and describe as accurately as possible, the timber traversed. When pine is found, give its proportion; tell whether good or poor, and indicate kind—white, norway, jack. If hemlock is found, note the relative amount. In hard wood districts, designate as good or poor, heavy or light, and indicate predominant kinds, oak, maple, birch, etc. Cedar swamps, spruce swamps, tamarack swamps and meadow swamps will be always discriminated. Outline burnt timber.

Each day, just before leaving camp, the geologist will compare his own and the camp aneroids, and the reading of each, with time, will be recorded. At work the aneroid will be read on gentle slopes at intervals of 200 paces; on steeper slopes at intervals of 100 paces; also at all maxima and minima. When minima are streams the map and notes will indicate this, showing width and character of streams. When a stream has made a cut of importance, aneroid readings will be made where the banks break off and at water level. If instead of an abrupt break, the stream valley has steep slopes, aneroid readings will be made with sufficient frequency to show this character.

At reading points the compassman will stop, read the dial compass, and remain until the records are complete. The readings will, as fast as made, be placed upon the map at the right-hand side of the line traveled, and in the notes, the numbers being inclosed in parentheses, basing the work upon the bench-mark which served as a starting point. At bench-marks the absolute reading of the aneroid and the altitude as shown by the bench-mark will be recorded to serve as a base for subsequent readings. For instance, aneroid 29.13 inches; altitude on bench-mark, 275 feet. At each subsequent reading, by setting 275 on the altitude circle at 29.13 on the fixed dial, altitudes may be directly recorded. When the next bench-mark is found at two miles distance, the difference between the aneroid reading on the basis of the first bench-mark and the second bench-mark will be recorded. At intervals of a half hour during the day the time will be attached to the aneroid readings. Upon reaching camp, after the day's work, the geologist will record the readings of his own and the camp aneroid, and also the time. Interpolations will then be made, based upon the bench-marks and times (not distances) if the day has been one of no abnormal atmospheric disturbances, or upon both bench-marks and camp aneroid readings if there have been unusual disturbances, and the corrected numbers, less a constant of 4 feet, will be placed upon the face of the map at the left-hand side of the lines of travel, and in the notes without parentheses, but the parentheses numbers will not be erased.

At each aneroid reading the trend of a horizontal contour line will be indicated upon the face of the map, making the length of the line correspond as nearly as may be with the actual distance seen. In passing directly up or down a slope, the contour lines will be at right angles to the direction of travel. In passing up a hill diagonally the contour lines will intersect the lines of travel at various angles, which can be estimated and plotted with sufficient accuracy by an appreciation of the north and south direction.

The course of travel will be always north and south. In starting from a quarter or a sixteenth post, the work will be plotted on the assumption that the true course is followed, but upon reaching the next section line the geologist will remain in the position at which the line is struck by the compassman until the latter finds the adjacent bench-mark. The intervening distance will then be paced by the compassman, and the point of intersection of the section line marked. From this point to the starting-point, a right line will be drawn as the actual course of travel. The positions of the contour lines, aneroid readings, etc., will not be changed.



Geology. — In running the north and south lines, the compassman will, if possible, determine the course by the dial compass. At the time the geologist reads his aneroid, the compassman will determine the magnetic variation, which will be given to the geologist and recorded in the note-book. Each morning the watch of the compassman will be set to apparent time (corrections being made for the equation of time and for longitude), so that he will need to make no correction in reading magnetic variation. On cloudy days, and at times when the sun is too low for the use of the dial compass, the course run will be by needle upon the supposition that the magnetic variations indicated on the township plats are right when corrected by deducting  $3^{\circ}$  if the variation is east, or by adding the same amount if the variation is west.

Not less than once per week the accuracy of the watch of the geologist in charge of a party (who will give time each morning to the compassmen), will be tested. This may be done, first, by obtaining correct time from a railway station by means of a packer when sent out for provisions. Such time will be mean, i. e., watch time for the nintieth meridian. Second, corrected time may be found by blazing out a north and south section line, preferably a range line, for some distance, setting a signal on the line and placing the dial compass duly leveled, in a north and south direction upon a Jacob's-staff just before mid-day, and setting the watch at 12 at the time the line strikes the noon hour. In a watch thus set all corrections are made.

It will be the constant business of the geologist to search for outcrops. All hills within a reasonable distance of the course of travel will be examined. Oftentimes upon the steeper slopes of a hill a rock surface is covered with a coating a few inches thick of moss, leaves or vegetable mold and can be stripped with the pick. Where the exposure is small and there is the least possibility that it may be a large boulder, indicate this fact in the notes and by a query on the map. All ledges off the line of travel of the compassman will be located by the geologist pacing to this line in an east and west direction, his course being determined by compass.






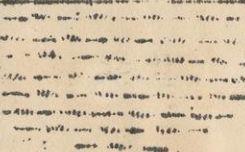
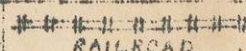
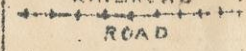

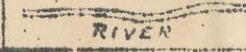
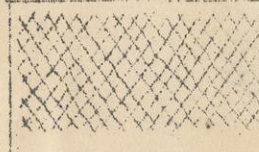
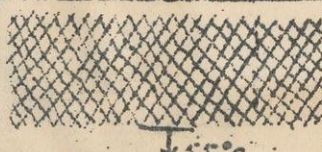


Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, having strike line and dip arrow with numbers attached. The greatest care must be taken to avoid confusing slaty or schistose structure, with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query.

To each exposure on the face of the map, attach the number of the specimens representing it. 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, No. 437, 1226, N., 353 W., *Strike, N.  $47^{\circ}$  E., Dip,  $68^{\circ}$  S. E.* Then follow with as full a description of the ledge as possible.

Collect a specimen from every ledge, and if the ledge exposes different kinds of rock, collect a specimen of all varieties. Take care to get fresh material, unless for a special purpose the weathered surface is desired. Where ledges are infrequent the normal size of specimens will be  $3 \times 1 \times 1$  inch. In case several specimens of the same ledge are necessary, and when ledges are numerous, specimens  $2 \times 2 \frac{1}{2} \times \frac{3}{4}$  inch will be allowed. In all cases collect chips for slicing. No two specimens will be given the same number. In the cases in which several specimens come from the same ledge, the different numbers assigned to them will enable an easy description of their relations. Specimens will be placed at once in paper bags provided, upon which shall be marked in at least two places, with a blue or red pencil, the specimen number.



# TOPOGRAPHICAL SIGNS.

 <p>PINE OR HEMLOCK</p>	 <p>HARDWOOD</p>	 <p>PINE OR HEMLOCK AND HARDWOOD</p>	 <p>CEDAR SWAMP</p>
 <p>SPRUCE OR TAMARACK SWAMP</p>	 <p>MARSH</p>	 <p>RAILROAD</p>  <p>ROAD</p>  <p>CREEK</p>  <p>RIVER</p>	 <p>NO STRUCTURE</p>
 <p>↓ 55° S. NEARLY MASSIVE</p>	 <p>↘ 35° E. ↘ 5.62° E. SHALY OR BEDDED</p>	 <p>↗ 83° SECONDARY STRUCTURE.</p>	

# EQUATION OF TIME FOR 1891.

Day	Min.	Day	Min.	Day	Min.
-----	------	-----	------	-----	------

## JUNE.

Add to watch time.

1-6	2	7-11	1	12-16	0
-----	---	------	---	-------	---

Subtract from watch time.

17-21	1	22-26	2	27-31	3
-------	---	-------	---	-------	---

## JULY.

Subtract from watch time.

1-6	4	7-13	5	14-31	6
-----	---	------	---	-------	---

## AUGUST.

Subtract from watch time.

1-7	6	8-13	5	14-18	4
19-23	3	24-26	2	27-29	1
30-31	0				

Book 278



SEPTEMBER.

Add to watch time.

1- 2	0	3- 5	1	6- 8	2
9-11	3	12-14	4	15-17	5
18-19	6	20-22	7	23-25	8
26-28	9	29-30	10		

OCTOBER.

Add to watch time.

1	10	2- 4	11	5- 8	12
9-12	13	13-16	14	17-22	15
23-31	16				

NOVEMBER.

Add to watch time.

1-13	16	14-19	15	20-23	14
24-26	13	27-29	12	30	11

Geological and  
Topographical notes  
by J. R. Hinlay

1

No 5.

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SPECIMENS: 1984-2000  
3101-3113

TOWNS

43-32



2

Nov 9<sup>th</sup> 1891

S. 14

T. 43

R. 32

(379)

883

\* - \*

\*\*\*

MIXED  
GROWTH\*  
SPRUCET  
A  
M  
P  
R  
A  
C  
K

(420)

470

(410) 415

(390) 395

420

MAPLE

HARDWOOD

MAPLE

7.55 A.M. Going South E line Sec 14 **3**  
B.M. 392.15 300 = 284

Pine and mixed growth.  
1000 (420) 10.25 A.M.

Sec 14 N 1000 a number of  
test pits here show jasper and  
mixed ore along with red  
shaly and gritty material and  
greenstone. The line between  
the slate and the greenstones  
passes almost exactly through  
this point. The Hollister mine  
is about 200 paces east of this pt.

Sec 14 100 N of S.E. cor

Test pit showing a greenstone  
agglomerate.

2000 10.50 A.M.

— Going N on E  $\frac{1}{2}$  line Sec 14 3.20 P.M.  
Aneroid 390. Edge of swamp

1994 Sec 14 N 120 W 500

Jasper from test pit.

1997 Sec 14 N 850 W 520

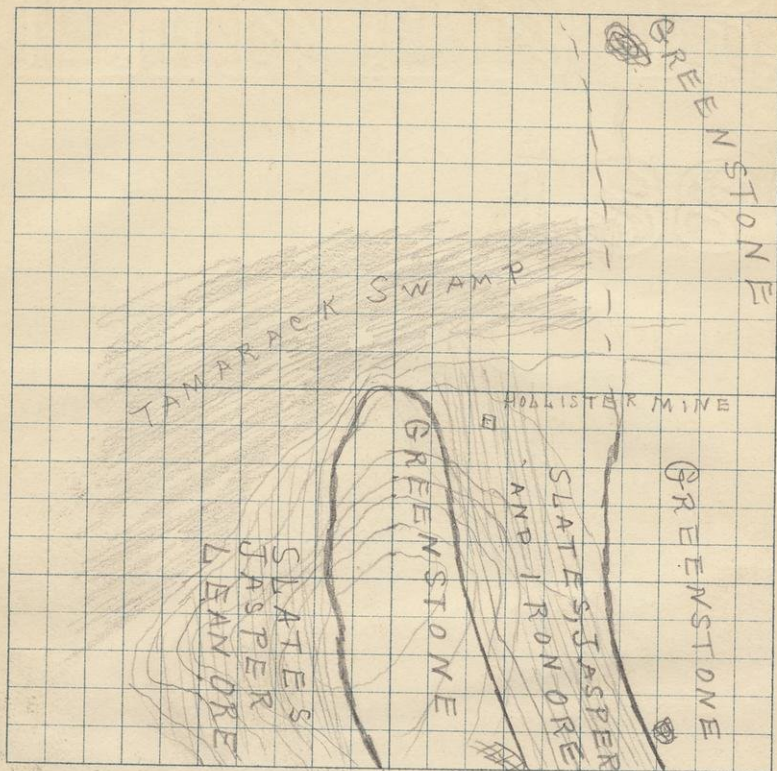
Outcrop of jasper. Looks like  
quartz porphyry.

1000 (380) 3.30 P.M. Tamarack swamp <sup>then</sup>

2000 (370) B.M. 380.97 4 P.M.

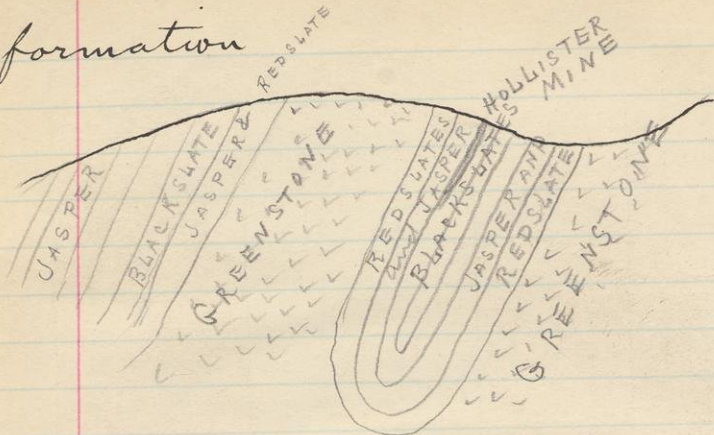
Cedar swamp.





The Hollister Mine is not now working. I could not get into it or obtain very definite information about it. The ore-body runs north and south and dips west about  $80^\circ$ . The rocks about it are all black slates or reddish jaspery shales. I think it safe

to correlate it with the Mansfield  
formation



The above plate show the distribution of the rocks. It will be seen that the Hollister are is very near the greenstone. None of the rocks in the neighborhood resemble the banded quartzose and slaty beds of the Crystal Falls district. The ore-body is 15 feet wide at the widest place and 82 feet long — so I was told by a man who had been in the mine.



6

Nov 9<sup>th</sup> 1991

S.

23

T.

43

R.

32

(440)

380

420

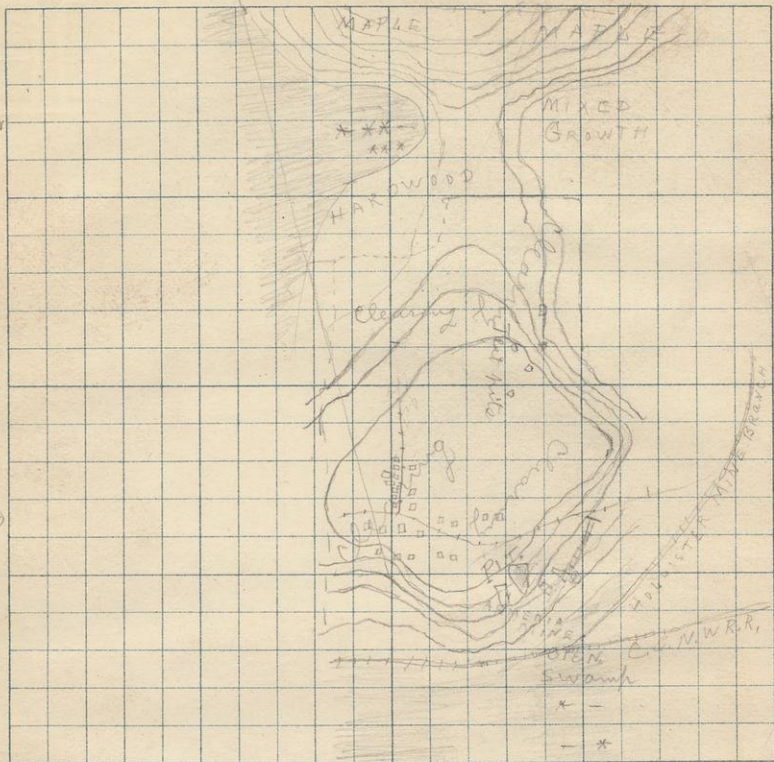
450

450

420

390

350



1995

Along S. on E line Sec 23

7

1989 Sec 23 N 1750 from S.E. cor  
Test pit showing green slate  
and jasper. Whether this green  
slate is altered greenstone or  
not I do not know. Also it  
is impossible to tell whether  
the jasper was found in place  
or not.

1990 Sec 23 N 1590  
Banded green slate. Looks clastic,  
but may be greenstone.

1991 Sec 23 N 1200 W 100  
Test pit showing abundance  
of jaspery slate and clastic  
are

1992 Sec 24 620 N 1980 W  
Black slates in R.R. cut. These slates  
are jaspery and reddish and  
greenish black. They are much  
crumpled.

Strike N 30° W

Dip 80° W.

2000 (385)

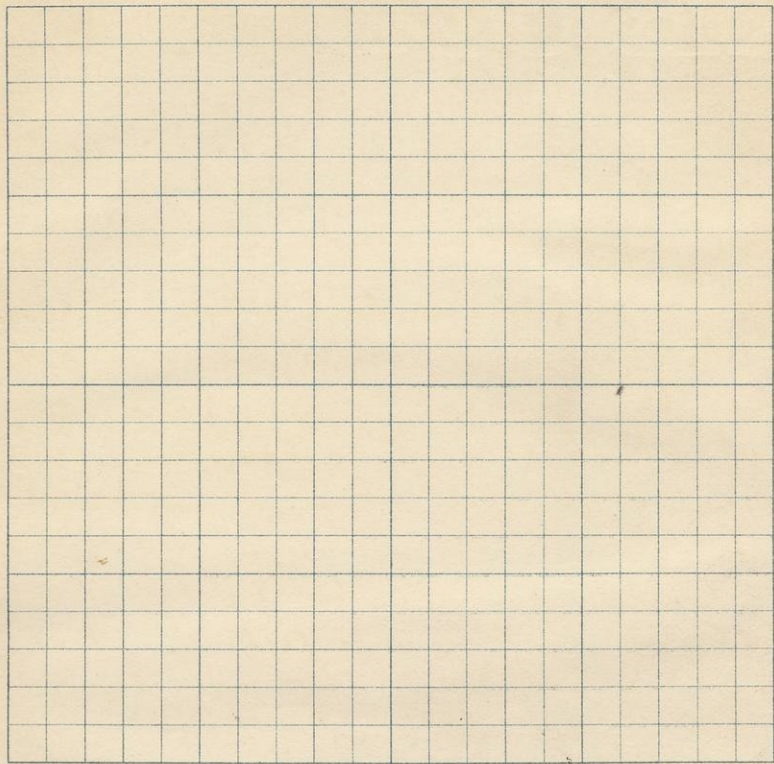
B.M. 381.47. Tan. Swamp.

— Along N on E line Sec 23 1.27 P.M.

B.M. 383.1 700 = 28.1

Came out 380 paces off the line E.





The Armenia Mine is now abandoned. It was a large open pit. There was nobody about the place to give me any information worth having. The ore lies in a crumpled flaggy and slaty formation much like that of Crystal Falls.

1993 Sec 23 N 950 W 500  
Test pit with gasper and lean or 9

1000 1.49 P.M. Clearing

1994 Sec 23 N 1835 W 600  
Test pits with gasper and slate.

1995 Sec 23 N 2000 W 400  
Test pit with green slate

---

It is to be remarked that the ore at the Armenia mine is 800 paces from the nearest greenstone. A great thickness of <sup>slates</sup> ~~greenstone~~ intervenes. There are a few outcrops of slate but not enough to give a succession of the beds. I believe that 1500 feet of strata come in between the ore horizon of the Armenia and that of the Mansfield.

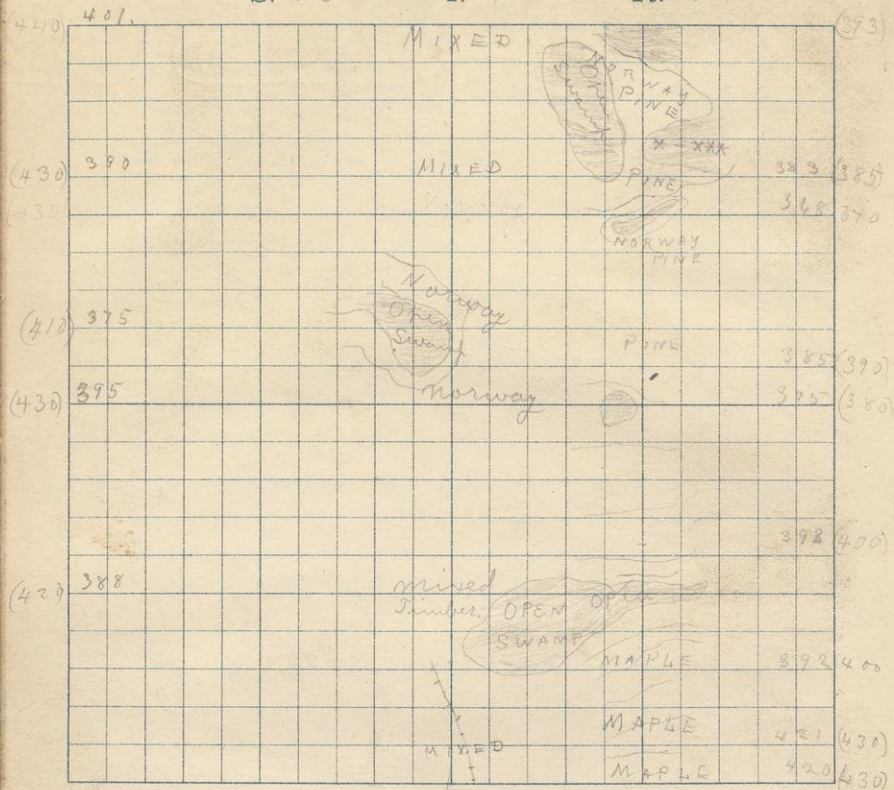


10 Nov 10<sup>th</sup> 1891

S. 15

T. 43

R. 32



Going Son  $\frac{1}{4}$  line Sec 15 8.15 A.M. **11**

B.M. 392.94  $\Delta = 28.8$

Cedar swamp

1000 (380) 8.45 A.M. Norway pine

2000 (430) 9.14 A.M. Fine maple.

1998 Sec 22 N 2000 W 1000

Red shale from test pit.

— Going Nor  $W\frac{1}{8}$  line Sec 15

1000 (430) 11.49 A.M. Norway pine

2000 (440) B.M. 401.04 12.11 A.M.

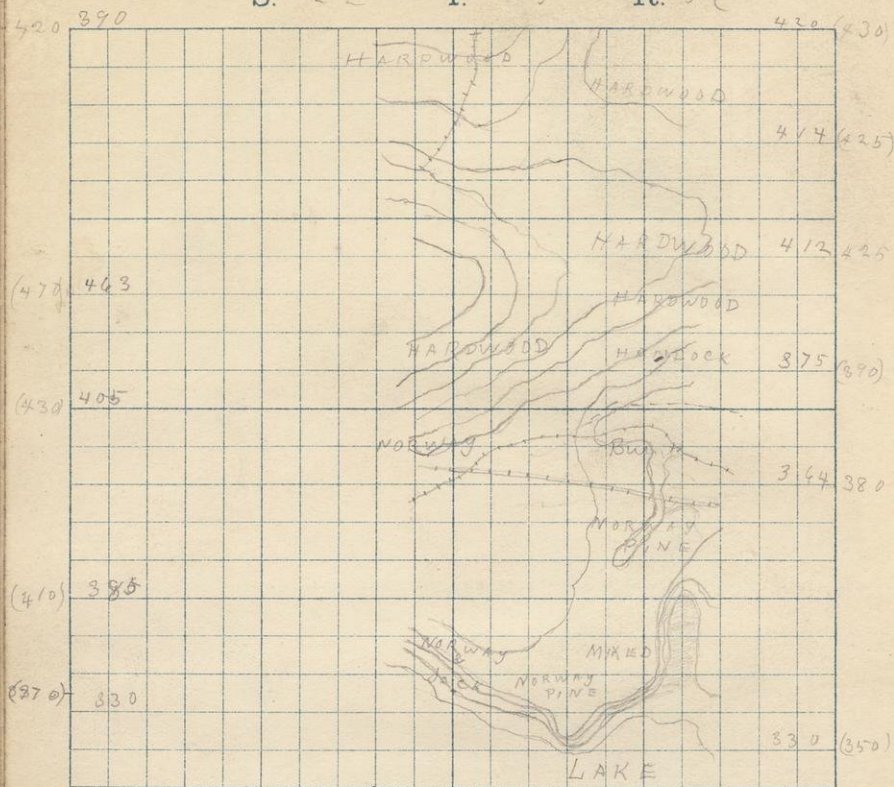


12 Nov 10<sup>th</sup> 1891

S. 22

T. 43

R. 32



Going S on  $\frac{1}{4}$  line Sec 22  
1000 (380) 9.43 A.M.

At 1750 Offset 500 to W  $\frac{1}{8}$  line 10.30 A.M.

Going N on W  $\frac{1}{8}$  line

250 (1370) Norway and jack pine

1000 (430) 10.50 A.M. Edge of hardwood.

2000 (420) 11.17 A.M. Hardwood

Found original line and lumberman's  
 $\frac{1}{2}$  stake. No new line has been  
blazed or stake set by the L.S.S.  
either here or at the  $\frac{1}{4}$  stake.



14 Nov 11<sup>th</sup> 1891 Locality.

S. 14

T. 43

R. 32

(330) 402

MIXED  
TIMBER

NORWAY

MIXED  
PINE

404 400

PINE

PINE

(340) 384

402 (390)

NORWAY

SPRU

MIXED

388 370

(320) 365

\*\*\*  
\*\*\*  
\*\*\*

Norway

330 370

385 (340)

Going down E line Sec 16 8.38 AM, 15

B. M. 413.32 200 = 28.4

1000 (390) 9.05 A.M. MIXED

1999 Sec 16 N 560

Ledge of dark banded stratus  
Strike N 90° E (about)

Dip 20°

It is a small moss covered out-  
crop and it is not possible  
to determine much from it.

2000 Sec 16 N 460 W 20

Good sized ledge of greenstone  
in swamp

2000 (340) 10. A.M. Cedar swamp

— Going N on E line Sec 16

1000 (340) 1.40 P.M. Norway & White Pine

2000 (330) 2.10 P.M. Norway

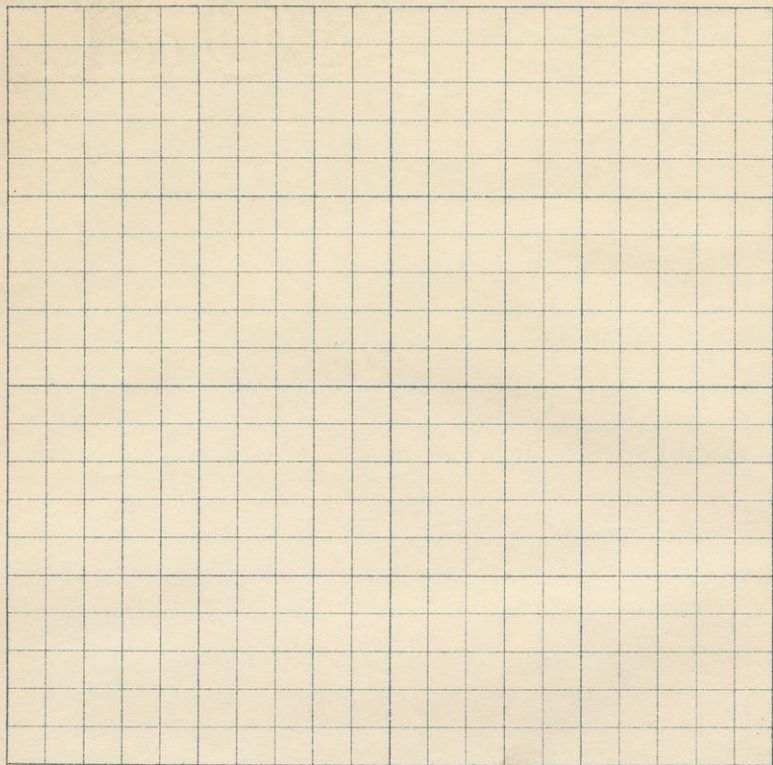
402.43



S.

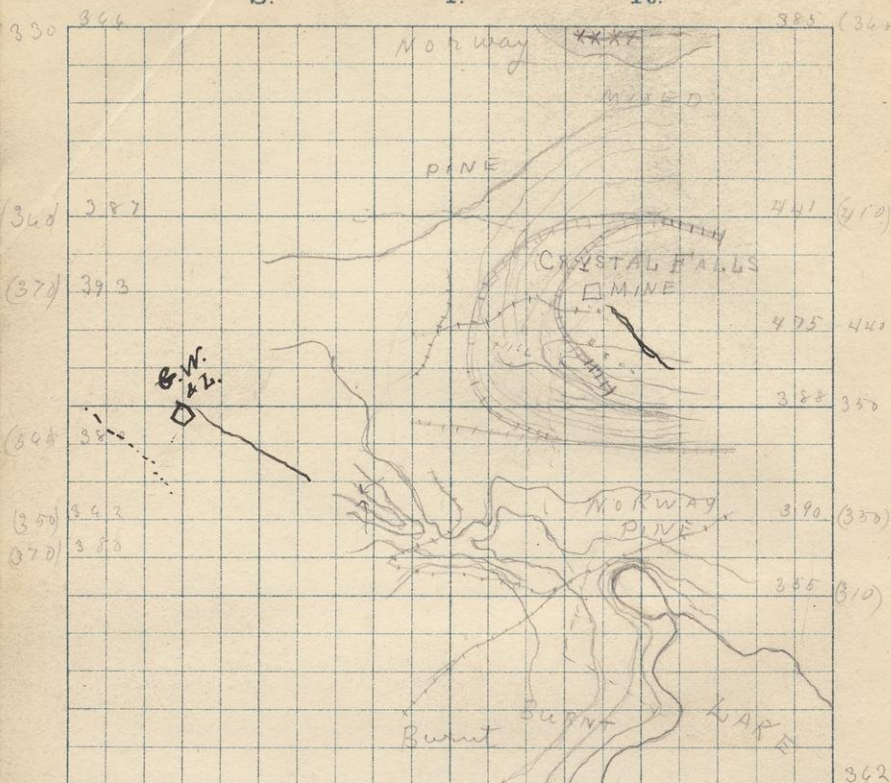
T.

R.









Bring S on E line Sec 21

3101

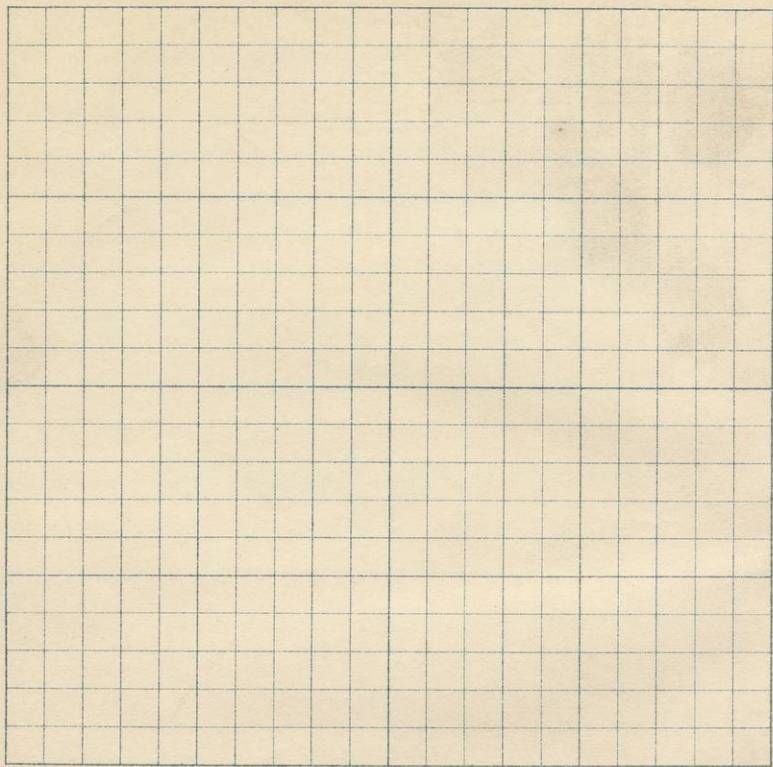
Banded slate from R. R. Cut in  
large Hill

Sec 21 N 140° W 150

There is a large mine on this  
hill, not working. At the  
open pit next the shaft  
house an ore body 7.5 ft  
wide is exposed. This ore body  
ends very suddenly against  
the banded, gaseous country  
rock. How long the ore body  
is I don't know. The formation  
here is tremendously contorted.  
From an outcrop it is impossible  
to determine the dip or strike.  
From the pits, however and the  
ore body you can see that  
the strike is about N. 40° W  
Dip 90°

It is probable that several ore  
bodies were found for there  
are several shafts with ore  
about them. It is impossible to  
give any adequate idea of the  
rocks here by handing in a few  
specimens. It is the Crystal Hills.





slate formation. This formation is practically vertical. Here it outcrops boldly. It is separated from the nearest greenstone by a space of 1000 paces. The same may be said of the ore bodies at the Youngstown, Paint River and Armenia mines.

2000 (310) B.M. 34 2.85. Burnt

11.15 A.M.

— Going N on E  $\frac{1}{2}$  line Sec 21, 12.30 P.M.

B.M. 390.17 600 ft = 28 in

1000 (320) 12.45 P.M.

2000 (330) 1.14 P.M. Norway Pine.



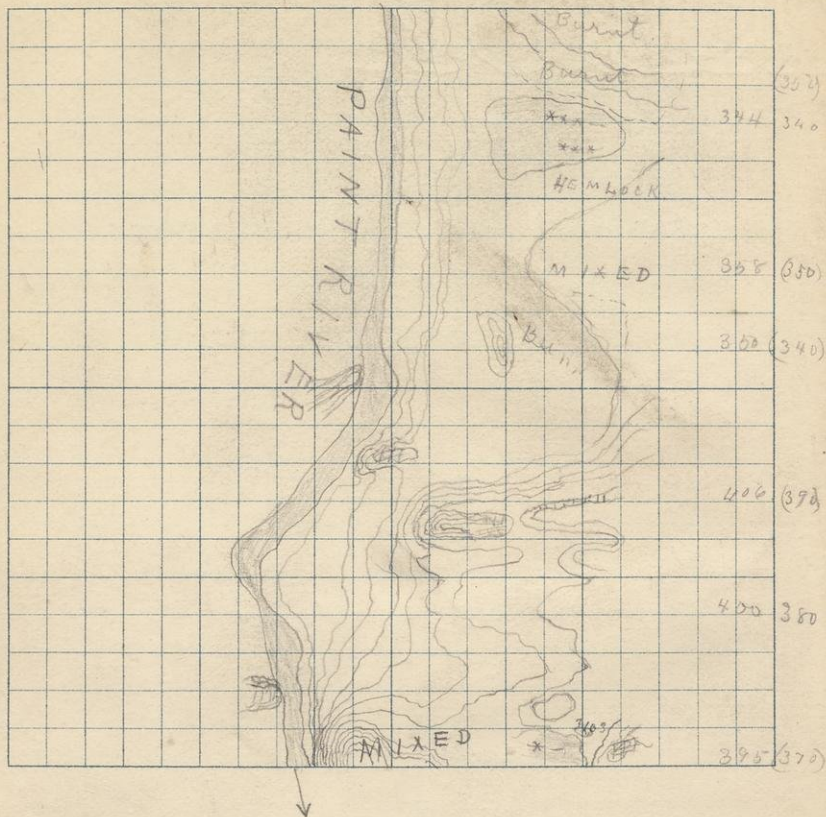
22

Nov 11<sup>th</sup> 1891

S. 17

T. 43

R. 32



Going S. on  $\frac{1}{4}$  line Sec 17.

23

B.M. 369. 37 7.60 A.M. 700 = 28.2

1000 (340) 8.35 A.M.

Burnt.

3102 Sec 17 N 700 W 1000

Greenstone amygduloid with  
incipient schistosity

3103 Sec 17 N 100 W 1000

Greenstone volcanic agglomerate  
with strong schistosity due to  
stretching.

2000 (370) 9.30 A.M. MIXED TIMBER.

Going N on W  $\frac{1}{4}$  line Sec 17

3110 Sec 17 N 200 W 800

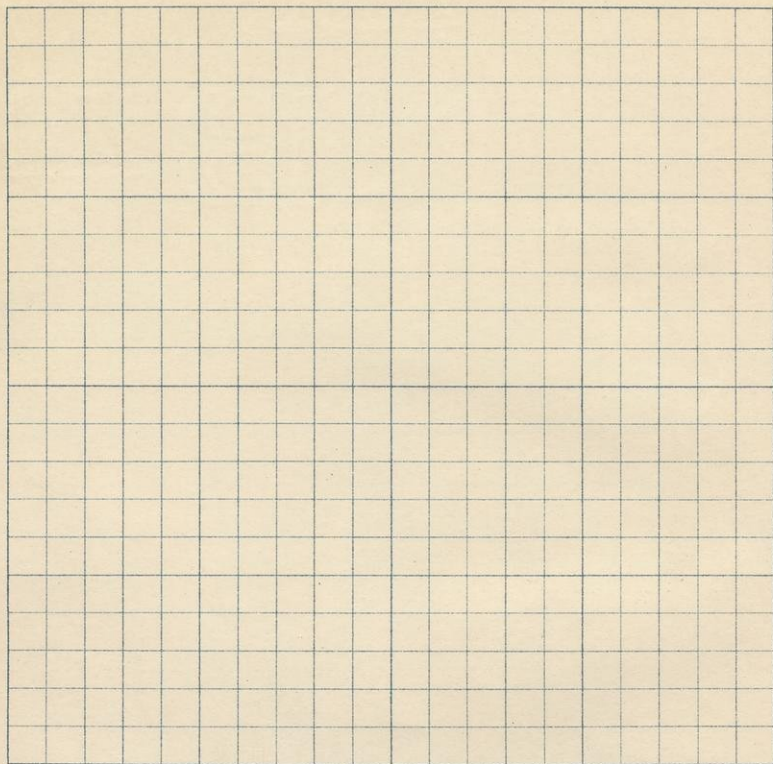
Greenstone amygduloid outcrops  
here at the water's edge



S.

T.

R.



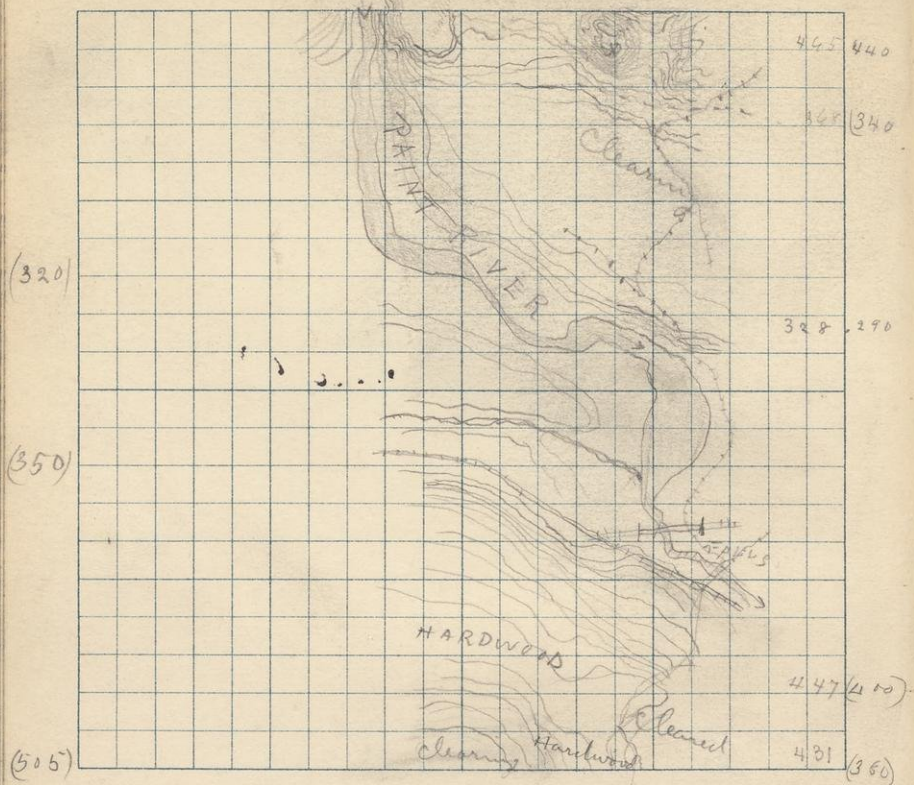




S. 20

T.

R.



Going S on  $\frac{1}{4}$  line Sec 20

3104 Sec 20 1900 N 1000 W

Great bluff of greenstone overlooking the Paint River valley and the Crystal Falls mining district. Here may be seen a coarse volcanic agglomerate. Boulders as much as a foot long can be seen in it.

3105 Sec 20 1800 N (1000 W!)

Greenstone aphanitic with pyrites.

2000 (380) B.M. 431, 52. Closing 11.10 AM.

- Going N on E  $\frac{1}{4}$  line

B.M. 505  $\Delta = 29.1$



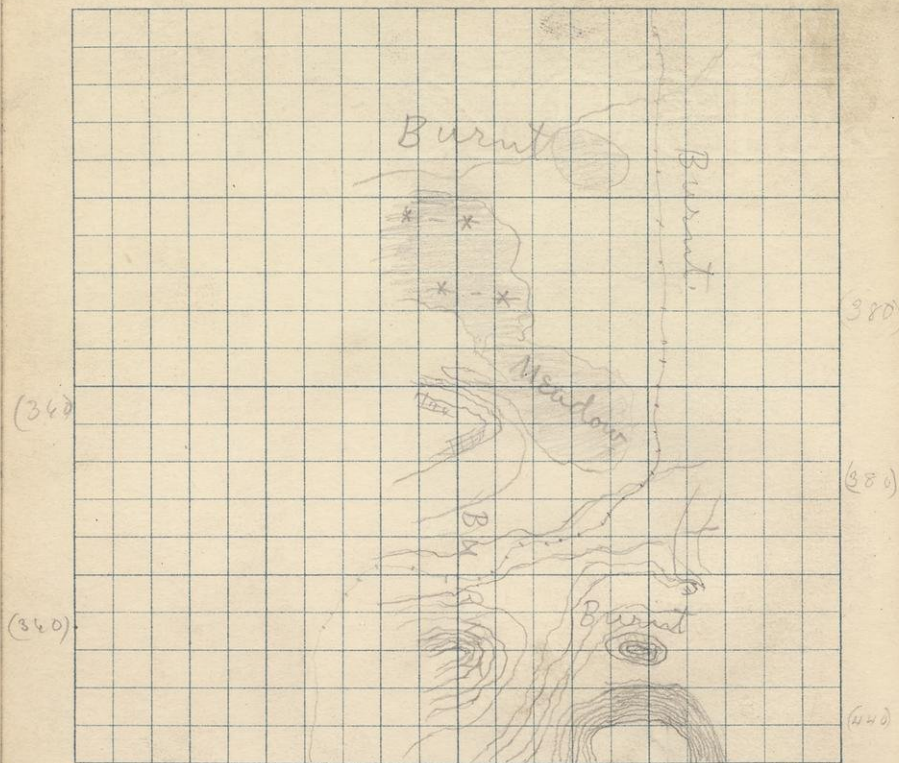
28

Nov 13<sup>th</sup> 1891

S. 18

T. 43

R. 32



3114. Sec 18 N 952 W 500

Here are several ledges of  
greenstone.

2000 (310) B.M. 374.6 Burnt

End of Job.

Young Son E line Sec 18

B M. 373.79 800 = 28.4

2000 (440)

3111 Sec 19 N 1880 from S. E Cor  
Greenstone, pseudo conglomerate  
specimen shows schistosity due  
to stretching.

— Young N on E line Sec 18

3114 Sec 18 N 200 W 500

Schistose greenstone.

315 Sec 18 N 310 W 500

Large ledge of greenstone.

The greenstones in Secs 17, 18, 19  
and 20 beginning just east of  
the Paint River and extending  
westward to this point show  
an increasing amount of  
dynamic alteration. On the E.  
Sec. line of 18 and 19 may be  
seen magnificent examples of  
the production of pseudo-  
conglomerates by brecciation  
in situ. On the E  $\frac{1}{2}$  line of the  
same sections the rocks are  
nearly all rendered schistose  
by a continuance of the same  
forces.



30

S.

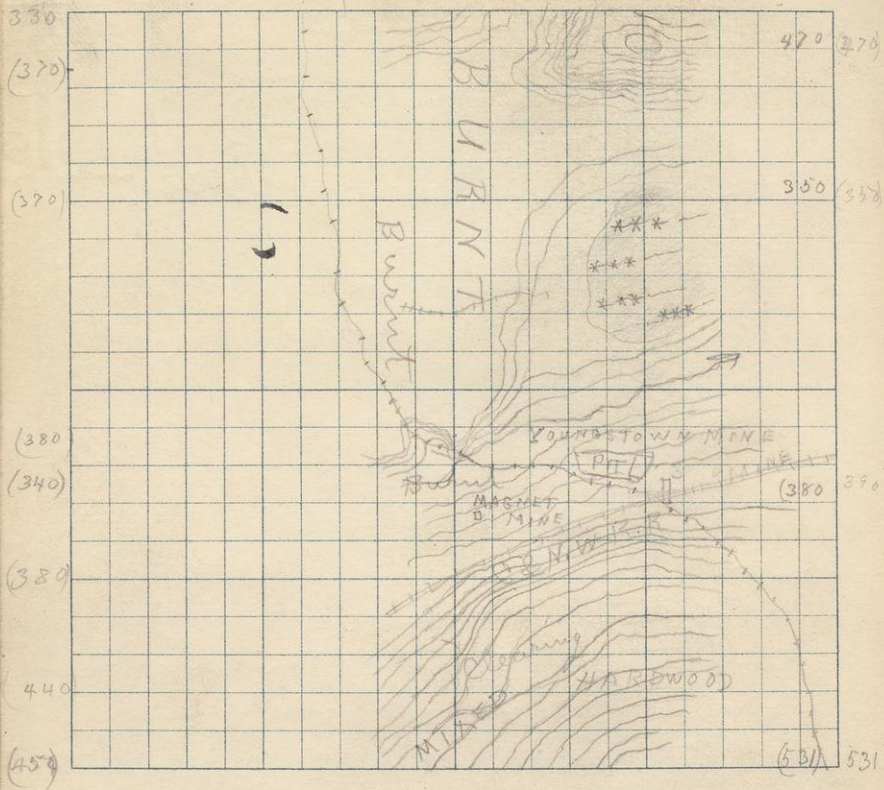
19

T.

43

R.

32



2000 BM. 5 31.

3112 Sec 20 N600 pass.

Banded rock from edge of river just below R.R. bridge.  
- Young Son E line Sec 19

B. M. 454.8 700 = 28.5

1974 Sec line (330)

9

3113 Sec 28 N900 W900

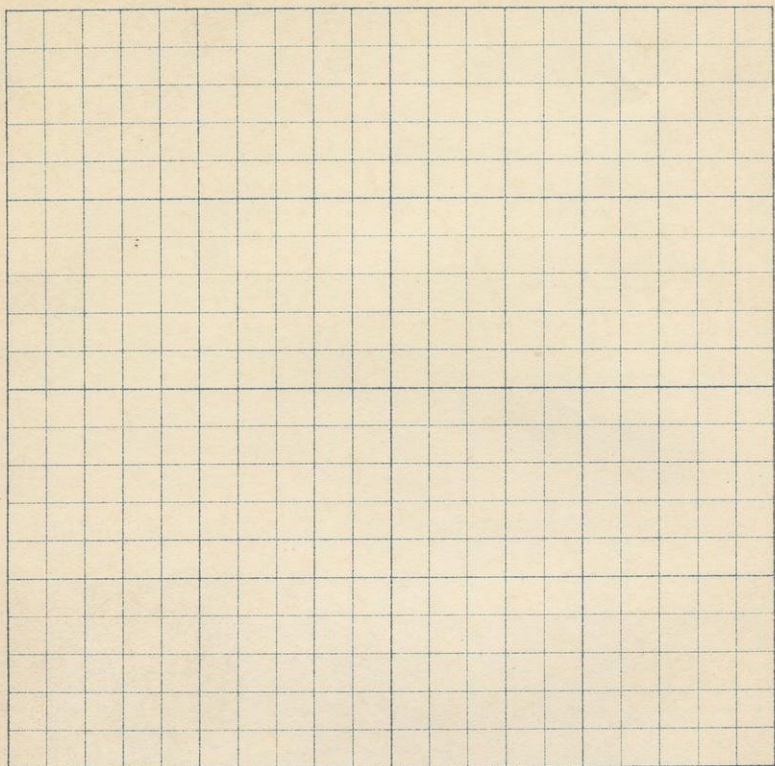
Probable contact between granite and slates, from test pit near bank of Paint River just east of Crystal Falls



S.

T.

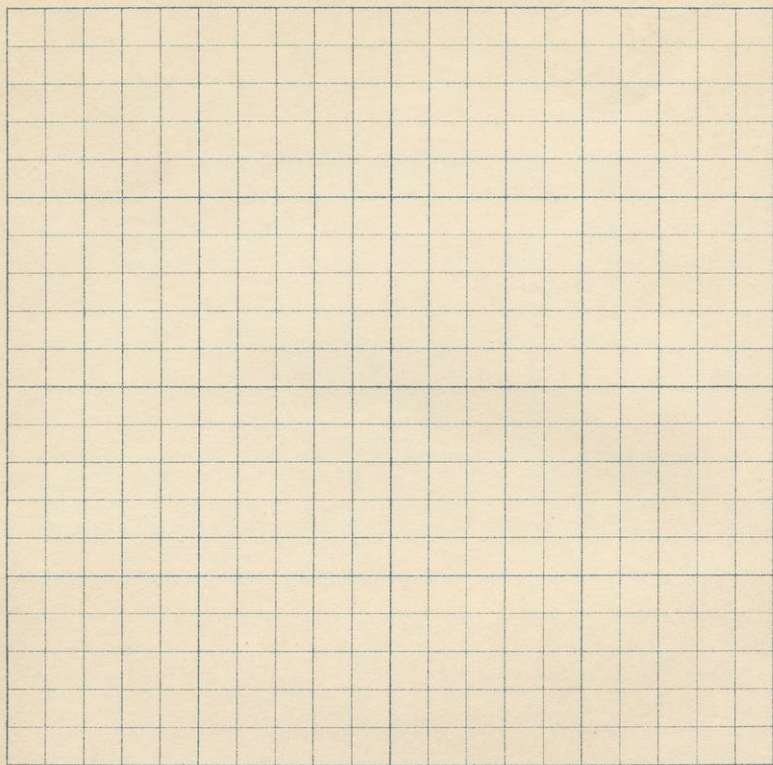
R.



The Youngstown Mine is now shut down. It contains probably the largest body of iron ore in the Upper Peninsula. It is 145 feet wide and nearly half a mile long. Not very much is known about it. It is known to be somewhat irregular and contorted. The ore is too low grade to work at present. It runs about 54 per-cent metallic iron and phosphorus above the bessemer limit. The pumps are not working and the mine is full of water. Scarcely anything can be learned about it except that the strike is E. S. W. and that the ore is in the same flaggy, siliceous, banded rocks as contain the other ore bodies near Crystal Falls.

The dip is everywhere nearly vertical. South of the mine is a large hill of barren green and black banded





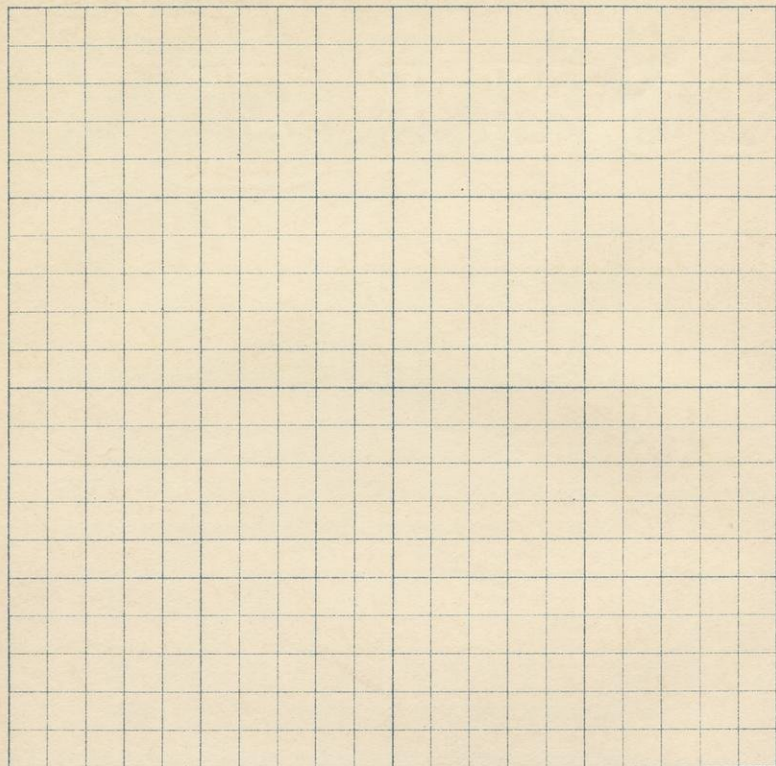
slates, which I am sure lie under <sup>35</sup>  
the ore horizon. These slates  
will be more fully described  
in a description of the Paint  
River and Great Western mines.



S.

T.

R.



Paint River and Monitor;  
Lincoln and Great Western  
and old Crystal Falls mines.

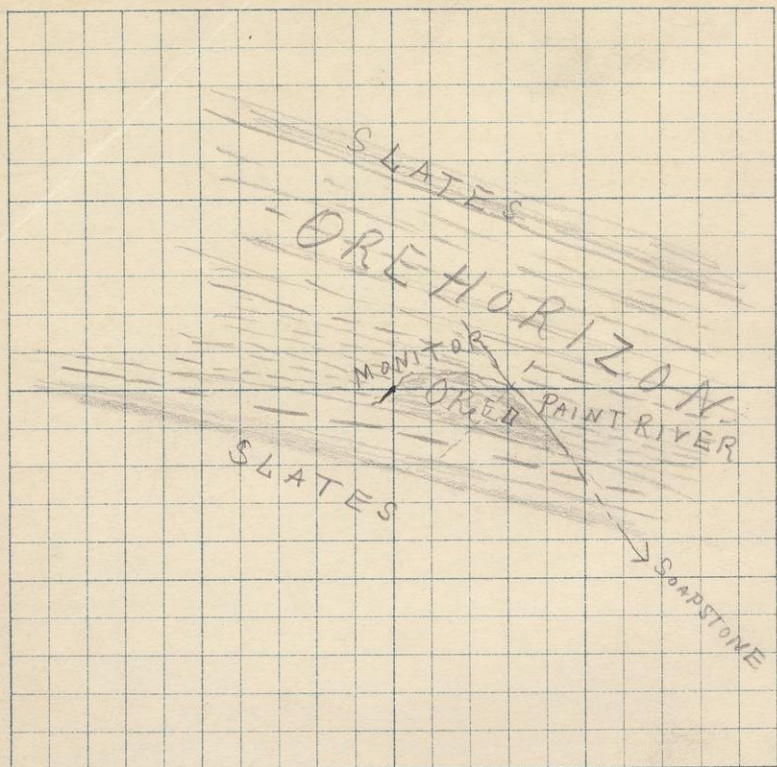
These mines lie  
in a range just east of the  
Paint river. They are extremely  
interesting from several points  
of view. In the first place it  
can be made out that the  
ore lies in a definite horizon.  
The Paint river exposes a  
great succession of outcrops,  
from which one can make  
out something of the succession  
of the beds. The ore bearing  
beds have a very striking  
appearance. They are banded  
siliceous slates and quartzose  
bands full of iron. The ore  
bodies are thick in these rocks.  
The Paint River and Monitor  
mines are working the same  
ore-body, which is about  
300 ft long 100 feet wide  
and of unknown depth. The  
arrangement of the rocks is  
represented on the sketch on



S.

T.

R.



the opposite page. In the 39  
Parit mine the ore is cut off  
sharply by a hanging wall  
of green soapstone which has  
every appearance of a dyke  
cutting across the formation  
at an angle of  $45^{\circ}$ . The rock  
is soft, green and soapy. It  
has the appearance of a decomposed  
basic dyke. The trough formed  
by the siliceous and slaty foot-  
wall and this greenstone soap-  
rock pitches very steeply toward  
the west



40

3

21

S.

45

T.

31

R.

33/27

33/28

33/29

33/14  
33/15  
33/16  
33/17  
33/27  
28  
29

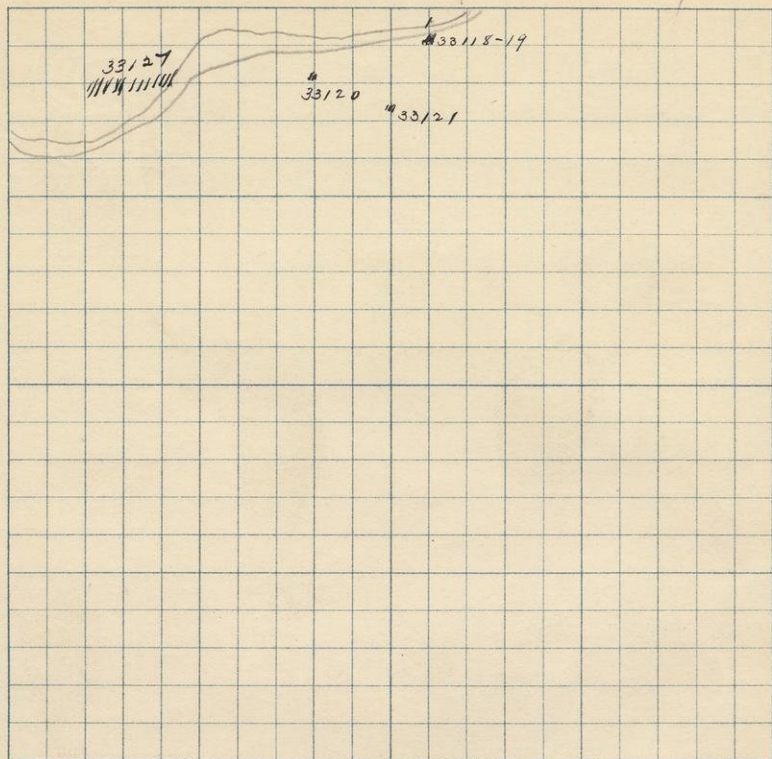
3

~~23114~~ 220 N - 530 W 86 cor sec 21-45-31  
~~23115~~ 200 N - 600 W " " "  
~~23116~~ 150 N - 650 W " " "  
 33117 (about 125 N 700 W " " "

33114-33127  
 were sent by Friday to  
 CR Van Hise in Feb. 92  
 with letter enclosing  
 the above locations



S. 28 T. 45 R. 31



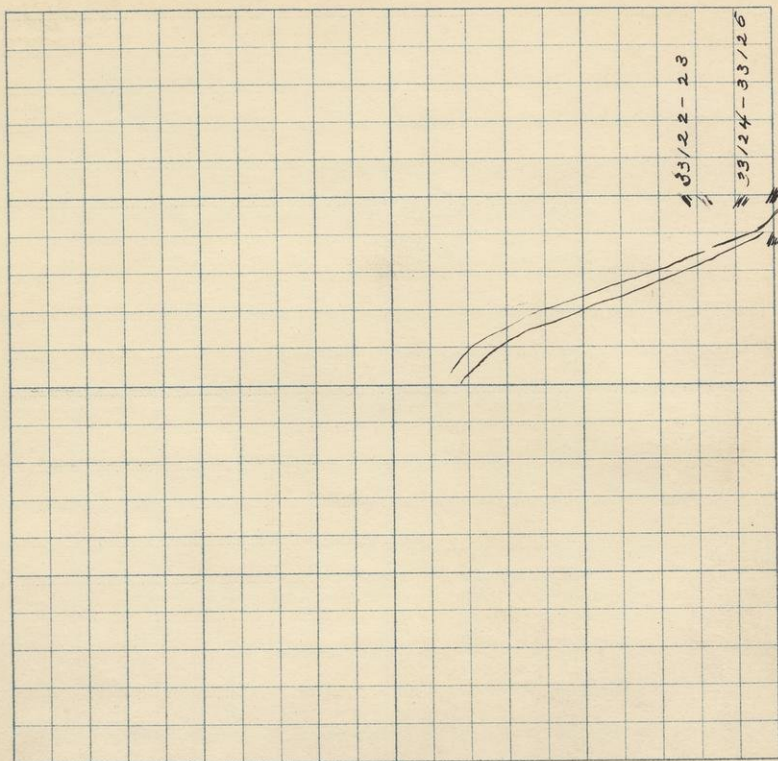
33118 1900N 900 W . 88 cr 28-45-31

33119 " " " "

33120 1800 " 1200 W " "

33121 1750 " 1000 W " "





33/2

33/2

2

33/24

25 150°N - 50°W SE, cor 1-45-32

26 From Shouldice list fits.

33/22

23 150°N - 180°W SE cor 1-45-32

I take these rocks ~~to~~ (which are several hundred feet thick, I think) to be partly ash beds and partly altered sediments. They overlie the lean ore beds.

striking 70°W Dip 45° NE



