Township 43 north, ranges 30, 31, and 32 west, specimens 31905-31988. No. 272 Oct 27 1891

Finlay, J. R.
[s.l.]: [s.n.], Oct 27 1891

LAKE SUPERIOR SURVEY

Indst.

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° 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.

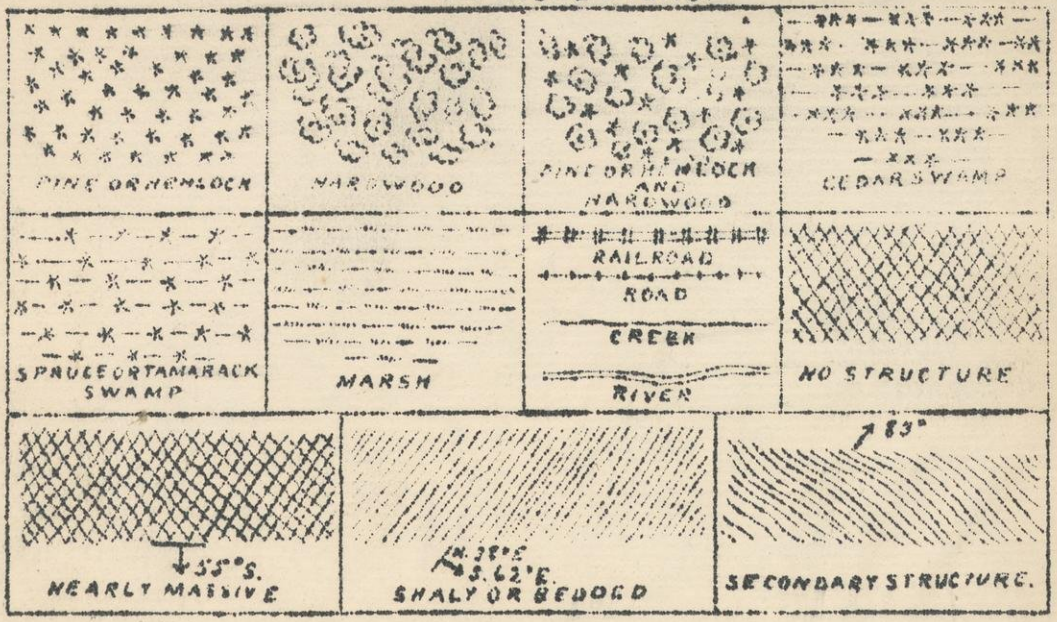
It will be the constant business of the geologist to search for outcrops. All hills within a reasonable distance of the course of travel will be examined. Oftentimes upon the steeper slopes of a hill a rock surface is covered with a coating a few inches thick of moss, leaves or vegetable mold and can be stripped with the pick. Where the exposure is small and there is the least possibility that it may be a large bowlder, 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° *E.*, *Dip*, 68° *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 3x4x1 inch. In case several specimens of the same ledge are necessary, and when ledges are numerous, specimens 2x2½x¾ 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.



EQUATION OF TIME FOR 1891.

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				

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. Finlay

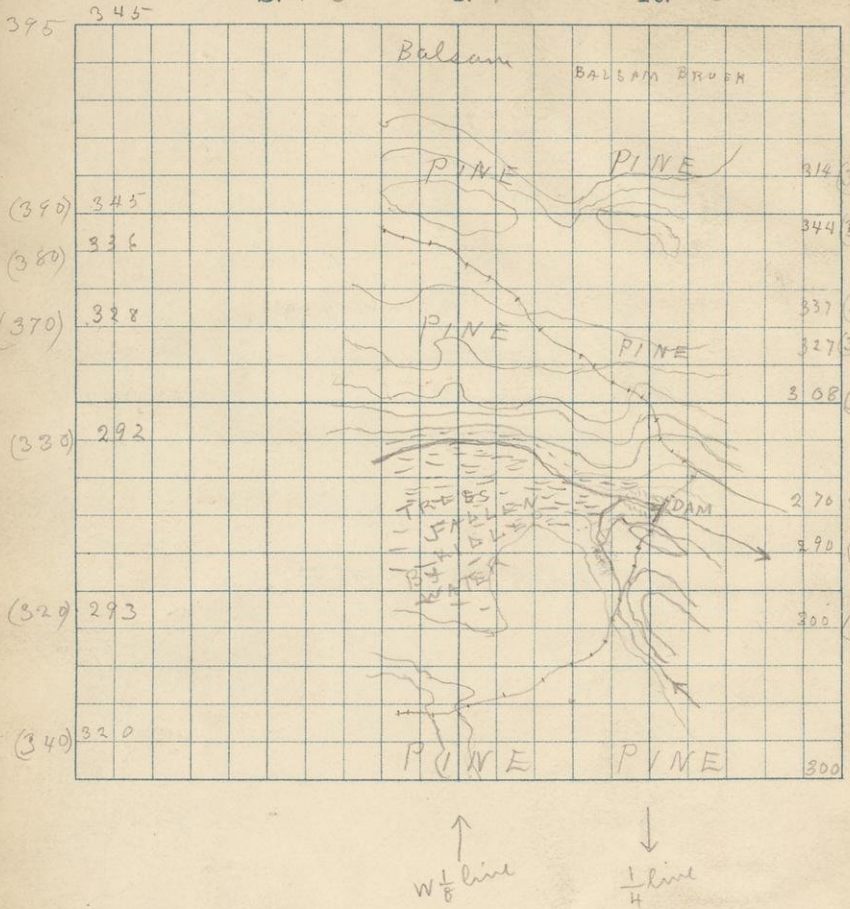
No. 4.

SPECIMENS: 1905–1989

TOWNS 43–30
43–31
43–32

2 Oct 27th 1891

S. 13 T. 43 R. 30



Going S on ¼ line Sec 13

B.M. 332.7 400 ft = 29.1 ch

8.13 AM

Balsam

400 (310) Edge of fine Pine grove

540 (340) " "

760 (330) Very heavy Pine

1000 (300) 9 AM. Supply Road. Pine

1280 (240) Ford. River. Logging road crosses stream on a dam which is made about 40 feet E of ¼ line.

1400 (280) very heavy Pine

1600 (290) " " "

1770 (270) Small stream flowing N.W.

2000 (285) Sec line Heavy Pine.

Going N on W ⅛ line Sec 13.

100 large Pines

205 Supply road " "

900 Ford River

1000 3.30 P.M.

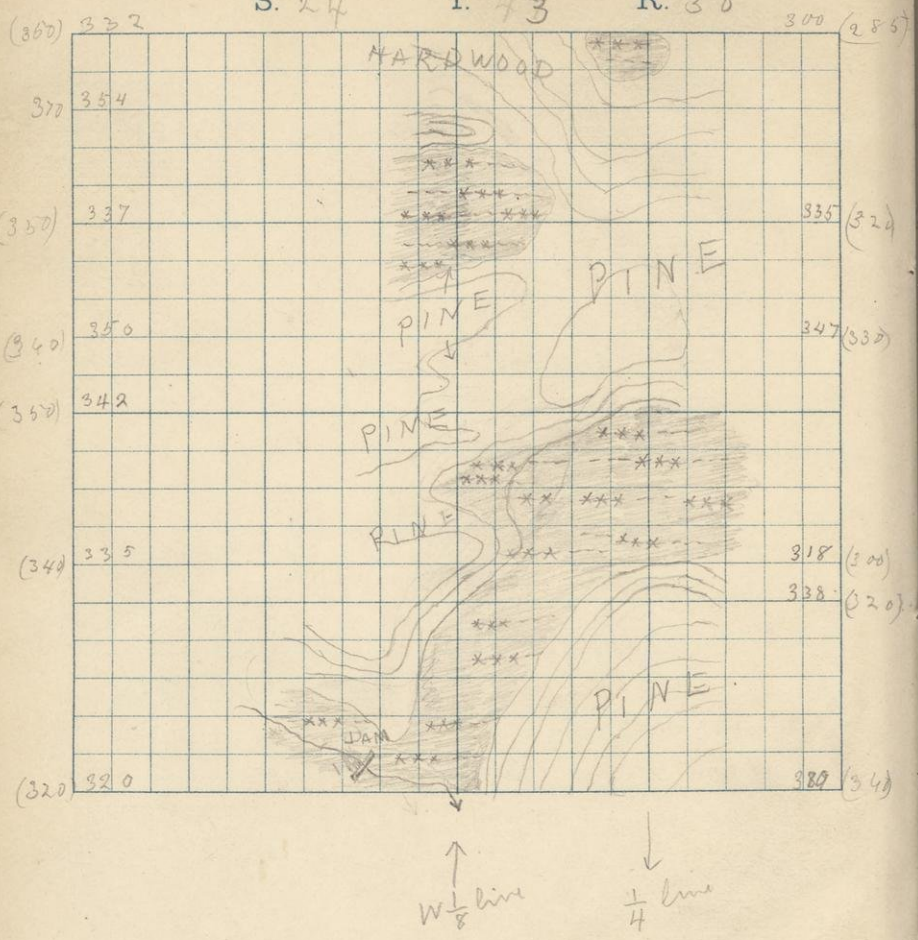
1390 (380) Supply road Heavy Pine

2000 (395) 4.05. Balsam Brush

B.M. 344.89.

4 Oct 27th 1891

S. 24 T. 43 R. 30



Going S on $\frac{1}{4}$ line Sec 24

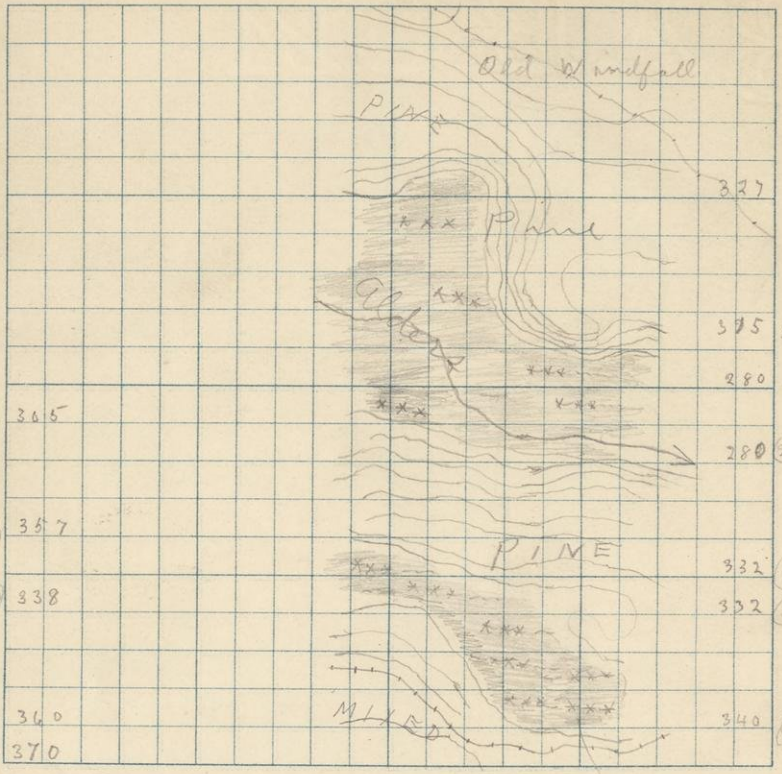
9.35 AM.

0. Edge of cedar swamp
120 Edge of Pine
500 (320) Pine
800 (330) Pine "
1000 (300) 10.05 A.M. Edge of Cedar Swamp
1500 (320) Pine.
2000 (360) B.M. 379.91, 10.40 AM.

Going N on W $\frac{1}{8}$ line Sec 24
B.M. 320.14. 1100 = 28.3
1.20 P.M. Pine, spruce, cedar, balsam
600 (340)
1000 (350) 1.48 P.M. Pine
1200 (340) "
1500 (350) Cedar Swamp
1800 (370) Pine Ridge
2000 (350) Sec line. Hardwood
2.20 P.M.

6 Oct 28th 1891

S. 14 T. 43 R. 30



E 1/8 line

Sec line

Going S on E line Sec 14

B.M. 35 1.35 1000 = 28.1

200 Supply road. Pine

500 (330 Pine

1000 (290) Cedar swamp Windfallen

1400 (350) Hardwood, hemlock, pine,

1950 Supply road Hardwood

2000 (370) Hardwood, hemlock, pine.

8.45 A.M.

Going N on E ¼ line Sec 14.

0. (380) 8.50 A.M. Hardwood, hemlock, pine

100 (370) " " "

254 Supply road. Heavy Pine.

425 (350) Cedar swamp

600 (370) Pine ridge

900 (320) Very Fine Pine

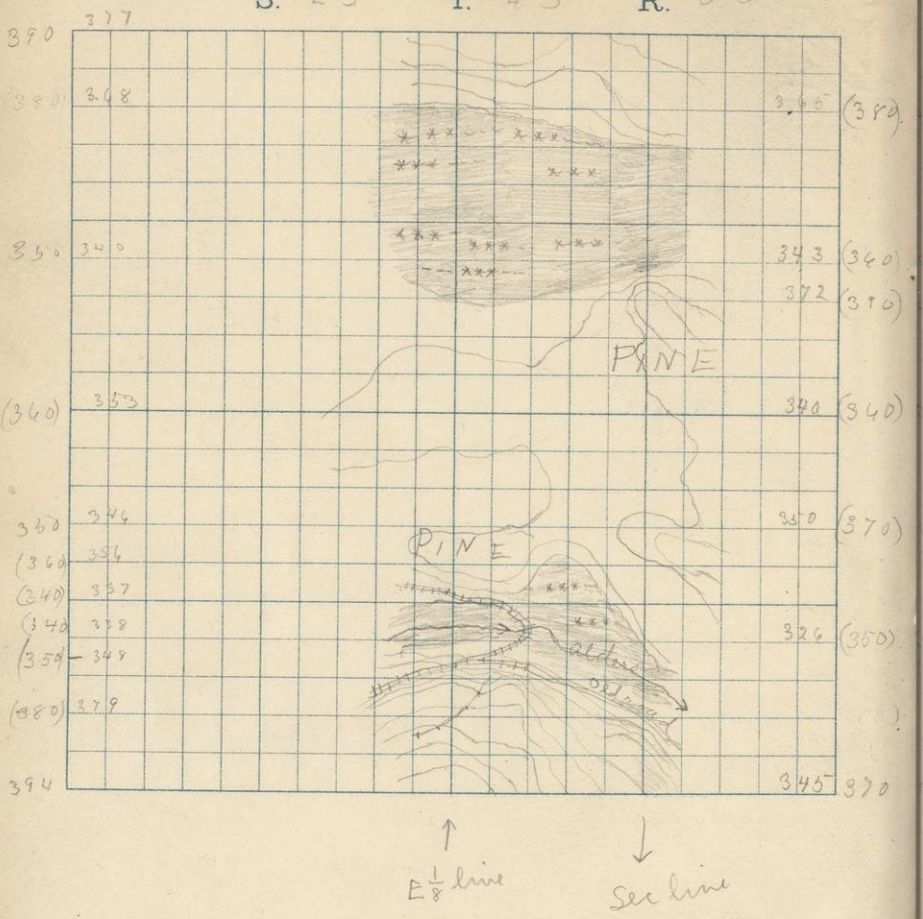
1000 (305) 9.20 A.M. Cedar swamp

1500 (320) Edge of Pine timber,

2000 (385) B.M. 343.28 10. A.M.

8 Oct 27th 1891

S. 23 T. 43 R. 80



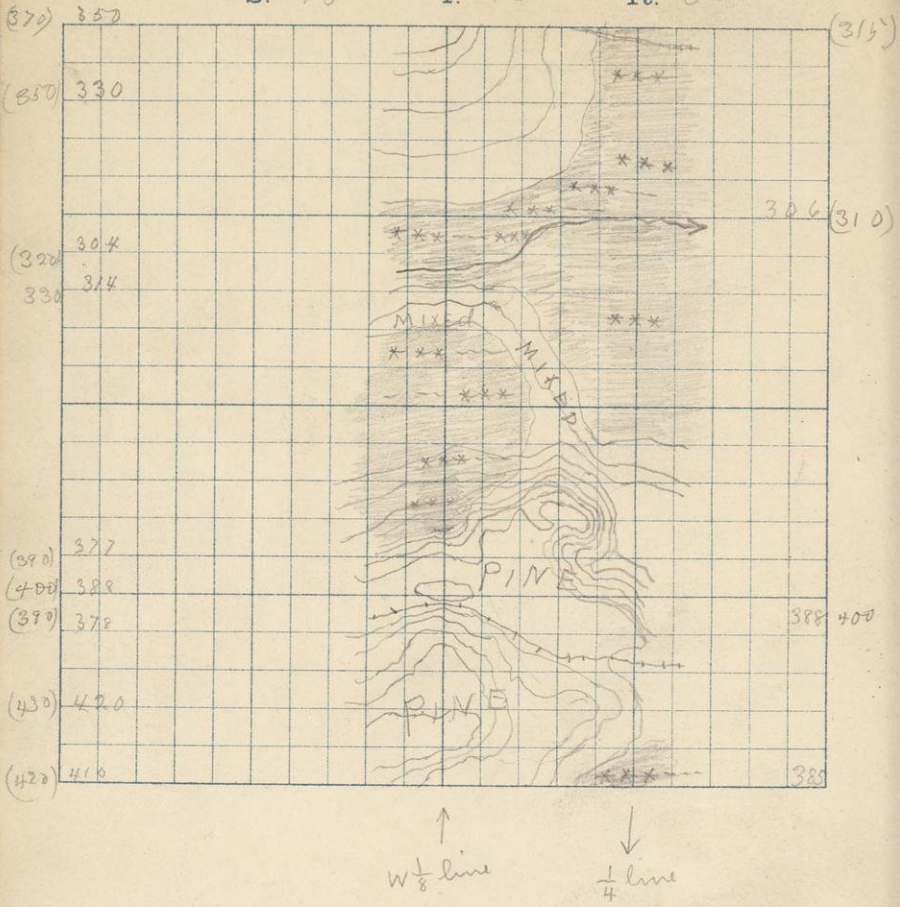
Going S on E line Sec. 23

0 (390) Hardwood
200 Hemlock, Hardwood Pine.
1000 (360) 12.40 P.M. Hemlock and Pine
1700 (350) alders. Small stream
2000 (370) B.M. 344.92 Cedar swamp
1.04 P.M.

Going N on E ½ line 11 A.M.
B.M. 393.85 500 = 29. in
Hardwood
200 (380) " Supply road
340 (350) Logging Railroad Narrow Gauge
430 (340) Stream flowing E.
500 (340 Logging railroad.
600 (340)
1000 (360) 11.35 A.M.
2000 (390) 12.04 P.M. Hardwood and Pine

10 Oct 28th 1891

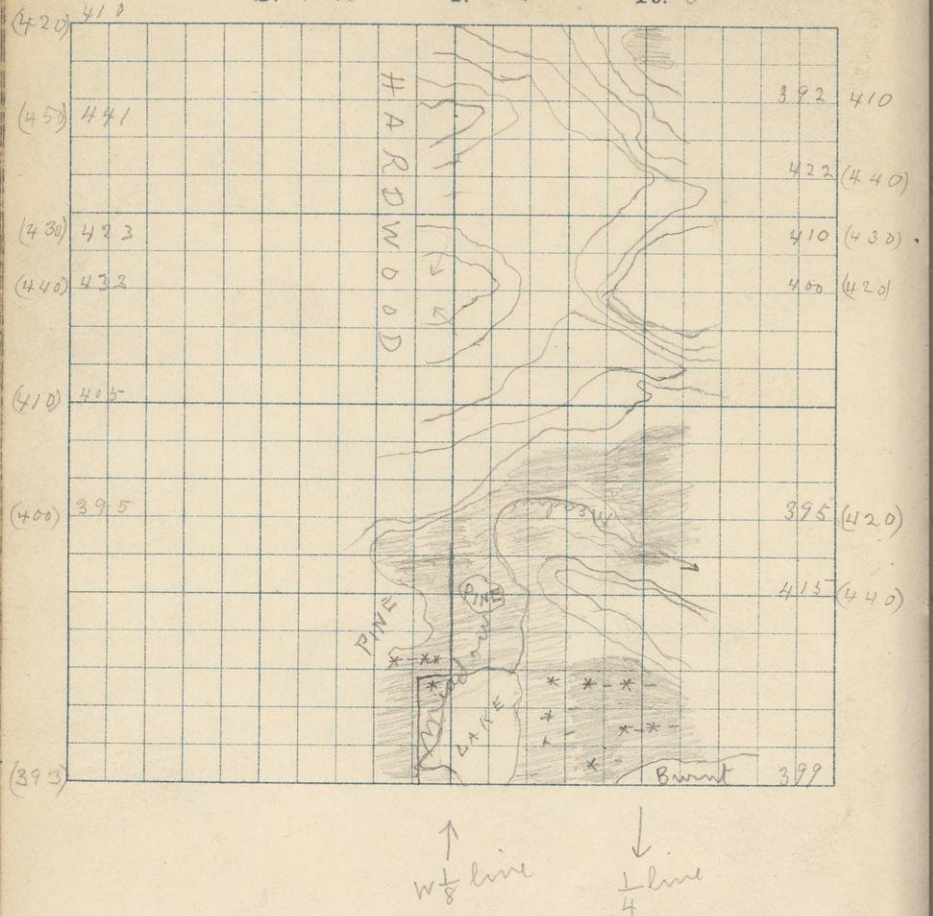
S. 15 T. 43 R. 30



Going S on ¼ line Sec 15 11.15 AM
B.M. 315.20 1400 ft = 27.9 in
Cedar swamp
30 Main logging road.
450 Pine grove in swamp
500 Ford river. Here a shallow swift stream. The boulders along it are composed mostly of reddish and bluish limestones, mottled quartzites and small fragments of greenstones.
1000 (315) 11.45 Cedar swamp.
1200 (340) Fine Pine grove
1400 (400) Pine.
1670 (390) Supply road
2000 (400) 12.15 P.M. Cedar swamp
Going N on W ¼ line Sec 15
200 (430) Hardwood
460 (390) Supply road Pine
600 " "
450 (360) Cedar swamp
1000 (340) 2.58 P.M. " "
1362 (320) Ford River
1800 (350) Old chopping
2000 (370) B.M. 350. 3.40 P.M. Pine

12 Oct 28th 1891

S. 22 T. 43 R. 80



Going South ¼ line Sec 22

2 00 (410) Hemlock and Hardwood
4 00 (440) "
5 70 (430) Large Pines
7 00 (420) Hardwood
8 50 (450) Fine Hardwood
10 00 (430) 12.40 P.M. Hemlock and Pine
13 00 (420) Dry swamp with Pine
15 00 (440) Fine Pine Grove.
17 00 (425) Tamarack Swamp.
20 00 (430) Burnt Pine land 1.10 P.M.

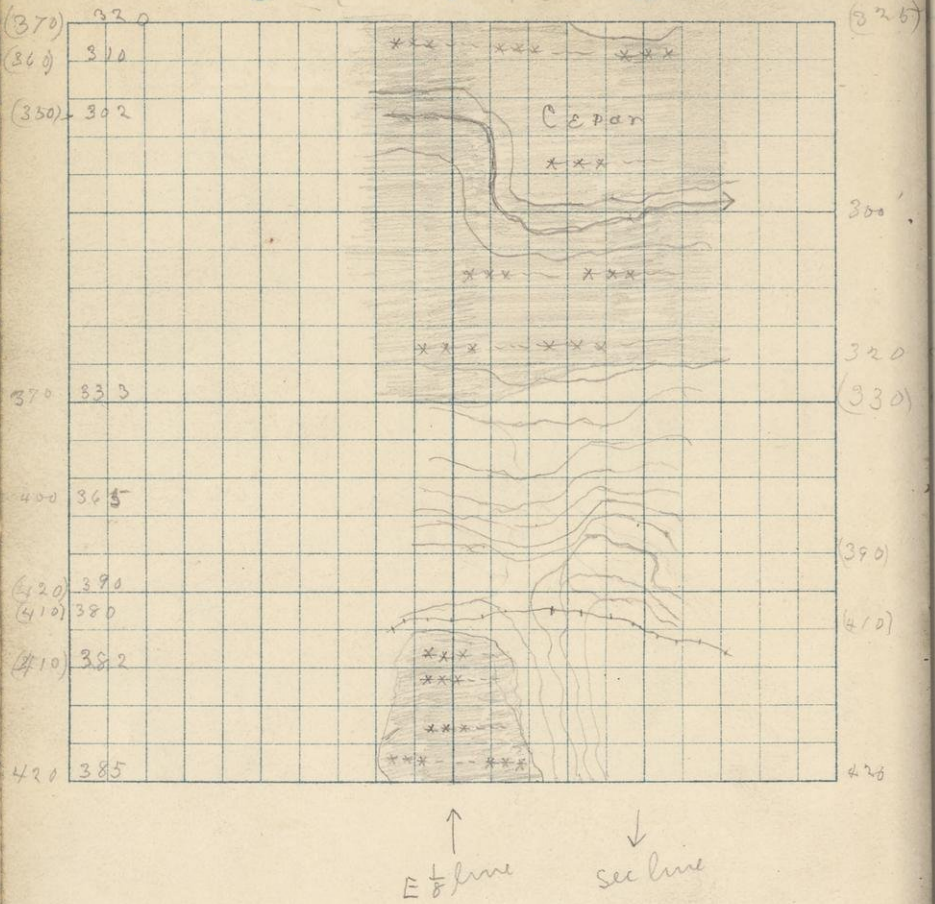
B.M. 399-31

Going N on W ¼ line Sec 22

B.M. 393. 5 100 = 29 in 1.40 P.M.
open swamp with lake
7 00 (400) Edge of Pine Timber
10 00 (410) 2.05 P.M. Fine Pine
13 00 (440) Hardwood
14 50 (430) "
17 50 (450)
20 00 (420) 2.30 P.M. "

14 Oct 29th 1891

S. 14 T. 43 R. 30



Going S on E line Sec 14 8.11 A.M.

B.M. 325.69 1200 = 27.7 m

115 Main logging road. Cedar swamp.

500 (300) Ford river

900 (320) Edge of Pine timber

1000 (330) 8.40 A.M. Old chopping

1420 (390) Hardwood and Pine

1600 (410) Pine Hardwood

1700 Supply road

2000 (420) 9. A.M. Hardwood

Going N on E ½ line Sec 14

300 (410) Cedar swamp

440 (410) Supply road

500 (420) Hardwood

760 (400)

1000 (370) 11.25 A.M. Pine

1750 (350) Ford River.

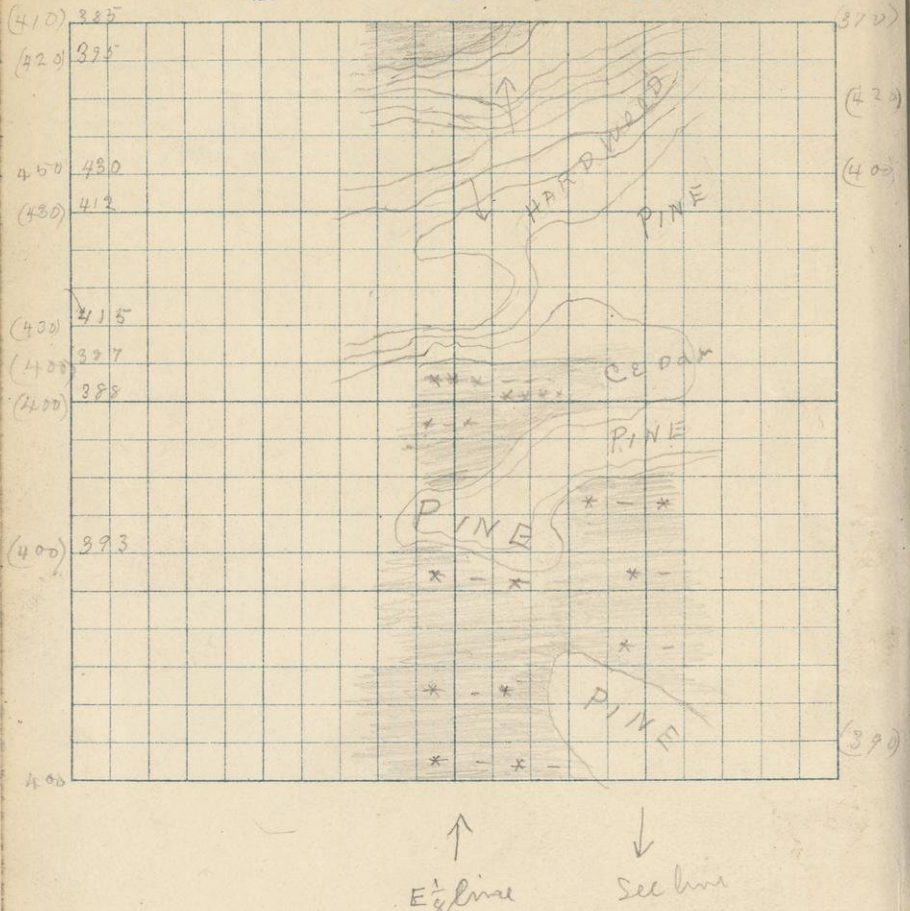
1900 (340) Main logging road.

2000 (370) 12. M. Cedar swamp

B.M. 320.81.

16 Oct 29th 1891

S. 21 T. 43 R. 30



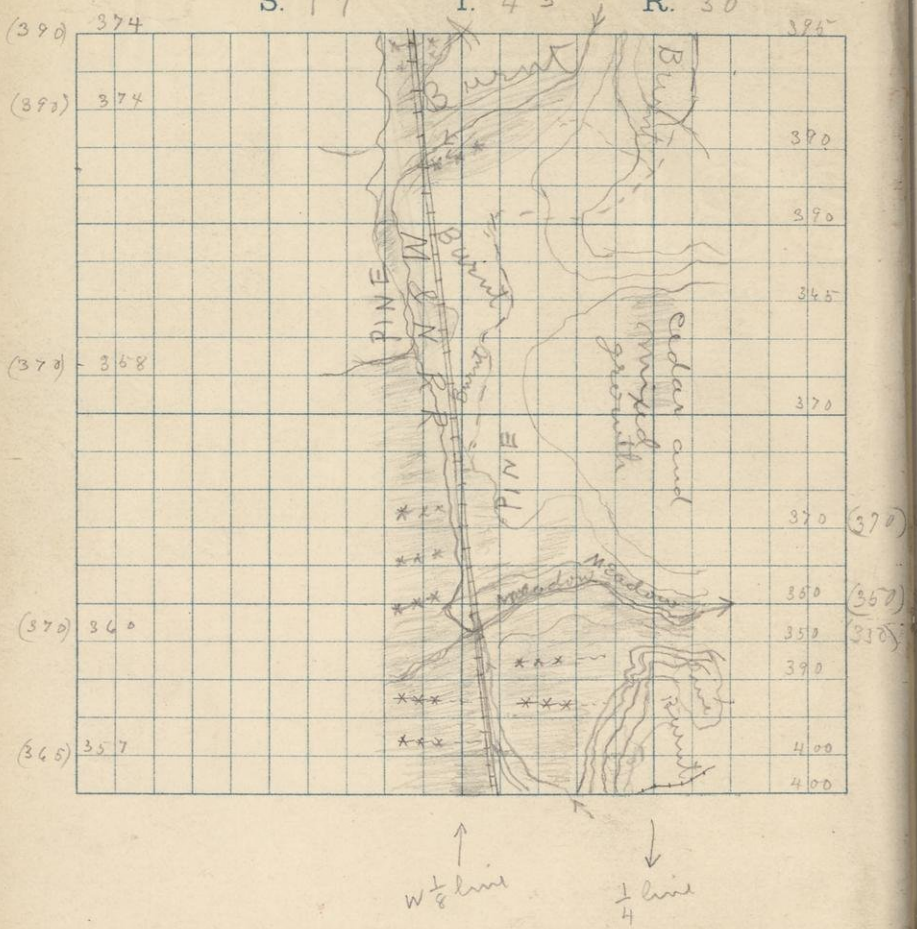
Going S on E line Sec 21

200 (420) Board timber Pine and fine Birch
450 (400) Edge of Pine and Hardwood
700 (400) Heavy Pine
900 (400) Very fine Cedar
1000 (400) 9.22. A.M. "
1900 (390) Pine Stone
2000 (390) 9.40 A.M. " "

Going N on E 1/8 line Sec 21 9.55. A.M.
B.M. 398.59. 1100 = 27.7 Tam. Swamp
600 (400) Edge of Pine
1000 (400) Tamarack swamp 10.20 A.M.
1100 (400) Edge of Pine timber
1200 (430) Very heavy Pine
1500 (430) "
1600 (460) Heavy Hardwood
1900 (420) Edge of swamp
2000 (410) 10.45 A.M. Cedar swamp

18 Oct 29th 1891

S. 17 T. 43 R. 30



Going S on ¼ line Sec 17

B.M. 395.15. 1.45 P.M. 500 ft. = 28.4

Burnt Timber

300 (390) Hemlock

500 (390) Hemlock, Cedar, and Pine.

700 (365) Cedar swamp

1000 (370) (2.05) Pine, balsam and cedar

1300 (370) cedar and balsam

1500 (360) Sluggish stream and meadow

1600 (350) Edge of Pine timber.

1700 (390) Pine ridge

1900 (400) " Partly burnt

2000 (400) 2.20 P.M. Supply road

Going N on W ⅛ line

0. (365) Cedar swamp

100 (365) Dense cedar swamp

Offset 100 paces to railroad track and followed it North.

R.R. runs N 10° W

440 (370) Sluggish stream flowing S.W through a meadow.

1140 (370) Pine Burnt.

1460 (380) " "

1640 Small stream flowing S.

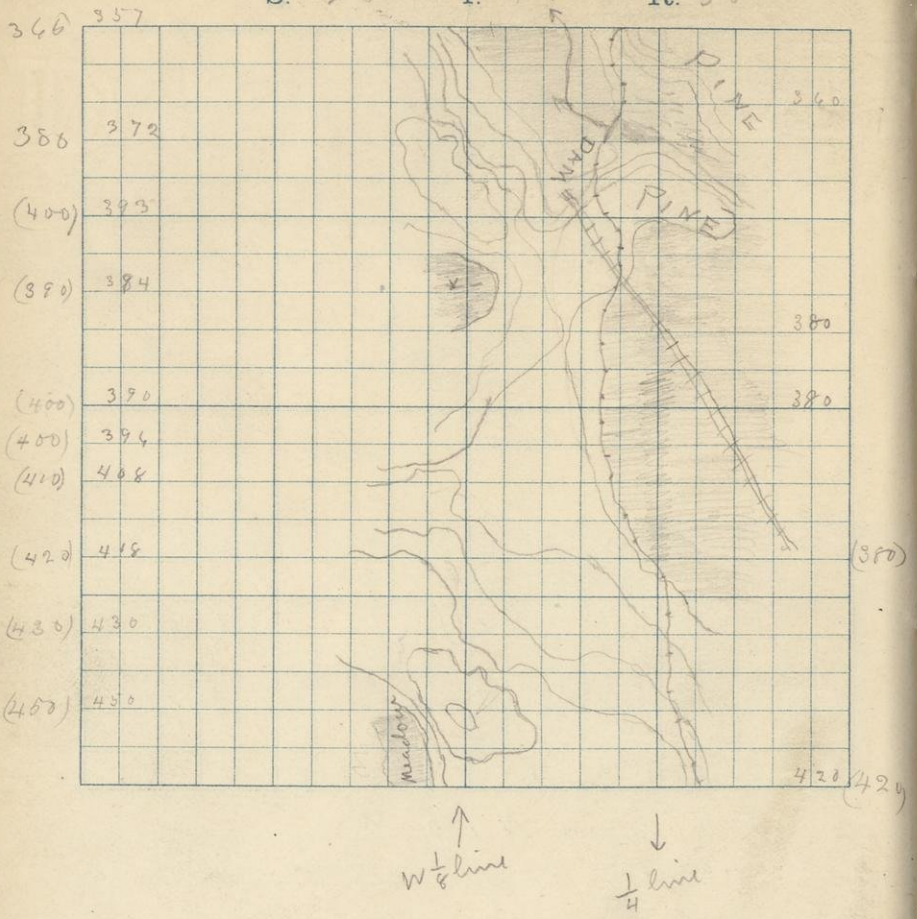
1800 (390) Dry cedar swamp

2000 (390) Found ⅛ stake 120 paces E of track

B.M. 374.04. 4.55 P.M.

20 Oct 29th 1891

S. 20 T. 43 R. 30



W 1/8 line

1/4 line

Going S on 1/4 line Sec 20

200 (340) Swamp killed by dam

250 Stream flowing W.

300 (offset 107 E) Supply road crosses stream on dam.

800 (380) Railroad, Cedar swamp

1000 (380) 2.50 B.M. " "

2000 (420) 3.10 P.M. Hardwood + Pine

B.M. 420.90.

Going N on W 1/8 line

B.M. 42 4.11 400 ft = 28.5 m

3.20 P.M. Hardwood, Hemlock, Pine

200 (400) Hardwood.

400 (430) "

600 (420) Hardwood with large Pine.

800 (416) " " " "

900 (400) Hemlock

1000 (400) 3.45 P.M. Hemlock and cedar with many very fine pines.

1300 (390) Tamarack Swamp

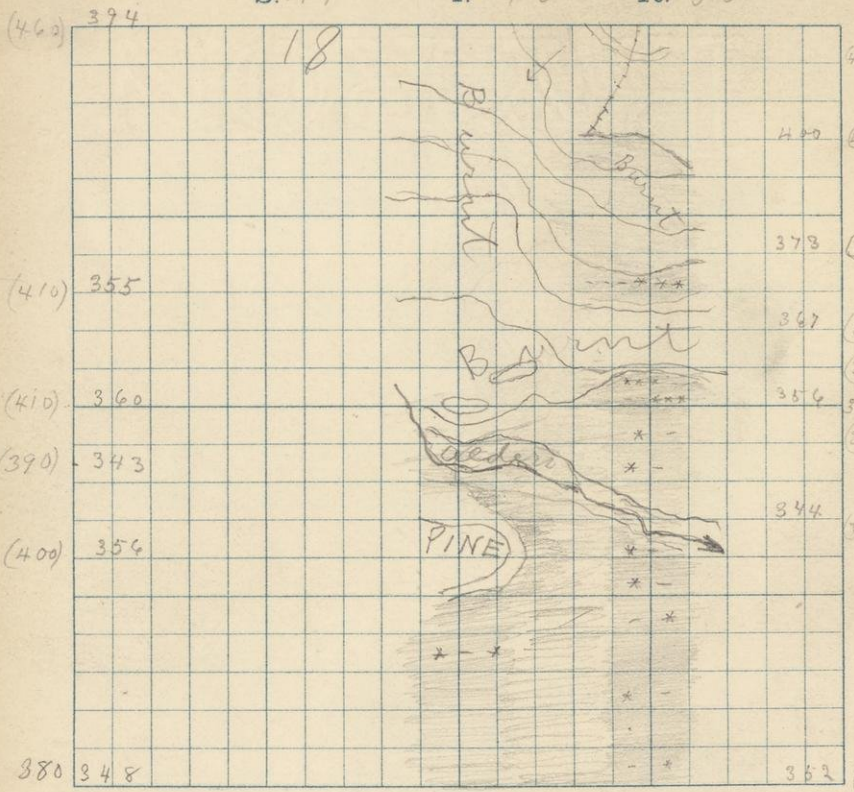
1500 (400) Heavy Pine.

1700 (380) " "

2000 (345) Cedar swamp. Sec line.

22 Oct 30th 1891

S. 17 T. 43 R. 30



Going S on E line Sec 18 7.40 A.M.

B.M. 423.05 400 ft = 28.4

Hardwood

300(400) Hardwood. edge of burnt country.

600(375) Burnt

800(370) Old chopping

900(370) Edge of Swamp

1000(340) 8.20 A.M. Cedar swamp

1100(340) Tamarack swamp

1330(350) Sluggish stream flowing E

2000(340) 8.57 A.M. Tamarack Swamp

Going N on E ¼ line Sec 18.

600(400) Scattering Pines

850(398) Very sluggish stream. cedars

1000(410) 1.15 P.M. Burnt timber

1300(410) " "

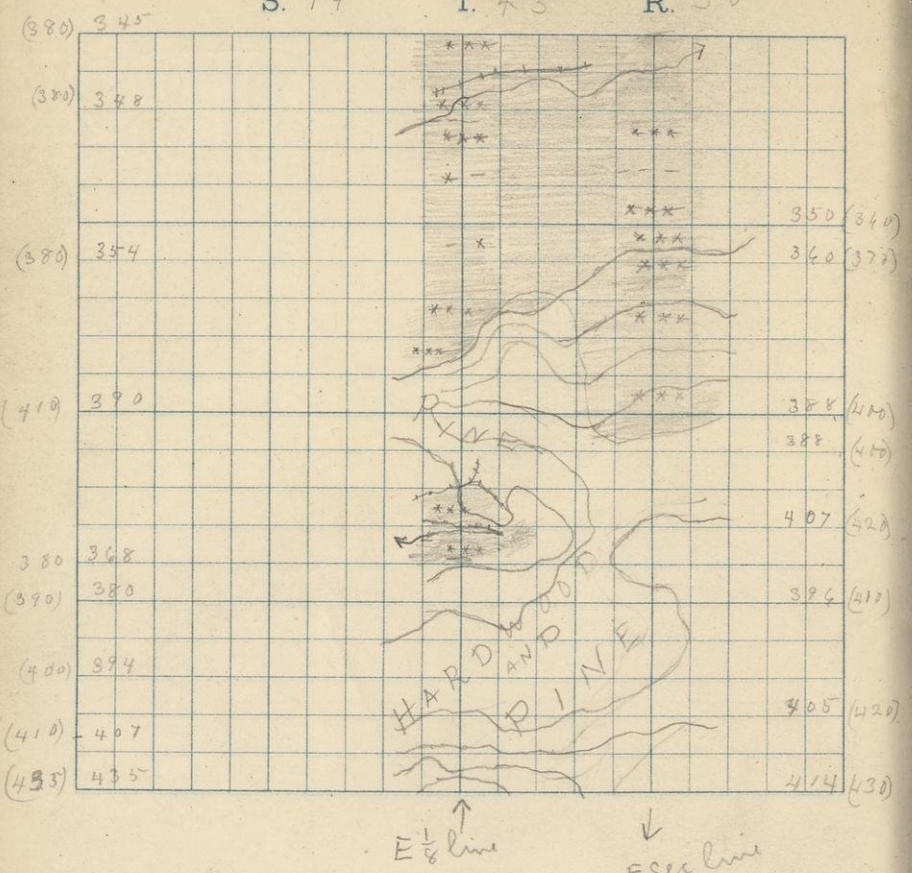
1400(410) Burnt cedar swamp.

2000(460) " Burnt timber

B.M. 393.54 2. P.M.

24 (Oct 30th 1891)

S. 19 T. 43 R. 30



The contours in the cedar swamp are not a mistake – they exist.

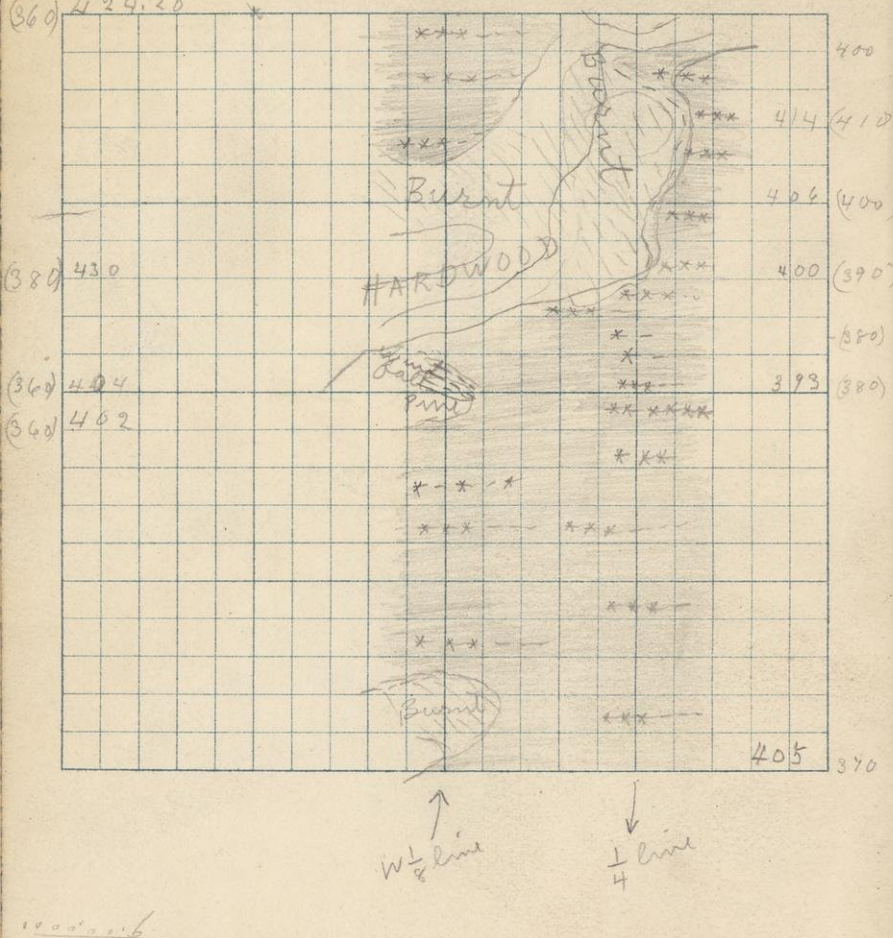
Going S on E line Sec 19

87 Small stream flowing E.
500 (340) Cedar swamp
600 (370) Fine cedar
1000 (400) 7.40 A.M. " "
1100 (400) Fine hemlock and Pine
1300 (420) " " " "
1500 (410) Heavy Pine
1800 (420) Old chopping
2000 (430) Heavy Pine
B.M. 414.94 10.06 A.M.

Going N on E ¼ line Sec 19.
B.M. 435.29 100 ft = 28.7 in.
10.45 A.M. Hardwood
300 (400) Old chopping
500 (390) Hemlock and Pine
600 (380) Cedar swamp.
674 (390) 11.05 A.M. Small stream flowing W
800 (400) Logging roads. The swamp here is very heavy. Contains many fine pines
1000 (410) 11.40 A.M. Hardwood and Pine
1200 (380) Cedar swamp.
1400 (360) Tamarack "
1700 Cedar "
1830 (380) Small stream flowing E
2000 (380) Dense cedar swamp

26 Oct 31st 1891.

S. 13 T. 43 R. 31



Going S on 1/4 line Sec 13 9.10 AM

B.M. 421.10 1700 ft = 30.7 m

Hardwood.

300 (410) Burnt.

700 (390) Edge of cedar swamp

850 (380) Spruce swamp

1000 (380) 9.35 A.M. Cedar swamp

2000 (370) 10.18 A.M. Edge of old chopping

Going N on W 1/8 line Sec 13

900 (360) Small pine grove

1000 (340) 1.150 P.M. Bad windfall

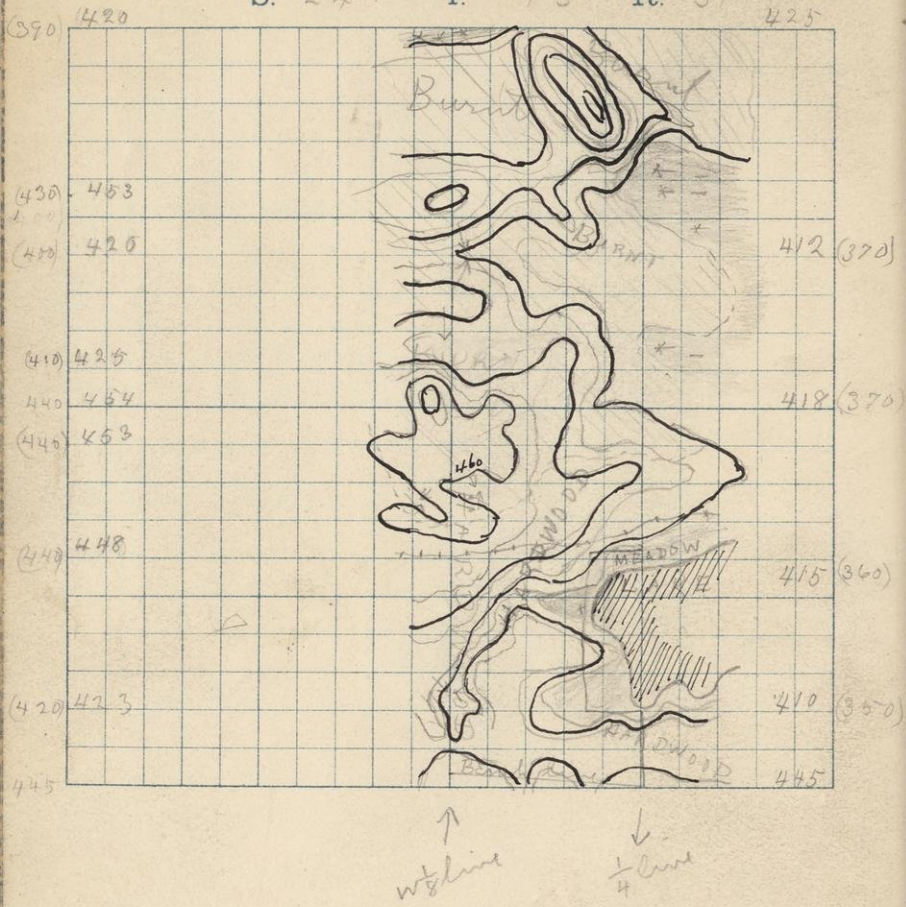
1300 (380) Hardwood

2000 (340) Edge of swamp

B.M. H 24.20. 2.40 P.M.

28 Oct 31st 1891

S. 24 T. 43 R. 37



Going S on 1/4 line Sec 24

1000 (370) 10.45 A.M. Timber chopped and burnt

1200 (390) " " "

1300 Supply road

1440 (360) Lake

1800 (350) End of Lake

2000 (380) 11.25 A.M. Hardwood

B.M. 445.33

Going N on W 1/8 line Sec 24

B.M. 445.40 300 = 28.4 11.45 A.M.

Bench line is here 28 paces N of the Section line.

200 (420) Hardwood

610 (440) Supply road "

900 (440) Timber chopped and burnt

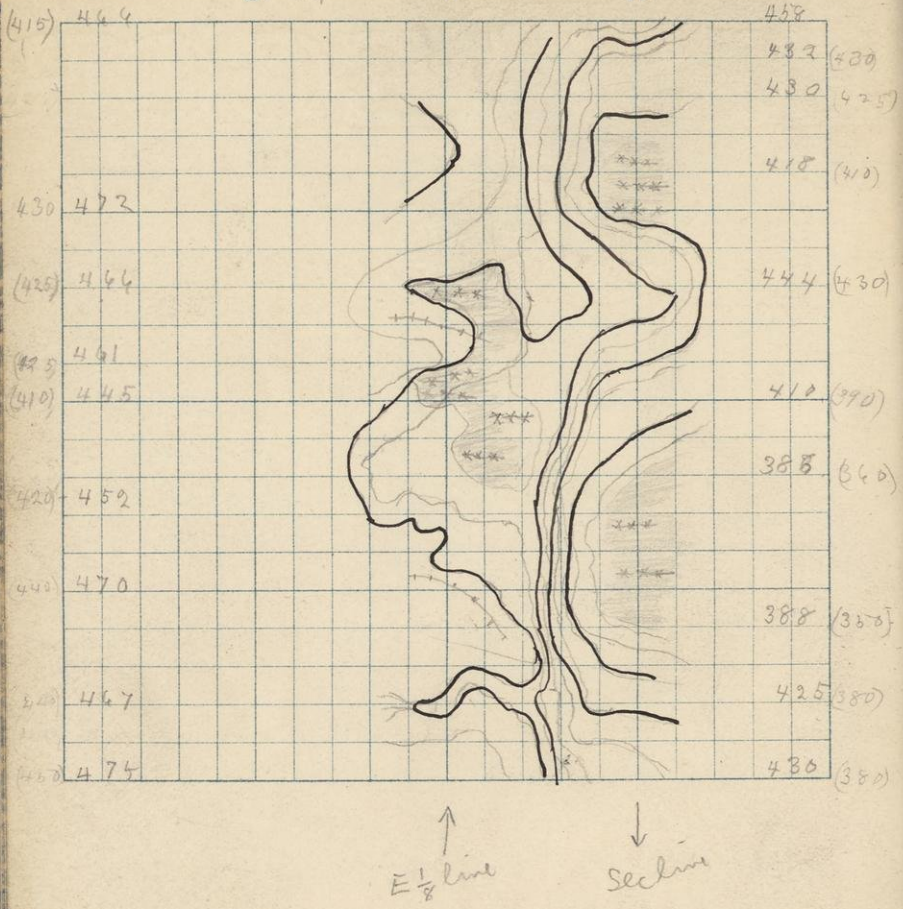
1000 (440) 12.25 P.M. " " "

2000 (390) Stake 144 paces to the West either the stake is set wrong or the variation is greater than that given on the map. Ran 10 on 4° then on 3° then on 2° E variation.

1.10 P.M.

30 Mon 1st 1891

S. 14 T. 43 R. 31



Going S on E line Sec 14 8.05 A.M.

B.M. 457.73 600 = 28.6 ch.

Hardwood

200 (425) Hemlock

700 (430) Hardwood

1000 (390) 8.40 A.M. "

1200 (340) Cedar swamp

1800 (380) Hardwood

2000 (380) 9.30 A.M. Hardwood and hemlock

Going N on E ¼ line Sec 14

500 (440) Supply road. Hardwood & cedar

1000 (410) 12.57 P.M. Cedar swamp.

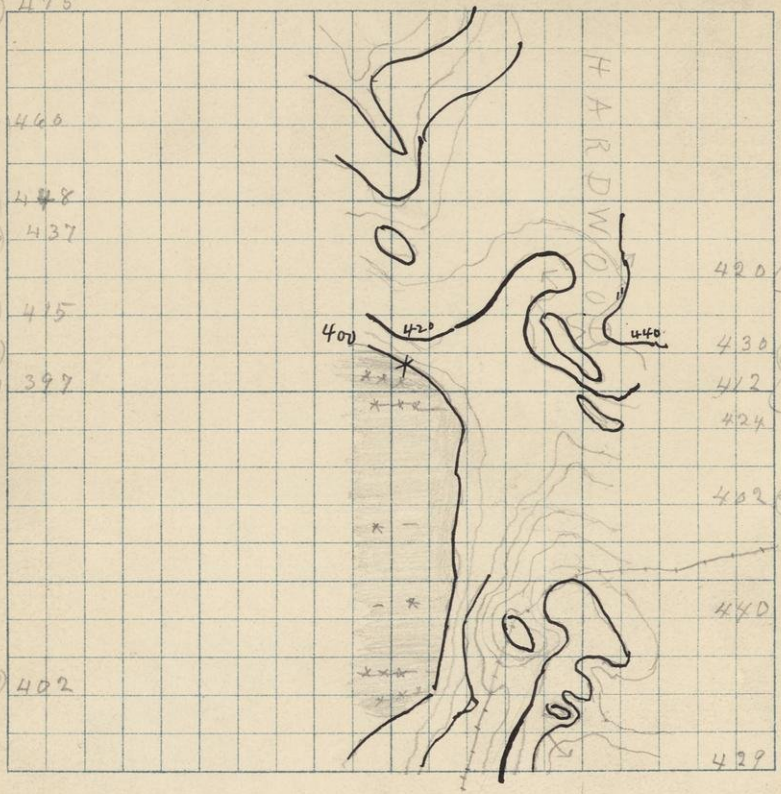
1190 (425) Supply road Hardwood

2000 (415) 1.43 P.M. "

B.M. 466.41

32 Nov 1st 1891

S. 23 T. 43 R. 31



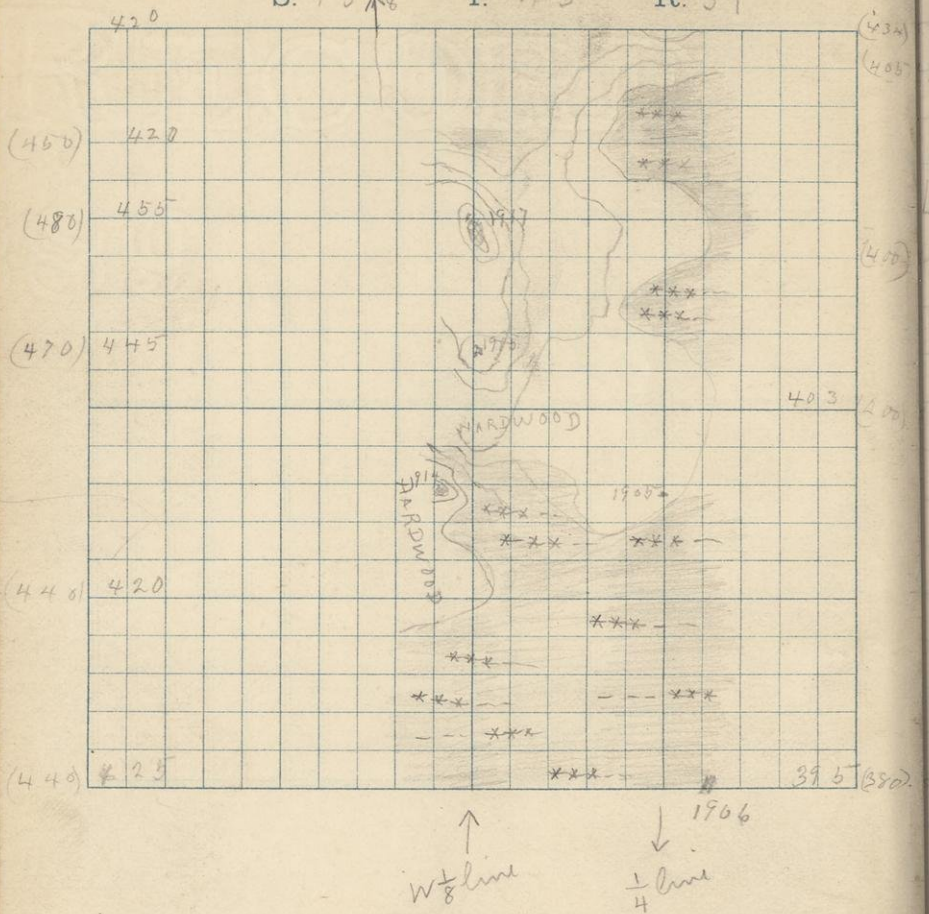
Going S. on E line Sec 23

700 (360) Hardwood
1000 (350) 9.53 A.M. " "
1300 (330) " "
1600 (340) " "
2000 (330) 10.50 A.M. " "
B.M. #2861

Going N on E ¼ line. 11.02 A.M.
B.M. 401.67. 700 = 28.6 W
1000 (385) 11.45 A.M. Cedar swamp
1100 (380) Hardwood
2000 (450) See Line. 12.24 P.M. "
Ran on 4° E variation. And comcout
50 Paces E of Post.

34 Nov 2nd 1891

S. 15 T. 43 R. 31



Going S on ¼ line Sec 15

B.M. 434.85 100 = 29.4 m

9.10 A.M. Hardwood

600(400) "

1000(400) 9.37 A.M. "

1905 Sec 15 777 N 1000 W of SE Cor

Outcrop of rather coarse greenstone

Quite massive but seems to have

an incipient cleavage.

2000(380) Sec line Cedar swamp

1906 Sec 15 400 paces W of SE Cor.

Large outcrop of greenstone. The

coarseness of the mass varies

considerably. Spec 1906½ shows the

finer and coarser varieties. Some

of the rock looks quite granitic

on account of the presence of

a large amount of red feldspar.

Going N on W ¼ line.

500(440) Hardwood and mixed.

1914 Sec 15 800 N 1600 W of S.E Cor.

Coarse massive diorite.

900(450) Hardwood

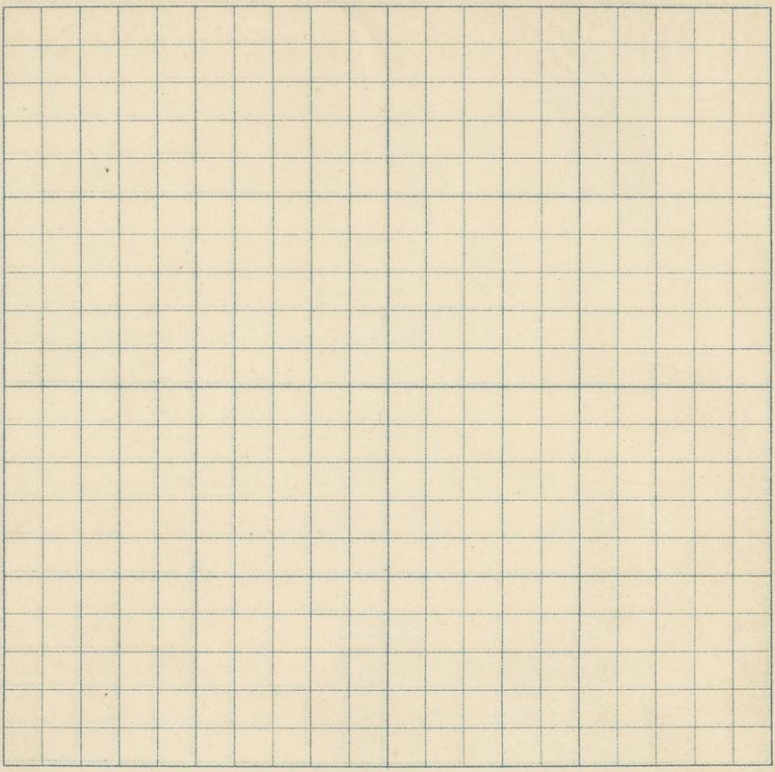
1000(450) 3 P.M. Hardwood

1915 Sec 15 N 1140 W 1500.

Aphanitic chloritic greenstone

with pyrites

S. T. R.



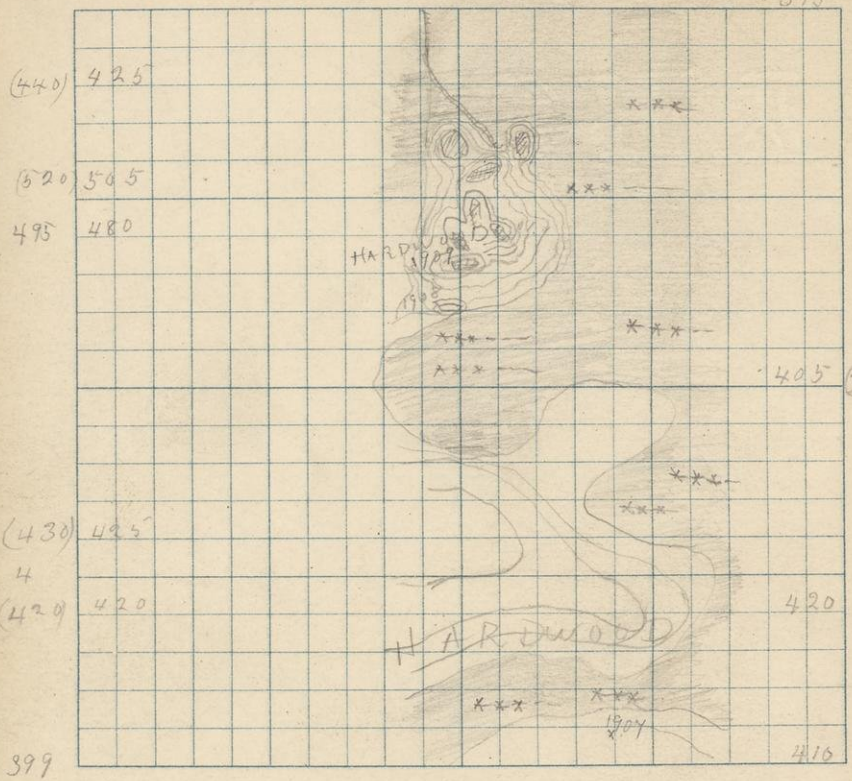
12 50 (470) Hardwood, hemlock, cedar

1916 Sec 15 N 1250 W 1500 from S. E Cor,
Medium grained chloritic
greenstone.
1500 (480) Hardwood

1917 Sec 15 1500 N 1500 W
Large exposure of greenstone.
Medium grained, probably
diabasic.
1900 Bench line Cedar swamp
B.P. Aneroid 450
Came out 250 paces E of Stake
H. Cameron. Compass.

38 Nov 2nd 1891

S. 22 T. 43 R. 31



Sec

W 1/8 line

1/4 line

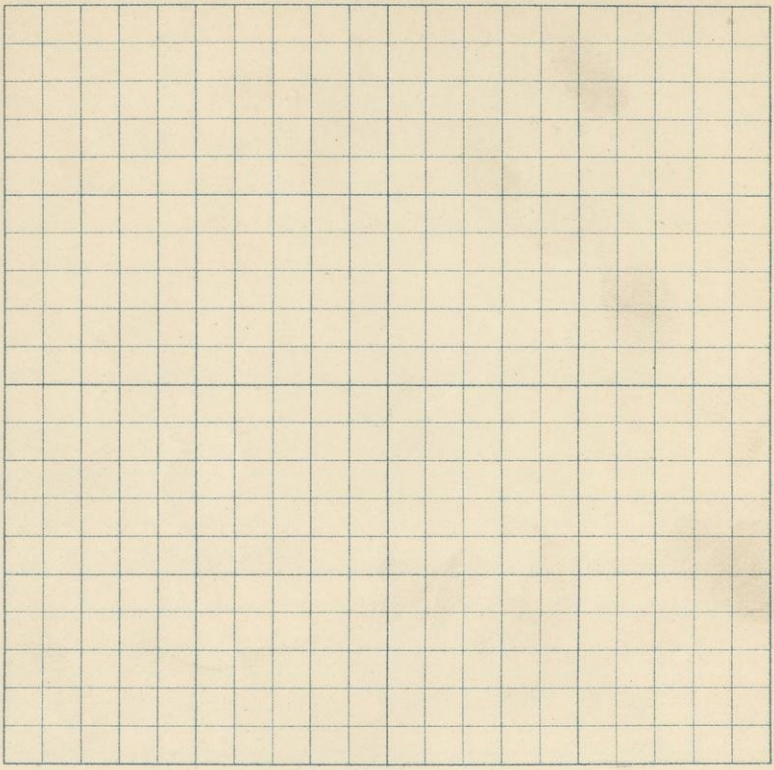
Going S on ¼ line Sec 22 10.50 A.M.
1000 (390) 11.23 A.M. Edge of swamp
2000 (390) B.M. 410 Hardwood
12.15 P.M

1907 Sec 22 1100 W 100 N of S.E Cor
Outcrop of massive greenstone
or diorite. Quite coarse grained
and shows no signs of schistosity
— Going N on W ⅛ line Sec
B.M. 398.52 200 = 29.3 m
800 Edge of Cedar swamp
1000 P.M. " "

1908 Sec 22 1200 N 1500 W of S.E Cor
Large outcrop of massive
greenstone or diorite

1909 1330 Sec 22 1330 N 1500 W of SE Cor.
Very large and interesting ex-
posure of greenstone. Some
are coarse grained, dark, containing
numerous iron pyrites and have
the appearance of a hornblendic
diorite. Others are lighter colored,
without pyrites, and look like
diabase. Some are dark and
totally aphanitic, probably
hornblendic greenstone; others
are aphanitic and light
colored. Some are agglomeratic

S. T. R.



(spec. 1809) which give every appearance of a volcanic breccia.

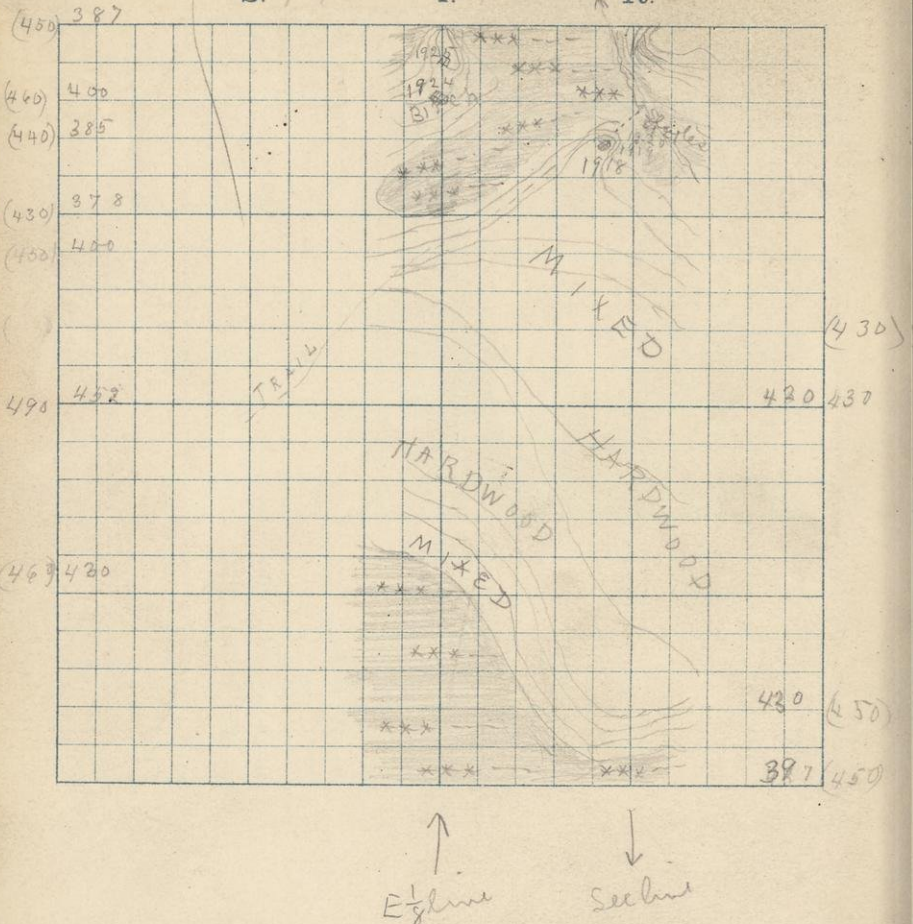
1460 (495)

2000 (440) See line Cedar swamp

2.30 P.M.

42 (Nov 3d 1891

S. 16 T. 43 R. 31



Going S. on E line Sec 14

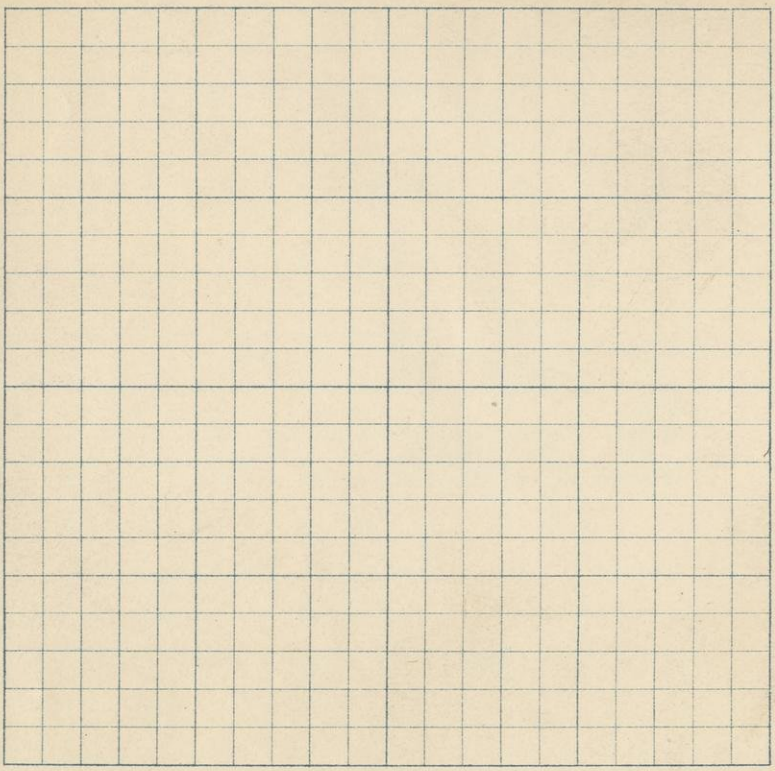
B.M. 387.49 200 = 29.12
9.30 A.M. Cedar swamp
312 (400) Mixed growth

1918 Sec 14 14 88 N of S.E Cor.
1919 Sedge of massive greenstone.
1920 Spec (1918).
1921 North of this ledge are numerous test pits extending over 100 paces N.E. These test pits expose a large body of slates apparently somewhat cut by dykes. 1920 shows the slates. Spec 1919 shows eruptive rocks found in the test pits in various stages of alteration and decomposition and metamorphism. These seem to occur in the slates. Some of the dyke rocks are entirely schistose.

Spec 1921 is from a test pit a few steps N of the greenstone ledge. I take it to be from a quartz porphyry dyke rendered very schistose by metamorphic action. I think there are many similar dykes in this neighborhood.

Most likely Laurentian

S. T. R.

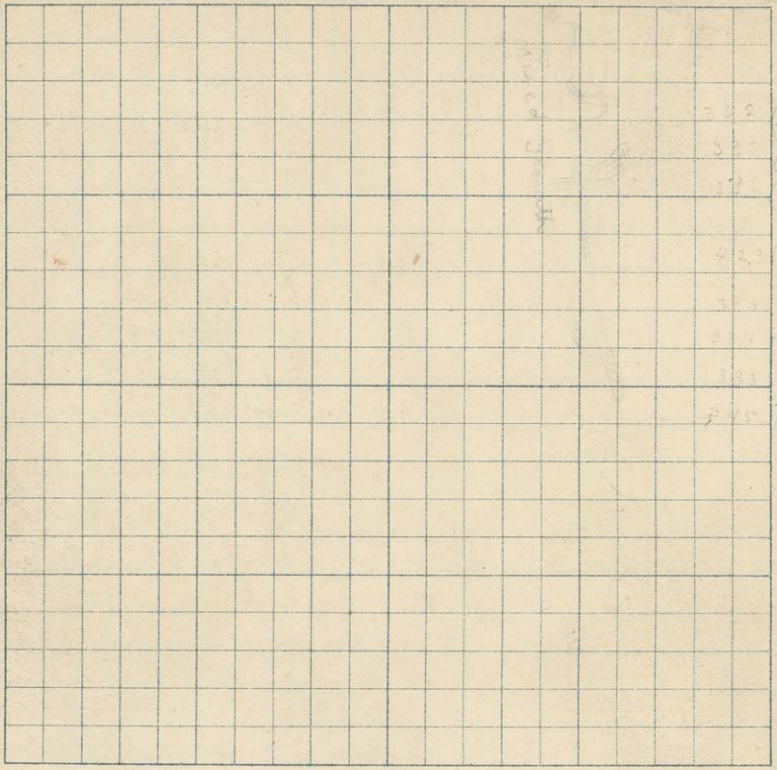


1000 (430) 10.56 AM. Mixed growth,
1500 (430) Mixed Timber,
1800 (450) Hardwood
2000 (420) 11.22 AM. Cedar swamp
— Going N on E ¼ line Sec 14
550 (440) Edge of swamp, mixed growth
1000 (490) 2.40 P.M. Hardwood.
1700 (440) Hardwood largely birch
1800 (460) Hardwood

1924 Sec 16 500 W 1800 N of S.E Cor
Extensive outcrop mostly of aphanitic greenstones. There is some volcanic agglomerate and some schistose rock containing quartz. Could not determine contacts or dip and strike. Some of the fine grained greenstone has a slaty cleavage.

1925 Sec 16 1900 N 500 W of S E Cor.
More aphanitic greenstone,
2000 (400) Cedar swamp
B. M. 384.33 3.40 P. M.
The ledge mentioned above goes to the bench line

S. T. R.



Going S on 1/4 line Sec 17 7.47 A.M.
B.M. 423.51 200 = 28,7
Hardwood

1926 Sec 17 1950 N 1100 W of S.E Cor
Greenstone schists, volcanic
breccias and aphanitic green-
stones, thoroughly banded.
Strike N 20° W
Dip 80° W.

1927 Apparently interbedded with
the above is a thick bed
of crystalline greenstone.

1928 Sec 17 1900 N 1100 W
Greenstone Amygdaloid

1929 Sec 17 N 1760 W 1500
Greenstone (diorite)

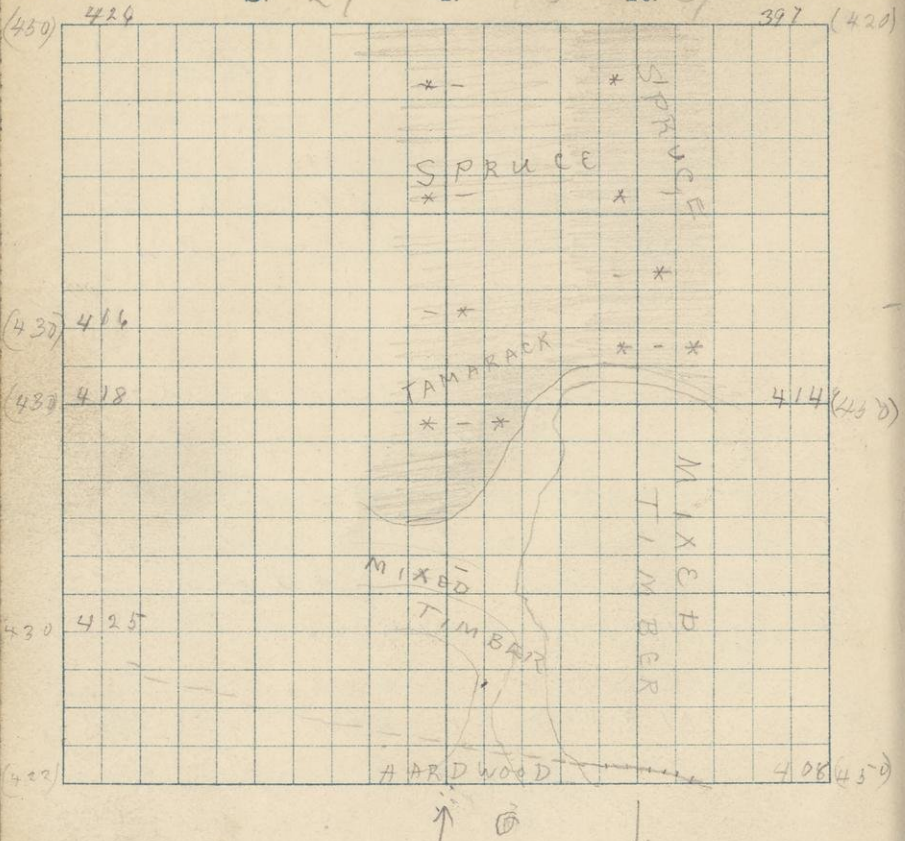
1930 Sec 17 N 1500 W 1000 Great ledge
of aphanitic greenstone.
No banded, schistose or slaty
structure seen.

1931 Sec 17 1250 N 1000 W
Medium grained crystalline green-
stone.
(000 (330) 8.35 A.M. Mixed.

1932 Sec 17 N 700 W 1000
Fine grained gritty greenstone

48

S. 21 T. 43 R. 31



Going S on E line Sec 21

O. (420) Cedar swamp

1000 (450) 11.50 A.M. Mixed growth.

2000 (450) 12.04 P.M " "

B.M. 408.53

1950 Incomplete county road from Sagola to Mansfield

1922 Sec 28 1900 N 300 W

1922A Large ledge of greenstone.

1922B North and west of this

1922C ledge are numerous test pits

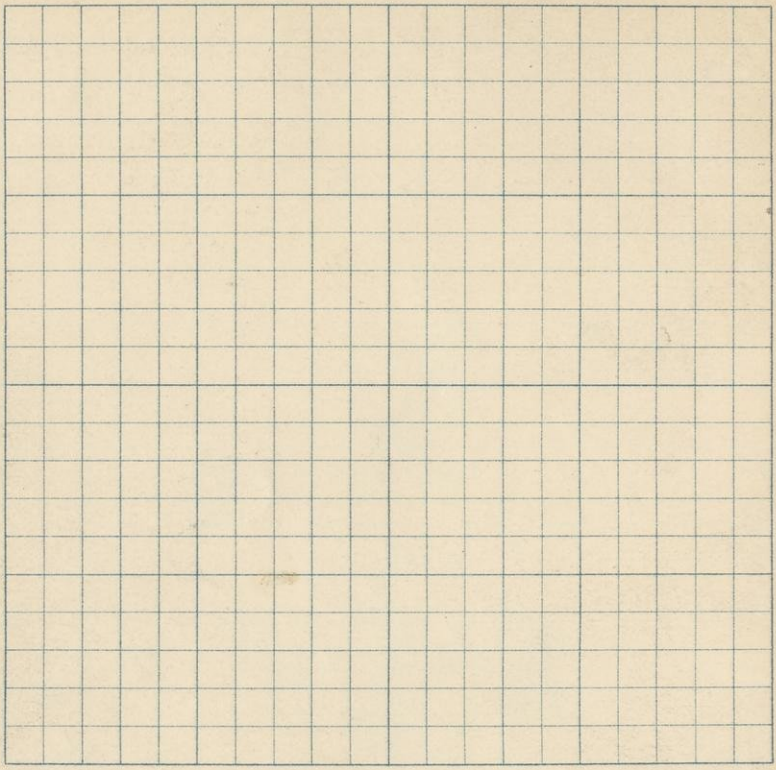
1922D in which black graphitic slates,

1922E red slates and red schists,

1922F which I believe were originally

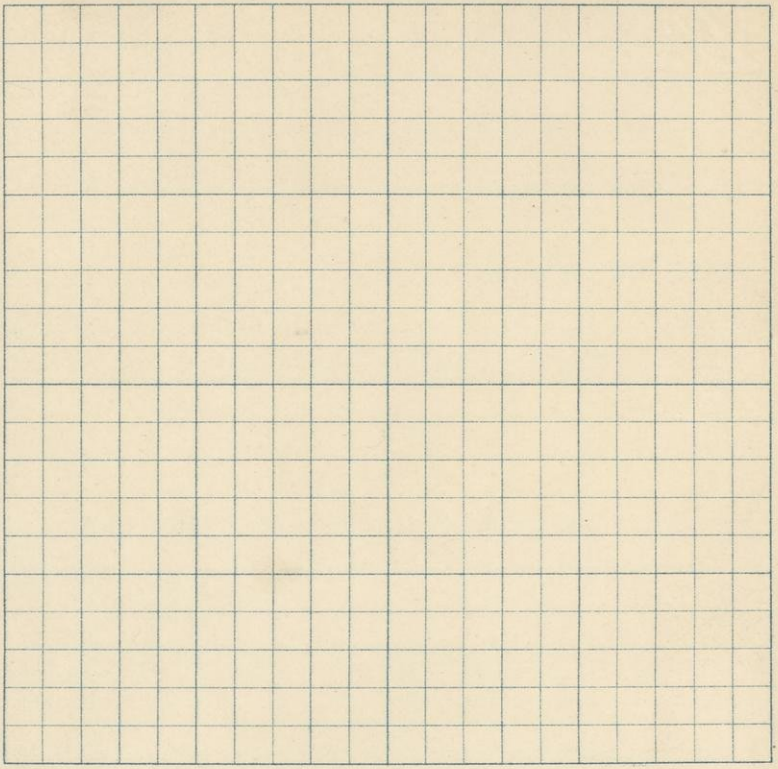
1922G dykes of quartz porphyry or granite. Spec 1922 contains samples from all the rocks shown in the test pits. Numerous boulders of schistose sericitic or talcose granite can be found almost everywhere in this region and there seems to be every possible gradation from a coarse granite to a fine red schist totally devoid of any crystalline structure and in fact a true slate.

S. T. R.



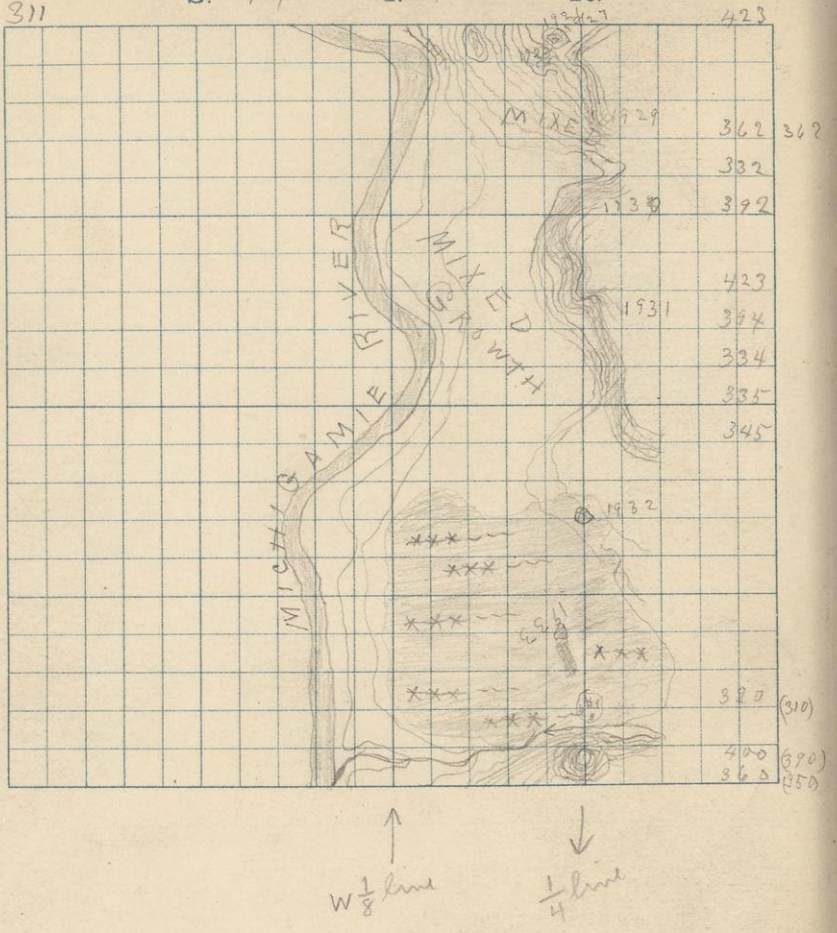
1. P.M Going N on E ¼ line Sec 21
B.M. 422.79 500 ft = 25.8 in
1923 Sec 21 400 W Hardwood
1923 Sec 21 400 W 270 N of SE Cor
Test pit showing red slate
400 (430) mixed timber.
700 (430) Edge of tamarack swamp
1000 (430) 1.30 P.M. " "
1200 (430) Spruce swamp
2010 (460) 2.04 P.M. See line " "

S. T. R.



54 Nov 4th 1891

S. 17 T. 43 R. 31

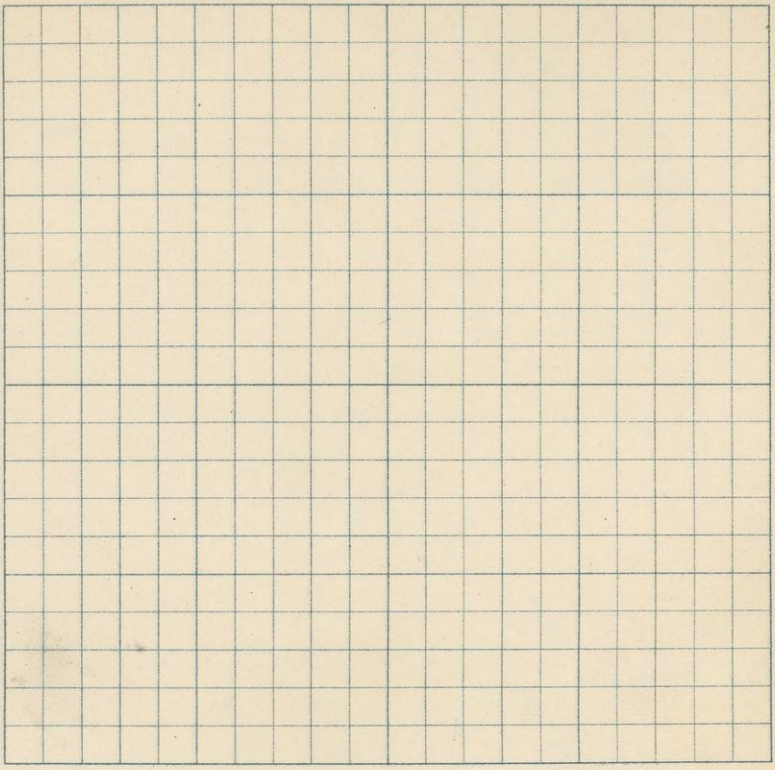


1933 Sec 17 N 400 W 1051
Coarse grained greenstone

1934 Sec 17 N 50 W 1000
Greenstone some coarse ~~the~~ some fine grained and schistose
Strike N 70° E
Dip 85° S
Strike and dip are very uncertain for the rocks are greatly contorted. Spec shows coarse and fine varieties.

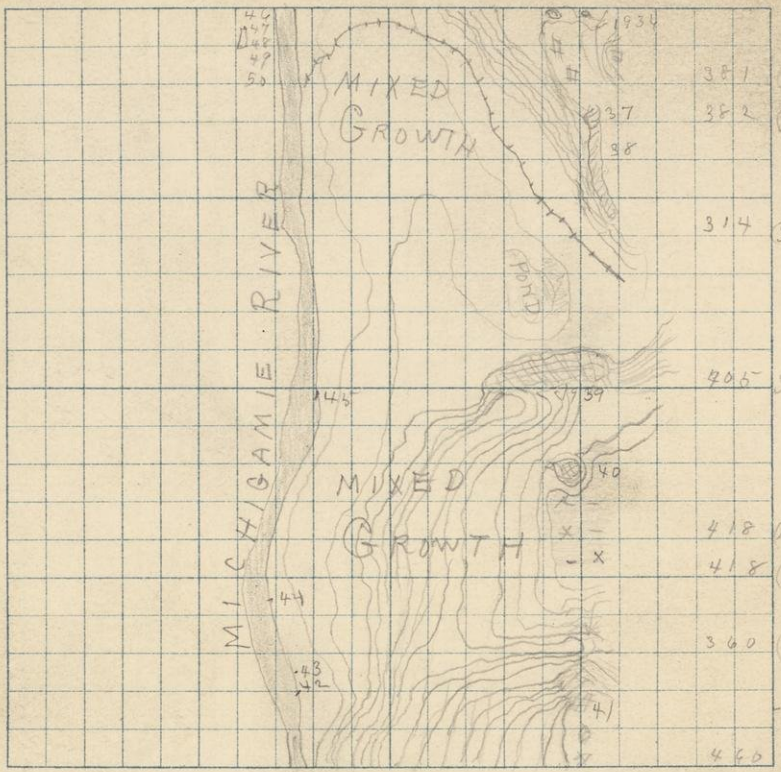
1935 Sec 17 N 40 W 1000
Siliceous pluggy slate. May or may not be in place. Lies almost immediate contact with the greenstone.
2000(350) See line 9.25 A.M. Mixed.

S. T. R.



58 Nov 4th 1891

S. 20 T. 43 R. 31



Going S on 1/4 line Sec 20

0. Ledge of greenstone

1934 Sec 20 0 N 1900 W 1000

Greenstone

1937 Sec 20 0 1700 N 1000 W

Strike N 90° E

Dip 90°

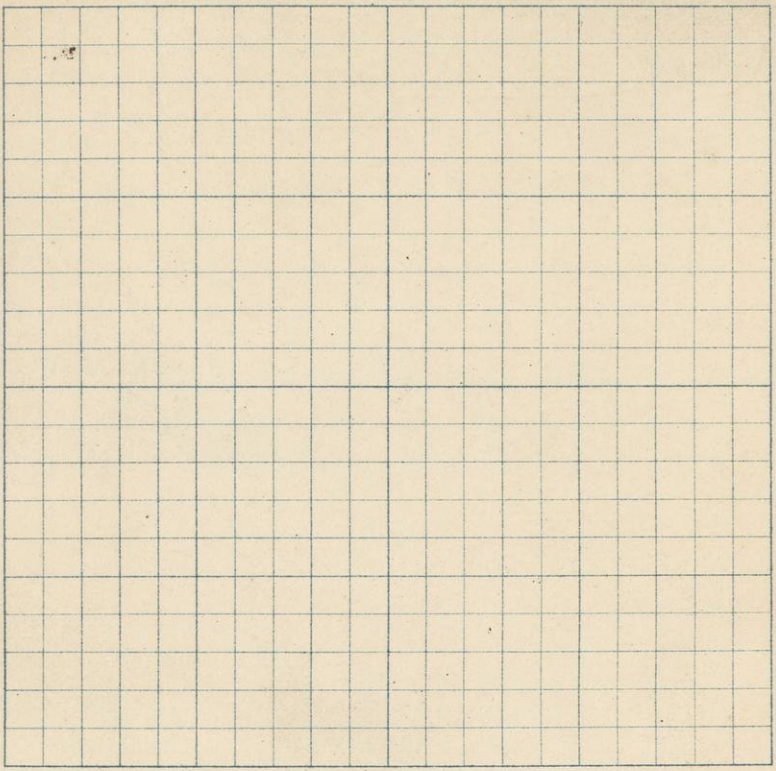
Banded greenstones.

1938 Sec 20 N 1630 W 1000

Pseudo-conglomerate. Boulders 2 to 3 feet through, generally rounded sometimes showing a concentric structure. Imbedded in a matrix of darker color. In this matrix are segregated considerable quantities of calcite (See spec.) I have no time to study these very interesting rocks.

For 500 paces along the quarter line of Sec 20 here is one continuous exposure of typical greenstones, including crystalline dioritic rocks, the peculiar pseudo conglomerate, massive aphanitic rocks and finely banded aphanitic greenstones. Here and there the rock may

S. T. R.



be seen to be schistose, with a strong slaty cleavage. In most places however the rock has no definite cleavage.

620(300) Mansfield and Sayola road.

1939 Sec 20 1000 N 1000 W

Immense ledge of greenstone. Some of it beautifully banded showing the dip to be nearly vertical. Strike in all directions. Some of these banded greenstones are very gritty. It is possible that they may correspond with what is called novaculite in the Marquette district.

1000(390) 10:30 A.M.

1940 Sec 20 800 N 1000 W

Coarse greenstone.

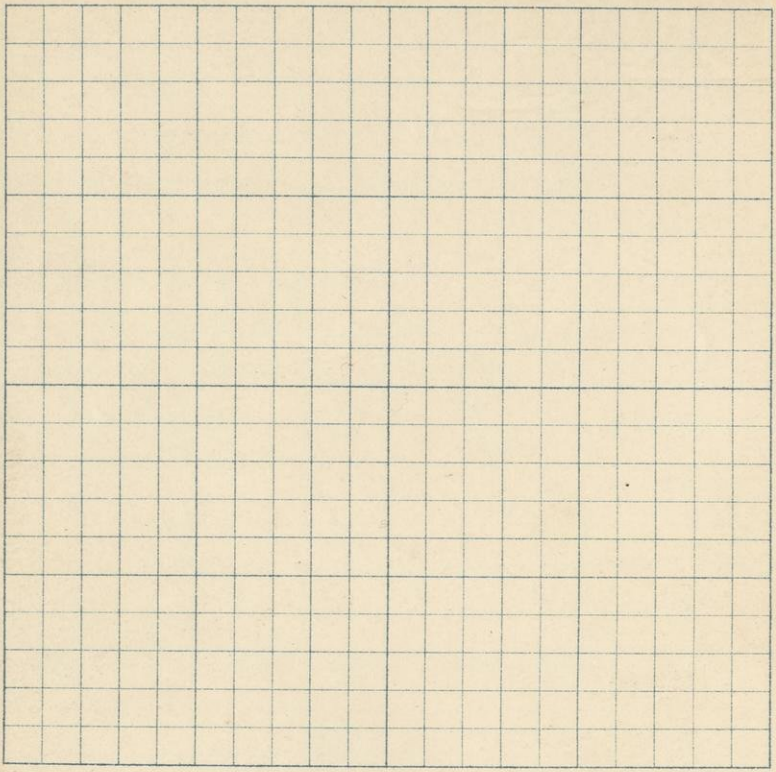
1000(400) Mixed timber.

1941 Sec 20 N 150 W 1000

Large bluff of rather coarse hornblendic trap, probably diorite.

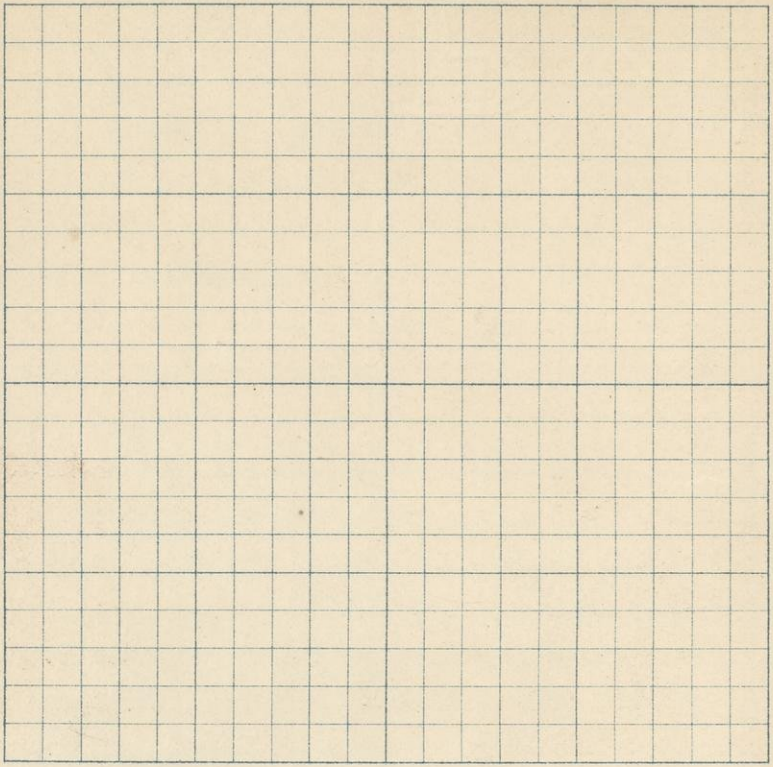
2000(440) 11.10 A.M. Hemlock B.M. 459.77.

S. T. R.



The coarse diorite (1941) goes down to the bench line.
In the two miles along the quarter lines of 17 and 20 there is practically a continuous outcrop of greenstones. There is an immense variety of them. There are coarse crystalline rocks and fine aphanitic rocks: coarse brecciated conglomerates, volcanic breccias, volcanic tuffs and no doubt dykes in abundance. I have only time to break off a few specimens and hurry on. Many of the rocks are well banded, some schistose, some slaty, some massive, some apparently very basic, others gritty and probably full of quartz.

S. T. R.



Going N on W⅛ line Sec 20

B. M. 374.94. 700 = 281 } Greenstone Ledge

1. 250 paces W est to River
aneroid 290

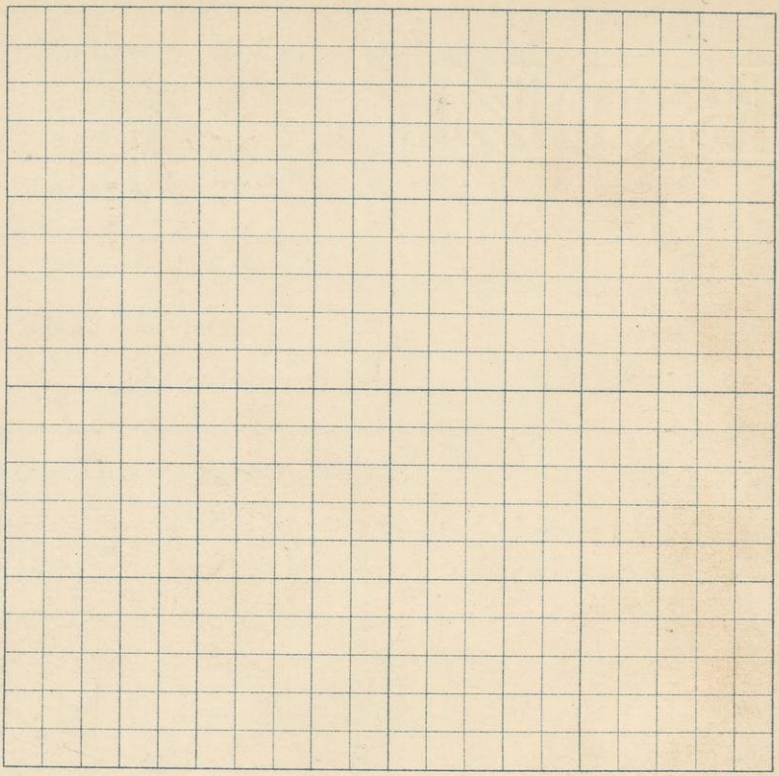
1942 Sec 20 200 N Bank of River
Schistose rock, may be clastic.

1943 250 paces up river
These rocks I think are undoubtedly black slates of clastic origin. The contact between these slates and the greenstones may be looked for with certainty between the river and the W⅛ line of Section 20.

1944 Sec 20 N 450 On bank of River
Ledge of what I think is banded gritty slate.

1945 Sec 20 1000 paces up river.
Strike N 10° E
Dip 80° W
Peculiar well banded rock. Dont know what it is.

S. T. R.

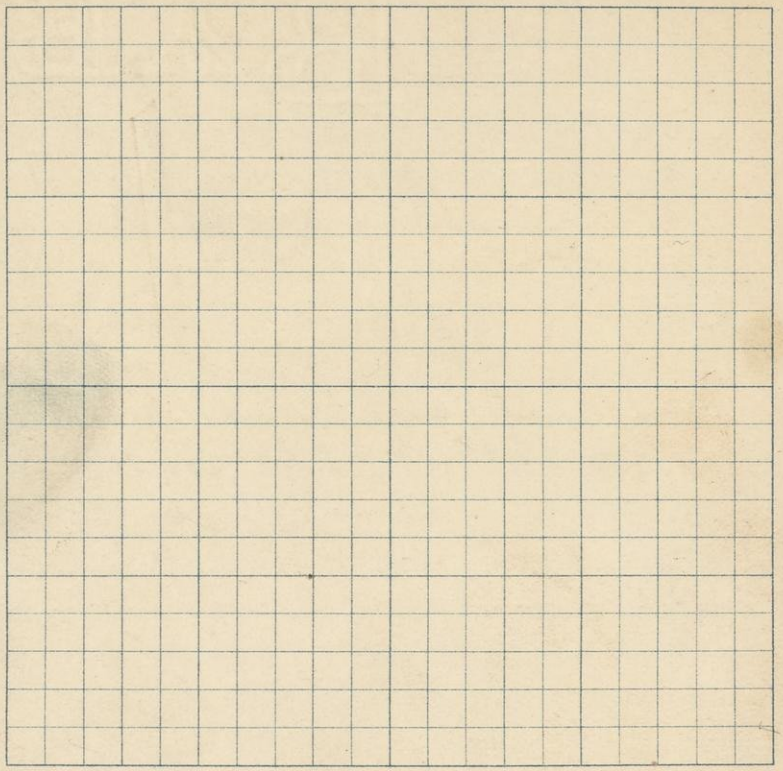


The Mansfield Mine, Sec 20. N.W. ¼.

On both sides of the river valley are ridges of greenstone. The main shaft was sunk in the greenstone which here dips nearly vertical, shading a little toward the west. Beneath the greenstone is about 50 ft of red slate (bright red) and then 25 - 35 ft of high grade red hematite. Black slate forms the foot wall in most places but in some places an unknown amount of a gray "soapstone" intervenes.

There are two grades of ore only one of which has so far been mined. The first grade is 62½ - 65% metallic iron with .030 to .040 phosphorus. The second grade is about 60% iron and phosphorus above the bessemer limit. The ore lens is 300 ft long at the first level and 600 at the second and an unknown length

S. T. R.



below. The richest ore apparently maintains an almost uniform length of about 300 ft though it widens with depth. The ore body is pitching toward the north. Between the 1st and 2nd levels (68 ft) the orebody gained 49 ft toward the north.

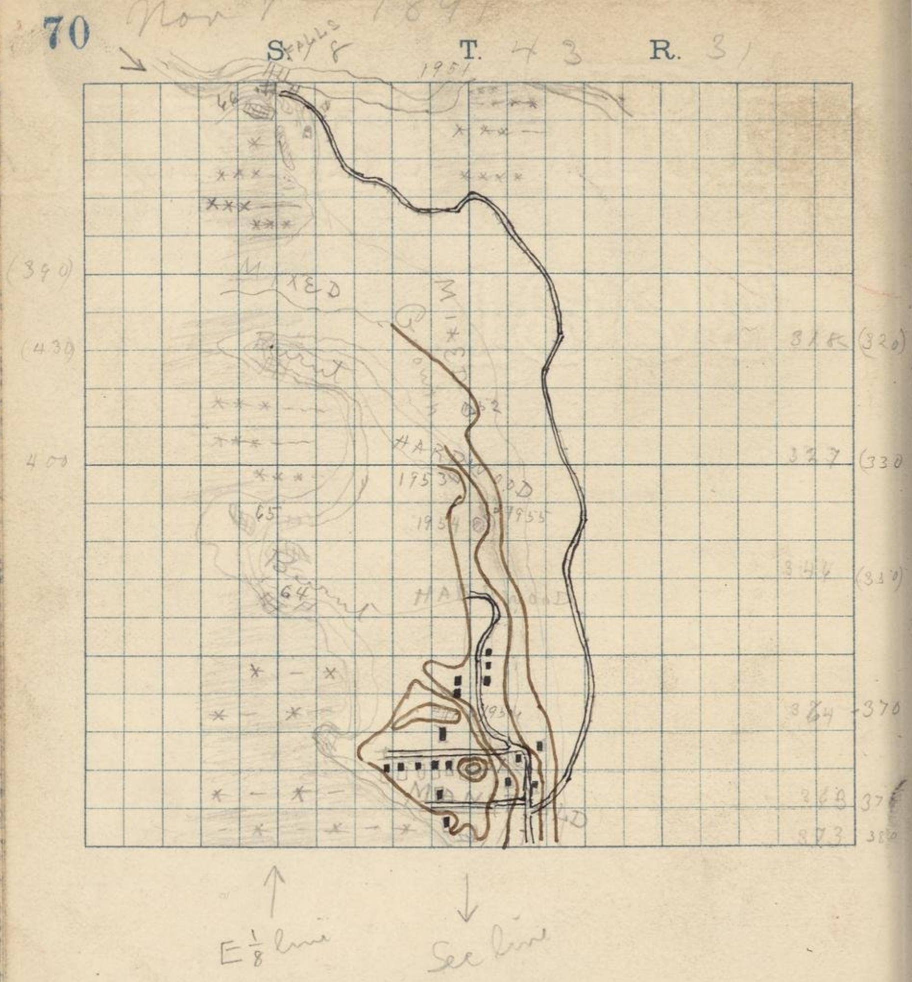
South of the mine along the river are many outcrops of clastic rocks, including graywackes, black slates and sericitic schists. Apparently the succession of rocks, as given by a considerable exposure along the river is 1st greenstone, 2nd black slate 3d sericitic schist 4th graywacke (coarse), 5th black slates and graywackes. The rocks, I should say, became more and more silicious the higher you go. The valley is bounded on each side by a great mass of greenstone of almost every variety.

Spec	
1947	Greenstone
48	Red slate
49	Soap rock
50	Black slate.

see p. 58. map

Nov 7 1897

S. 8 T. 43 R. 31



7.45 A.M. Going S on E. line Sec 18

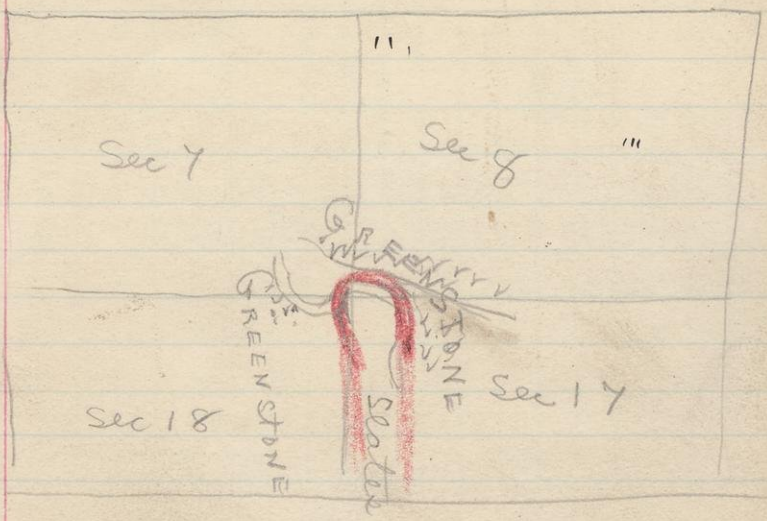
B. M. 310.01 1000 = 27.7

1951 Sec 18 " 2040 N of S.E Cor

Outcrop of black slate on R bank of Michigamme river.

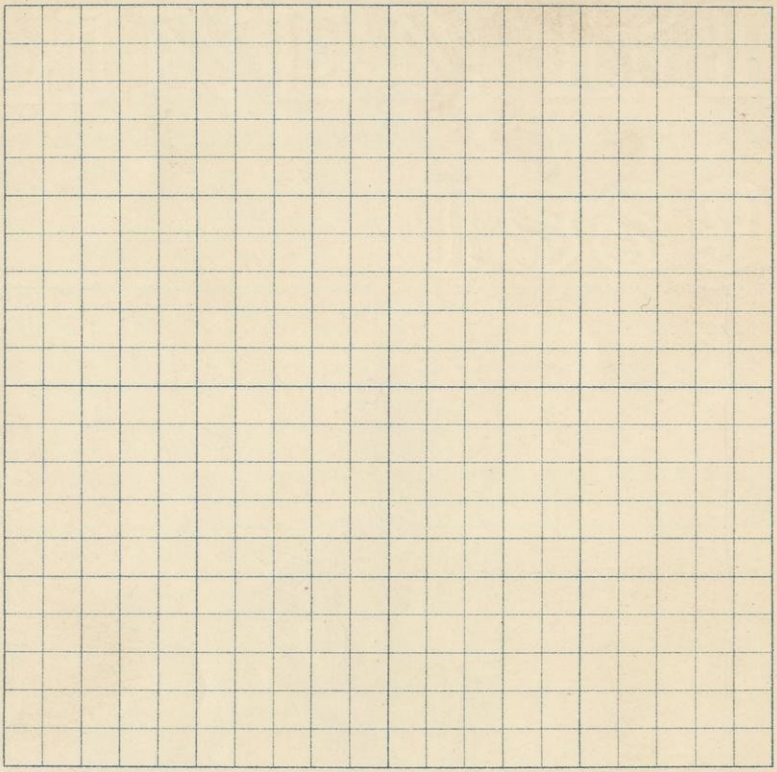
Strike N. 30° W

Dip 90°



The above is a very rude sketch showing the position of the end of this very remarkable fold. I have followed a continuous outcrop of greenstone all around the northern end of the fold and also for two miles down on each side of the river. Scarcely 50 paces from this

S. T. R.



Corner on the other side of the river you can see a large outcrop of slate in almost immediate contact with greenstone

Strike N 85° W

Dip 90°

A long tongue of slate follows this river down. It is a synclinal fold, so compressed that the dip is constant in every part exposed. At the Mansfield mine a layer of red slate comes in between the greenstone and the black slate. I have found an outcrop of similar red slate on the other side of the river next to the greenstone.

The slate at this point is often full of pyrites.

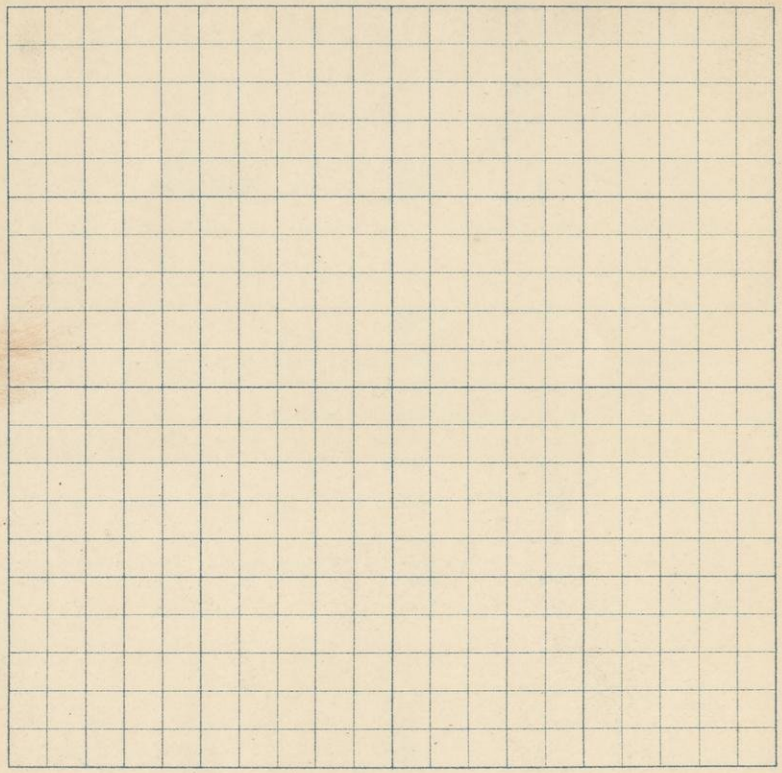
1952 Sec 18 .11 50 N of S.E Cor
Banded greenstone.
1000 (330) 8.45 AM. Hardwood

1953 Sec 18 N 960 W 40
Greenstone.

1954 Sec 17 N 850 W 1960
Greenstone.

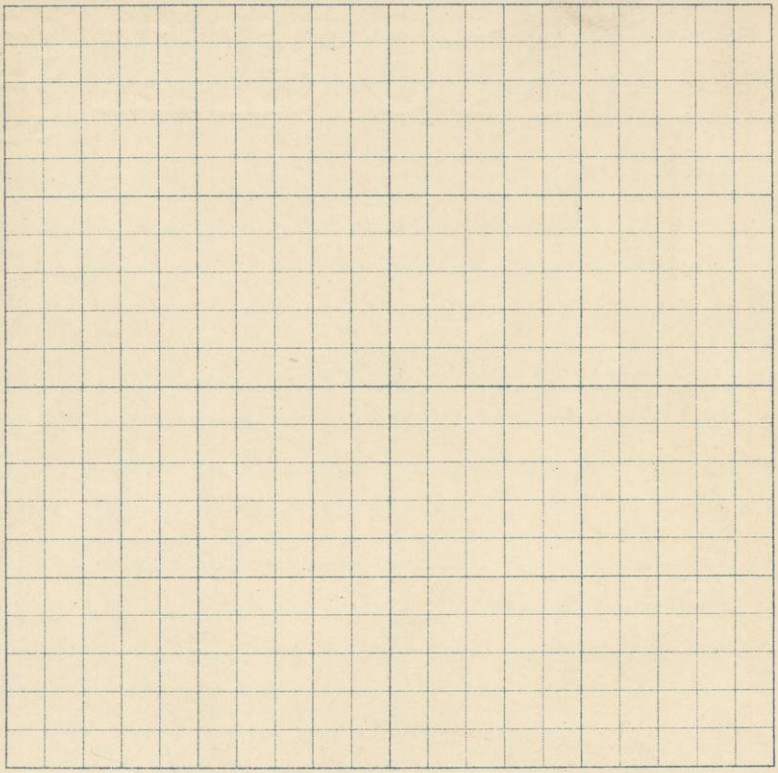
1955 Sec 17 N 850 W 1930 Jasper and lean ore from test pit.

S. T. R.



at this point apparently no regular red slate were found, but the reddish, cherty lean ore material locally called "vein matter" or "capping" which comes in at the ends of the ore lens at the Mansfield mine, is apparently very abundant. The red slate proper is apparently not very constant at this locality, but between the greenstone and the black slate there generally is either red slate or jasper or iron ore, or all three. In some places there is what may be a kind of basal conglomerate here. That is to say there is a queer looking material consisting of greenstone mixed with red slate. This occurs in the Mansfield mine and may be seen in several test pits north of it. In some places this mixed material, or basal conglomerate is about 3 feet thick and the materials composing it are quite fine. At other places it is probably much thicker and the pieces

S. T. R.



of greenstone larger. In some places there is a reddish green shaly material between the greenstone and the red slate which may be nothing but re-cemented greenstone detritus.

1400 (350) Clearing

Just east of this point on the right bank of the river are numerous test pits, showing iron ore and jasper. Just on the river itself are outcrops of black banded slate (same as 1951) striking N 10° W (magnetic) and dipping 80° W

1954 Sec 18 N 35°

Greenstone, gritty

On the eastern exposure of this ledge is a rather remarkable example of the formation of a kind of conglomerate by the brecciation of the rock in folding. In some places the rock presents the appearance of large boulders fitting into each other more or less and separated from each other by by thin bands of darker colored material. In other places the rock is completely crushed for

S. T. R.

Conglomerate arising from brecciation in situ.

three or four feet and for this space the rock has been entirely altered and recomposed. Sometimes this recomposed material is full of fragments of the rock which have not been so much affected. In places large segregations of quartz and calcite are found. In many places this quartz is well banded and makes pretty gray agate.

1954 Sec 18 N 200

Gritty greenstone.

Going N on E ½ line Sec 18

1964 Sec 18 N 650 W 600

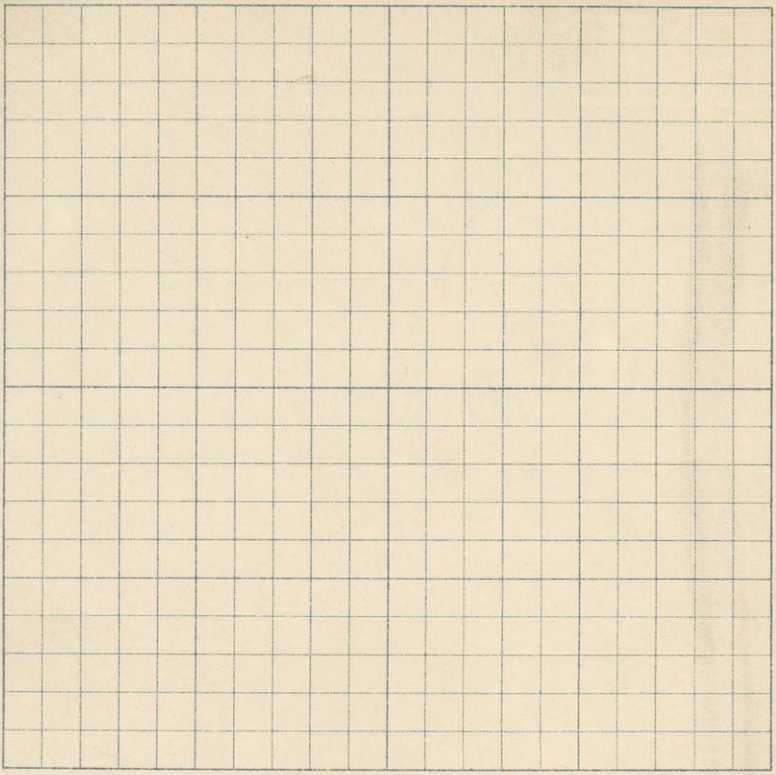
Greenstone.

1965 Sec 18 800 N 500 W

Pseudo-agglomerate arising from the brecciation of greenstone in situ

This specimen fairly represents the condition of large masses of the rock in this ledge. There is no sign of schistose structure. The rock has simply been broken and recemented. The coarseness of the breccia varies enormously. In some places the rock has

S. T. R.



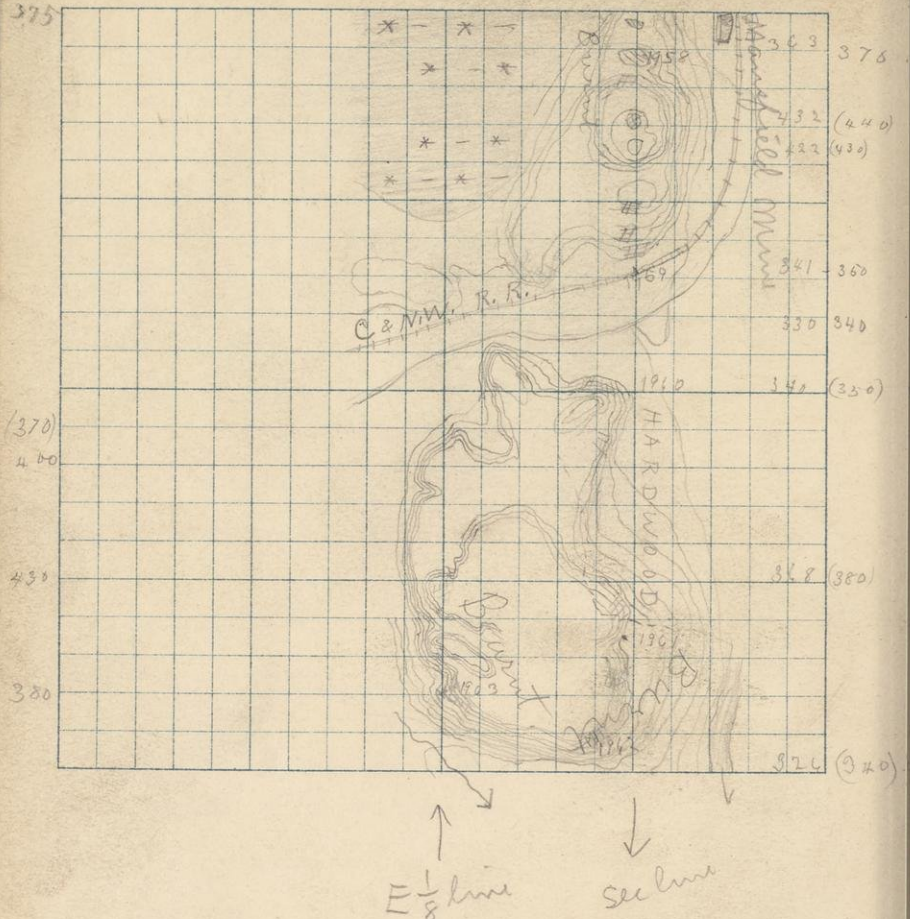
the appearance of consisting of large boulders enclosed by thin anastomosing bands. In other places it is almost as fine as sandstone. The specimen (1963) is rather a fine grained one. You can see places here where the brecciation has only commenced

This can be seen best in banded
gneiss or "
gneiss" where you can see
the effect of incipient motion
most readily.

1966 Sec 18 2000 N 500 W
Greenstone
B.M. 843. Aneroid 350.

82 Nov 7th 1891

S. 19 T. 43 R. 31



Going S on E line Sec 19.

1958 Sec 19 N 900 W 11. A.M.
Greenstone.
100-400 great ridge of greenstone
500 (400)
680 (350) C. & N.W. R. R.

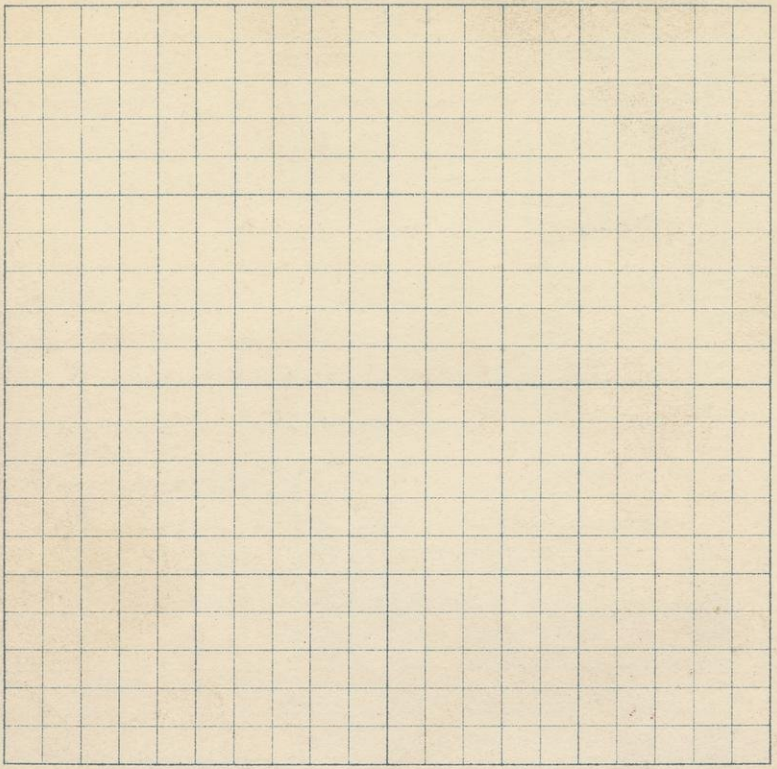
1959 Sec 19 N 1300
Greenstone in R. R. cut. Partly brecciated in situ into a pseudo conglomerate.
This is an exceptionally fine exposure of this peculiar phenomenon.
800 Road to Crystal Falls.

1960 Sec 19 N 1000
Greenstone
1000 (350) 11.40 A.M.

1961 Sec 19 N 350
Greenstone

1962 Sec 19 N 100 W 100
Greenstone. Here the greenstone ridge on the west side of the river comes to an abrupt end in a bold bluff. On the east side of the river the greenstone bluffs continue for a mile or more.
2000 (340) Burnt 12.30 P.M.
B. M. S 26.68

S. T. R.



On the Bench line here the tongue of slate which runs up the Michigamme River as far as the S. line of Sec. 8. is not over two hundred paces wide. The greenstone comes down within 100 paces of the river on each side. The slate outcrops are all right in the river, except

where they have been exposed by test pits. It is probable that the fold maintains nearly a uniform width for the two miles. At the very widest part it is certainly less than 400 paces and I think that nowhere is it 300 paces wide. It is always over 100 paces wide. The fold is so compressed that the dip is uniform (80° W) except at the extreme northern end. This inclination is perfectly constant to the bottom of the Mansfield mine which is 300 feet deep. At that place there is every indication that the fold continues down an indefinite distance

At the extreme N end it is about 500 paces across

Going N on E ⅛ line Sec 19

B.M. 33524 0 = 28. 8. 1.30 P.M.

Burnt

1903 Dec 19 200 N 500 W.

Greenstone

1963 From 200 to 900 is one continuous ledge of greenstone

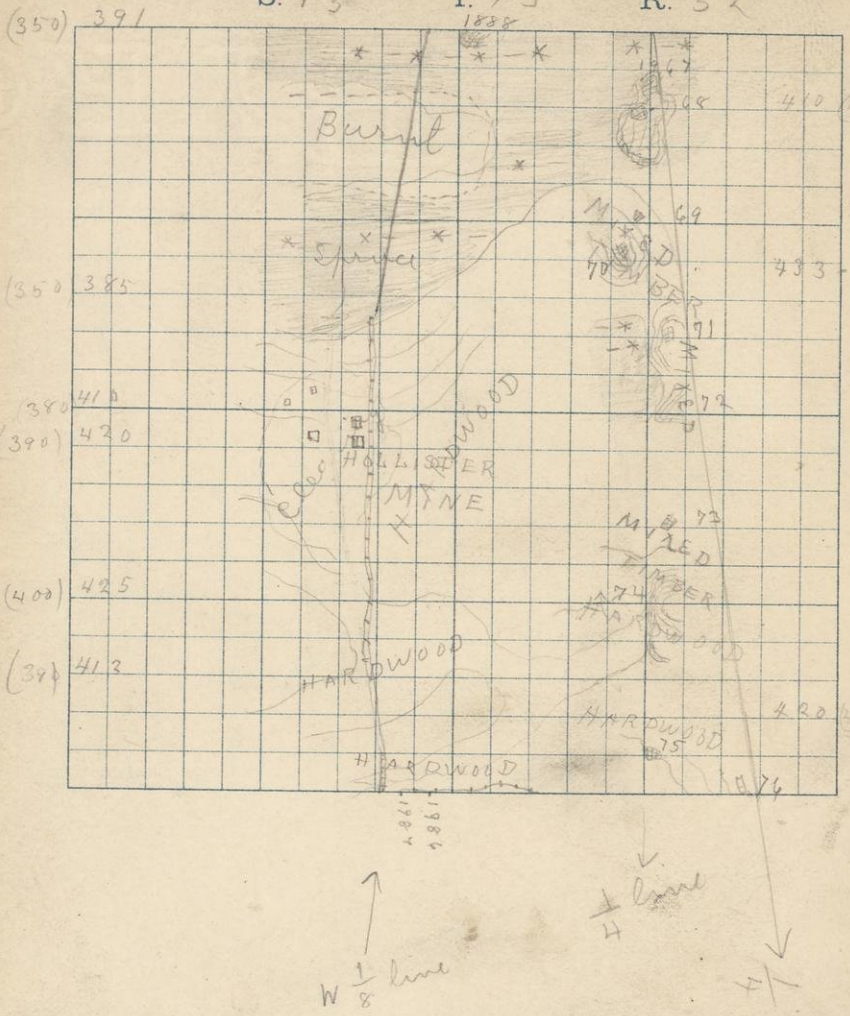
1000 2.17 P.M. Burnt.

1100 Road from Mansfield to Crystal Falls

2000 (375)

Nov 8th 1891

S. 13 T. 43 R. 32



Going S on ¼ line Sec 13 9 A.M.
B.M. 386.07 - 300.00 = 28.4 m

1967 Sec 13 N 1900 W 1000
Greenstone amygduloid.

1968 Sec 13 N 1800 W 1000
Greenstone

1969 Sec 13 N 1500 W 1000
Greenstone.

1970 Sec 13 N 1370 W 1100
Splendid example of a pseudo agglomerate produced by brecciation. Spec. 1970 shows the phenomenon perfectly. It is a valuable specimen for any ~~&~~ cabinet, I hope it gets to Madison safely.

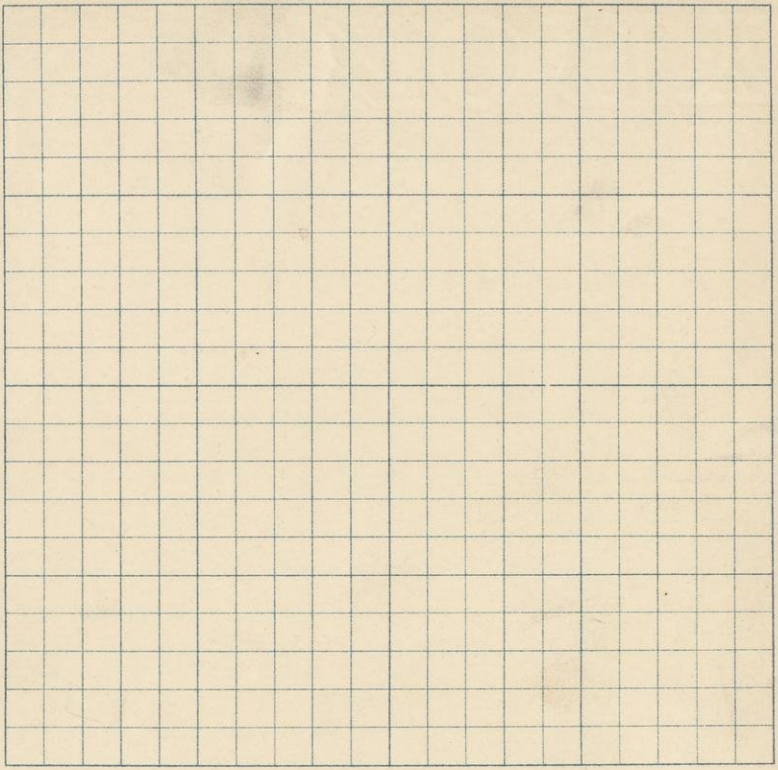
1971 Sec 13 N 1200 W 1000
Greenstone.
1000 (380) 9.55 A.M. Tem. Swamp

1972 Sec 13 N 1000 W 1000
Greenstone amygduloid with schistosity incipient.

1973 Sec 13 N 700 W 1000
Greenstone.

1974 Sec 13 N 500 W 1000
Greenstone

S. T. R.



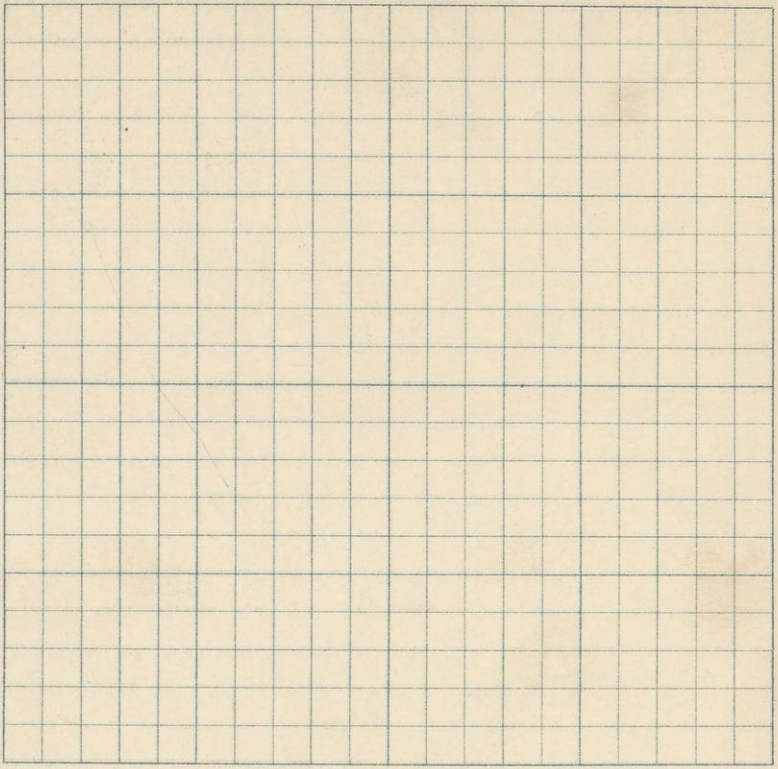
1975 Sec 13 N 100 W 1000
Greenstone.

1976 Sec 13 W 1000 paces from S.E Cor.
This is an excellent specimen
of typical volcanic agglomerate.
In this rock the fragments are
angular and certainly not the
product of brecciation
2000 (440) Day cloudy. Came out 300
paces west of line. Variations heavy
— Going N on W ¼ line Sec 13 2.30 P.M

1986 Sec 13. 1560 W of S.E cor
Red banded slate from test pit

1987 Sec 13 1640 W of S E cor.
Red banded slate from test pit
75 paces S.W. to ledge of greenstone
S Sec 13 N 950 W 1700 from S.E Cor.
Hollister Mine. Not now running.
Filled with water.

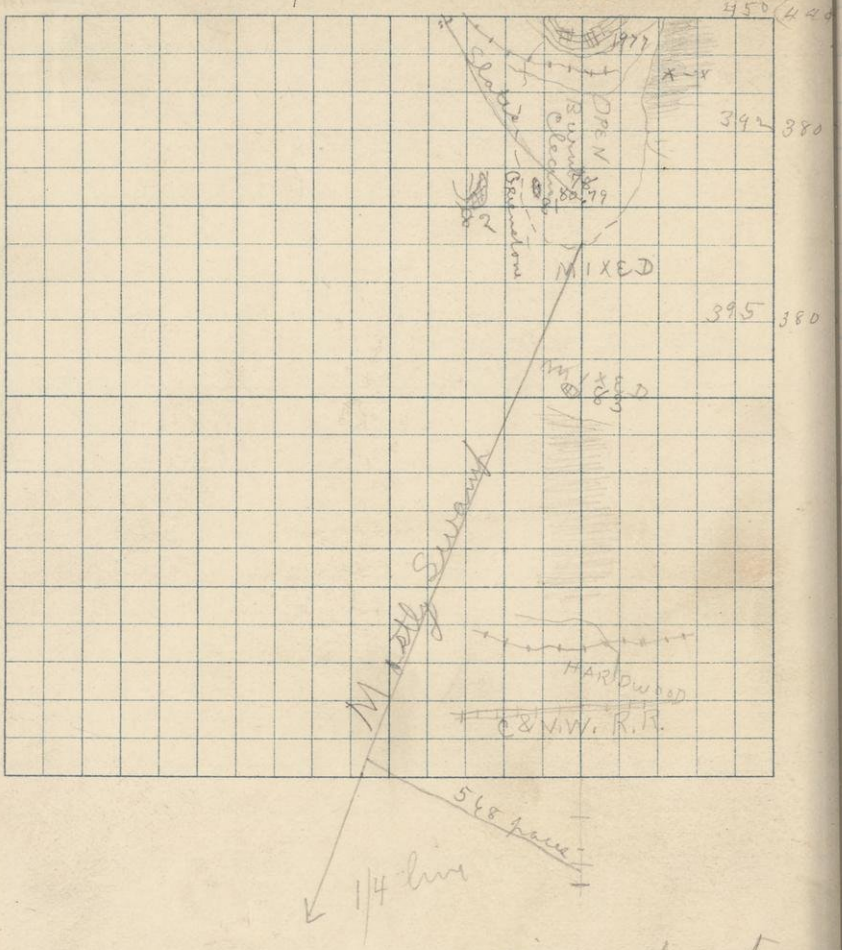
S. T. R.



2000 (350) Bench line. B. M. 3991
struck line 80 paces W of stake
1988. Sec 13 1980 N 1470 W of S.E. Cor.
Greenstone.

92

S. 24 T. 43 R. 32



This bad close is entirely due to heavy variations.

Young S on 1/4 line Sec 24
O.(440) 11. A.M. Hardwood.

1977 Sec 24 1960 N 1000 W
Excellent specimen of greenstone amygduloid. There is a large bluff of it here, but I have no time to examine it carefully.

1978 Sec 24 N 15° 47 W 1000
Test pit with red slate

1979 Sec 24 N 15° 05 W 1000
Test pit with banded black slates.

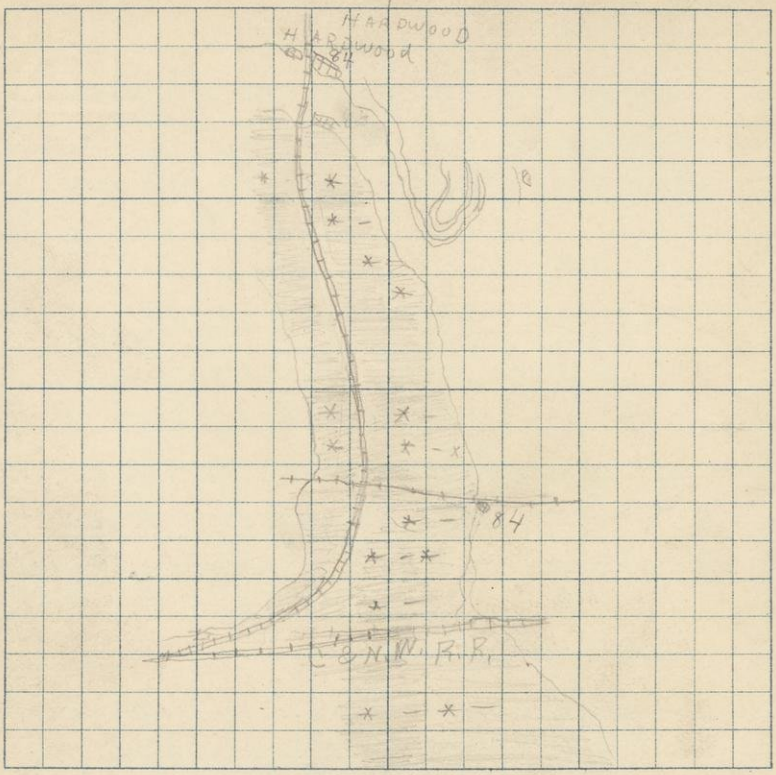
1980 20 paces west is another test pit out of which has been dug a green soap rock like that in the hanging wall of the Point River mine.
A little further S. W. is another pit showing abundance of lean ore and hard bright red jasper.

1981 N. W of this place are a number of test pits all showing lean ore, jasper and red and black slates. 120 W is a ledge of greenstone

1982 Sec 24 N 150 W 1245.
A perfectly magnificent exposure of volcanic agglomerate. No words can describe it. It consists of immense bobbabs of amygduloid

Nov 9th 1891

S. 24 T. 43 R. 32 W 1/8 line



and aphanitic greenstone mixed with finer scoriaceous material. Spec 1982 shows chips from an amygdaloid bomb, from a fragment of aphanitic greenstone and from the matrix. Not only is this volcanic agglomerate here, but there is a fine exposure a little to the west of pseudo conglomerate

800 (380) The variations here are very heavy. We don't know where we are going. The day is cloudy.
1000 (380) 12. 37. mixed growth.

1983 Sec 24 W 1000 N 1000
Greenstone.
2258 Struck Bench line 568 paces ± of Stake.
B.M. 378. Aneroid 860. 1.30 P.M.

– Going N on W 1/8 line Sec 24
B.M. 380.74. 400 = 280

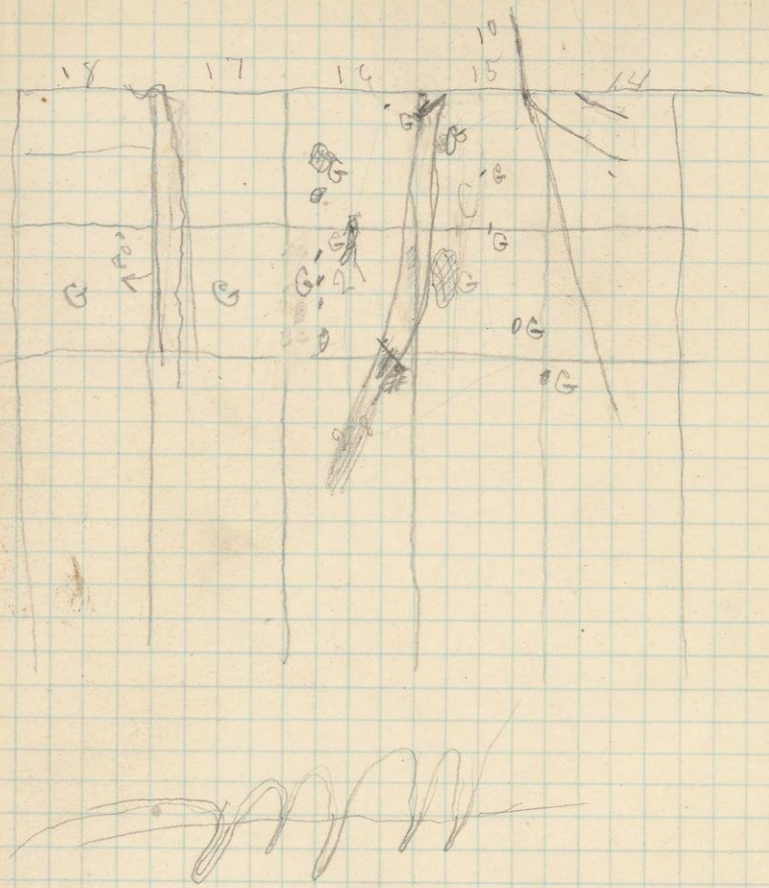
1984 Sec 24 N 700 W 1500
Greenstone

1985 Sec 24 N 1923 W 1750
Greenstone in R.R. Cut
On account of heavy variations and late hour, offset to R.R. at 462 paces.

Blank Pages

96-111

Skipped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390
480