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## Marquette district, Michigan. No. 121 1891

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1891

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Ishpeming  
Vol.  
Traverses.

U. S. GEOLOGICAL SURVEY  
FIELD SECTION BOOK

Marquette District  
W. S. Bayley.

1891



# LAKE SUPERIOR DIVISION.

## 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 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, with dip arrow and number attached as before. 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 specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to 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. The ruling of the left-hand page is also arranged so that, if desirable, a smaller scale can be used, two inches, one inch, or even one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

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. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened, but chips of them must be taken. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small sized specimens, trimmed to a uniform size of  $2 \times 2\frac{1}{2} \times \frac{3}{4}$  inches will be allowed, but in all other cases *large sized specimens*, trimmed to a size of  $3 \times 4 \times 1$  inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. Specimens should not be placed together without protection in the collecting bag as the fresh surfaces, important in determining the character of rocks, are thus destroyed. They should be damaged by no temporary mark, but the numbers should be at once marked in at least two places upon the inclosing paper or cloth bags. It is desirable that specimens be permanently marked in camp by painting the numbers upon them in white upon a black background, using Silver White and Ivory Black oil tubes for color, with turpentine as a diluent.

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

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

19500 — 19558  
19650 — 19664  
19667 — 19675  
19705 — 19736  
19811 — 19821

1 Book #121



# Marquette Region

Vicinity of the  
Saginaw Mine, Stonerville  
etc.

June 30 to July  
1891

W. S. Bayley

Assistants

E. P. Erickson

L. H. Smith.

1

June 30/91.

Began work on the South side  
of the Decatur Scrub Shore and  
Atlantic Railroad in vicinity  
of Shreveville.

The work is the continuation of  
that done by Merriam and Erick-  
sen to the west, and is accomplish-  
ed by the same method as those  
made use of by them.

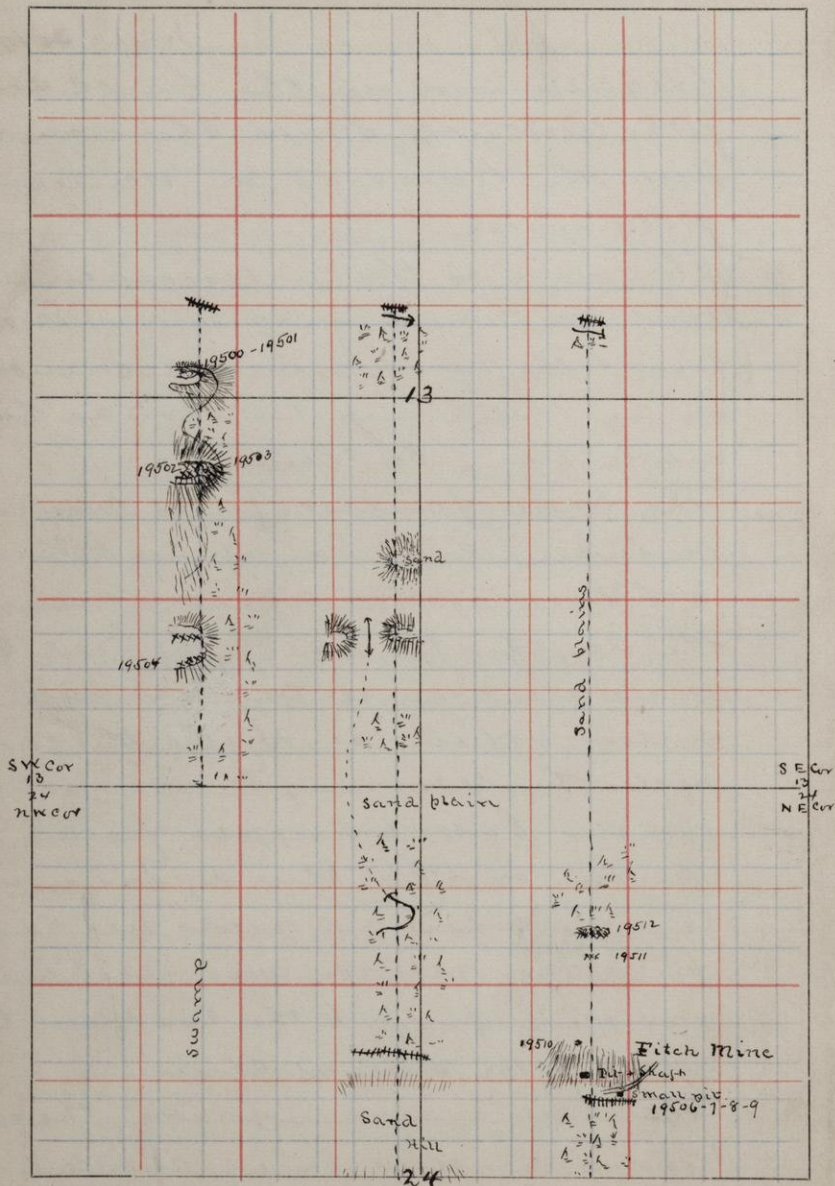
The time for use of Dial compass  
is taken each day from a known  
N. & S. line, and this serves during  
the day for the use of the Dial. All  
runs are made by Dial, and  
unless otherwise stated are cor-  
rected by referring to corners and  
quarter posts wherever found.

On one or two cloudy days, in  
regions where no rocks are ex-  
posed the needle was used with  
variation found to the East and the  
west of the several runs.

Alternate runs are made, the in-  
termediate ones being made by  
some one else.

T. 47

R. 28





On this day made a run from the railroad south, beginning at 1600 N of E line Sec 13. T 47. R. 28. The railroad here is 1250 N. of S. line.

The first rocks found are at 1090 N. Here is a round knob of greenstone, with E.W. schistosity & more or less plainly developed. It is cut in one place by a dyke of granitic looking material.

✓ 19500 Greenstone 1090 N. 1600 N of S.E. Cor. Sec. 13. T 47. R. 28.

✓ 19501 From small dyke cutting 19500.

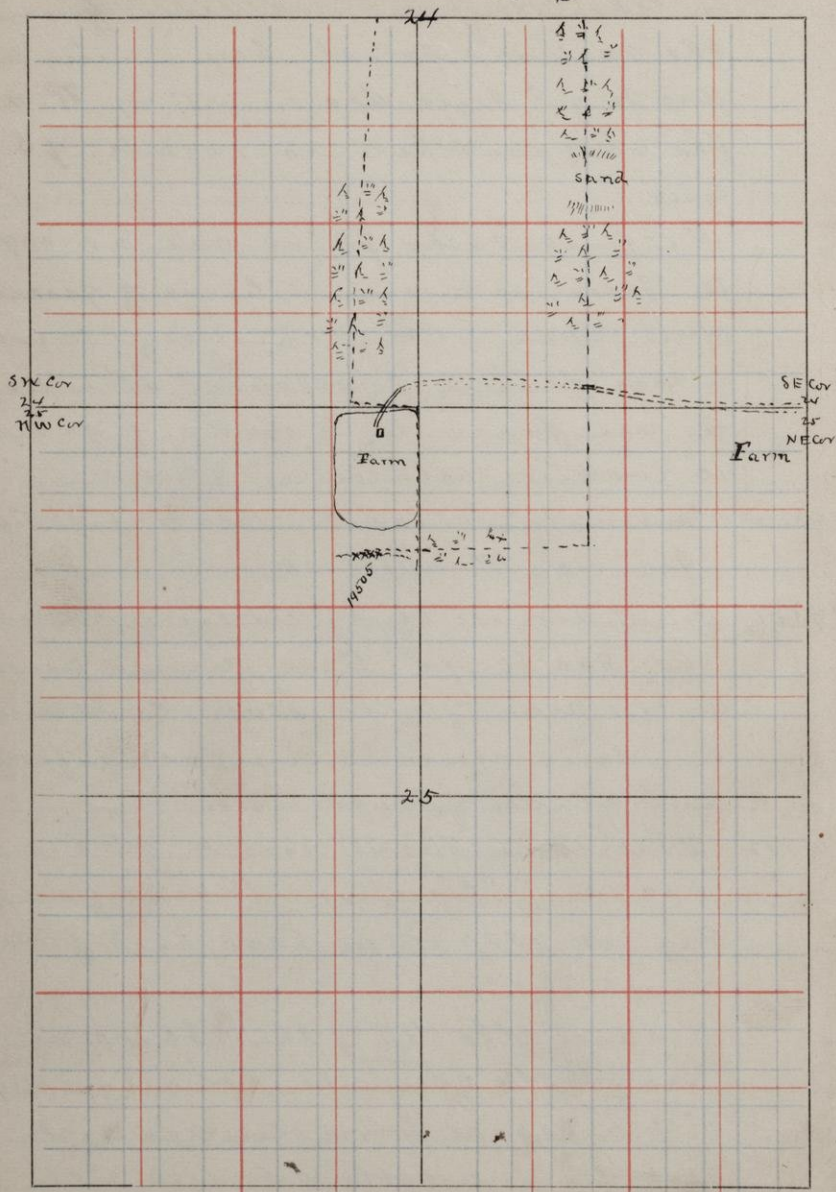
At 860 N of S. line crossed another small ridge of greenstone, containing long narrow crystals of feldspar and flakes of black mica.

✓ 19502 Greenstone 860 N. 1600 N. of S.E. Cor. Sec 13. [Specimens taken yesterday at 1520 N, on East end of same knob.]

Nearer the top of this bluff, at 850 N. the greenstone changes slightly to a coarse hornblende rock, best seen at the S.E. end of the bluff which is high and bare.

T. 47

R. 28



19503 From this point, 850 N. 1580 W of  
S.E. cor. Sec. 13.

The next rocks form a ridge at  
320 N of the South line. In this  
ridge the rock appears beaded,  
with a dip high to the S.

19504 From this ridge 320 N, 1620 W of  
O.E. Sec. 13.

For some reason went no further  
S. in this line.

July 1.

Made another trip S. Starting  
at railroad 1900 W of E line Sec  
13. T. 47. R. 28. No rocks were  
seen in Sec 13. in this run.

After crossing sandhills and swamps  
struck S. line of Sec. at 1040 W.  
of S.E. corner.

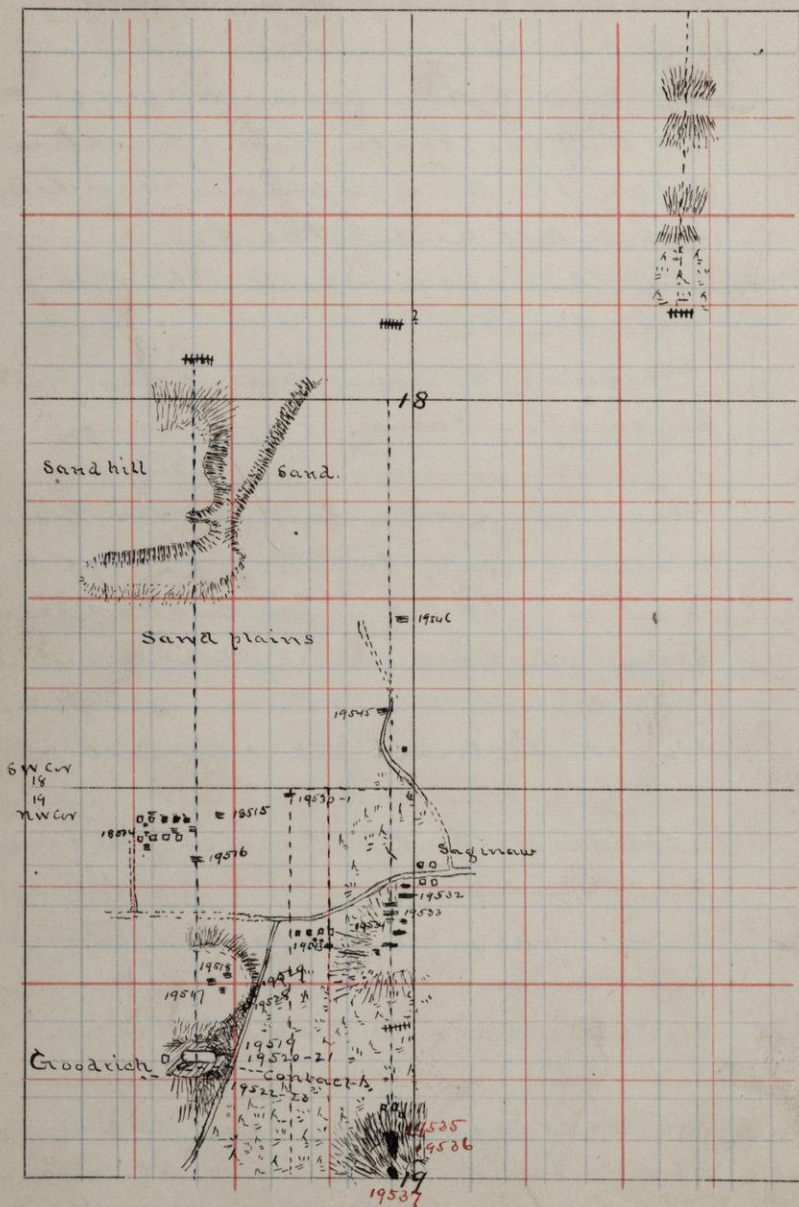
Continued S. through Section  
24, starting at 40 W of  $\frac{1}{4}$  post,  
traversing swamps and sand  
hills as indicated in the map  
until reached 2000 S. Here  
corrected up finding ourselves  
100 paces further west than  
should have been and 65 to 80 paces  
South. Found the S.  $\frac{1}{4}$  post of the



T. 47

6

R. 27



19500  
1650N 1175W  
Sec 25-47-23

Section aces from it went S.  
350 paces and west 175, then S  
to mine to granite ledge, with  
precipitous face of about 15 ft. to  
the N. The ridge runs E & W some  
little distance but the coarse  
red granite is exposed for only  
46 paces E & W.

Went East from this point 375  
paces to 600 N of E line of Sec. 25  
and from here ran north.

No granite was seen on the East-  
ern run, most of the time being  
spent in swamp. On the run  
North also no rocks were seen  
until came out of the swamp on  
to the Fitch Mine, which was not  
accurately located. Beyond this  
also no rocks were found. The  
rail road on this run was struck  
at 1200 N of S. line of Sec 13.

The location of main shaft of the  
Fitch Mine is not beyond doubt.  
The locations of other ledges in the  
vicinity are with reference to this  
and are accurate relatively.







## Titch Mine

The small open pit is cutting East of the Main pit shows several of the rocks in their relations. All are bedded with an apparently vertical dip, possibly inclined a little to the North.

19506 Above (to North) is jasper conglomerate with iron fragments, jasper dirts and quartz pebbles. Under this is a seam of hematite and under this gneiss.

19507 The one is the specular or slaty one, the bright ochrace hematite.

The overlying conglomerate is the usual jasper conglomerate at some little distance from the one, but nearer this it is a conglomerate

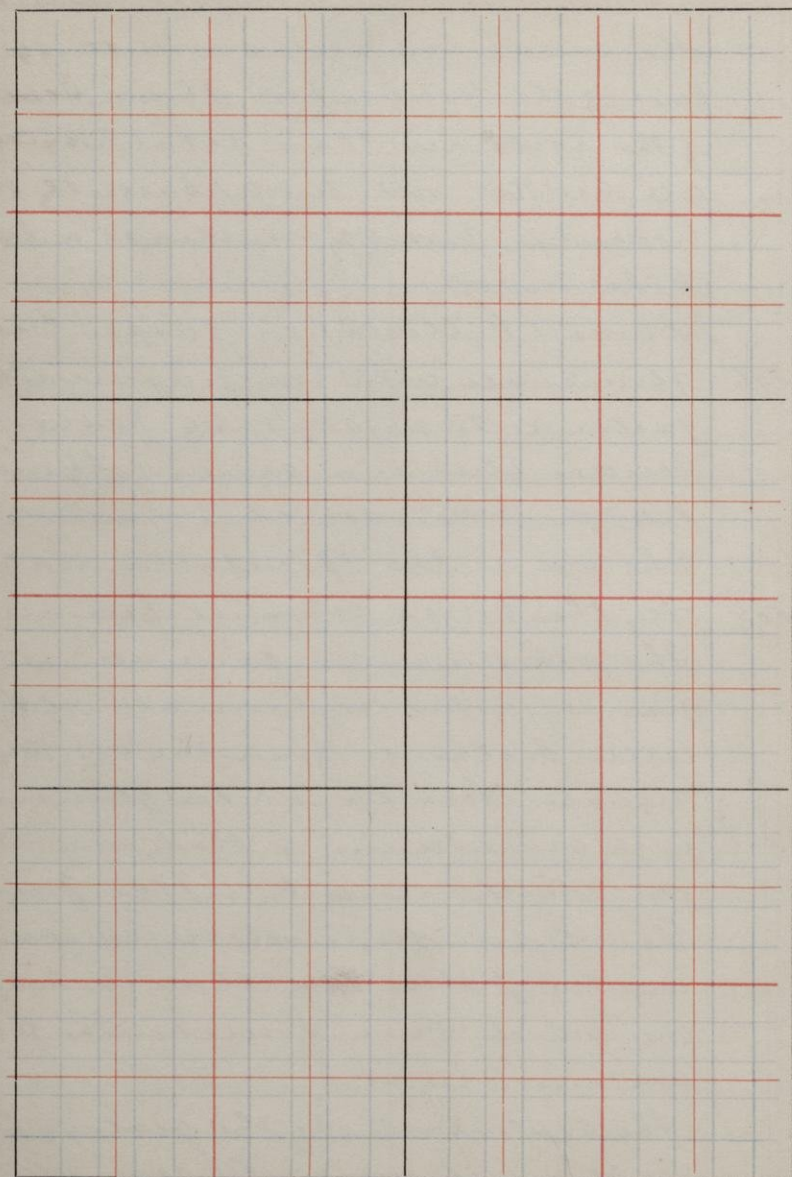
19508 with granular or slaty one. The one itself seems to differ from the one conglomerate in containing no pebbles but there is hard one, which can sometimes be discerned in it.

The explanation of the geology here is plain if we are to regard the conglomerate as indicating a

T.

10

R.



geological break. The one is then the fine detritus of underlying beds that first settled in consequence of high specific gravity; the overlying one - conglomerate is this material with pebbles; and the finer conglomerate is the remaining detrital material from which one particles have been removed. As time succeeded the forces were less violent than in previous times. The pebbles now become smaller until finally the detritus yielded up quartzites that should be found overlying the conglomerate (See spec. 19511)

At the time just described the exposures are 30 paces long and 10 wide, with strike about  $10^{\circ}$  N of E.

✓ 19508 The greenstone in the foot wall is schistose near the ore, but more massive at some distance from it.

✓ 19509 From 2 ft. S. of Contact with ore.

The South side of the main pit



12

[illegible]

was located at 1275 N. of 600 W. of  
S.E. cor Sec. 24

Could not get into this pit, but  
recognized greenstone in the S. and  
what appeared to be a bedded rock  
dipping N. in other places of opening.

At 350 further north in the  
top of hill in whose south slope  
is the mine, are low, smooth  
✓ 19510 Exposures of conglomerate, scattered  
between the houses of the mine  
settlement

✓ 19511 At 1590 N. 600 W. of S.E. cor Sec 24  
are low ledges of quartzite?, with  
a little feldspar intermingled with  
the quartz fragments. The bedding of  
the rock was not noticeable

✓ 19512 At 1620 N. 600 W. of S.E. cor Sec 24  
a large ledge of dark gray gray-  
wacke appears, measuring 35 paces  
E-W and 15 paces N-S.

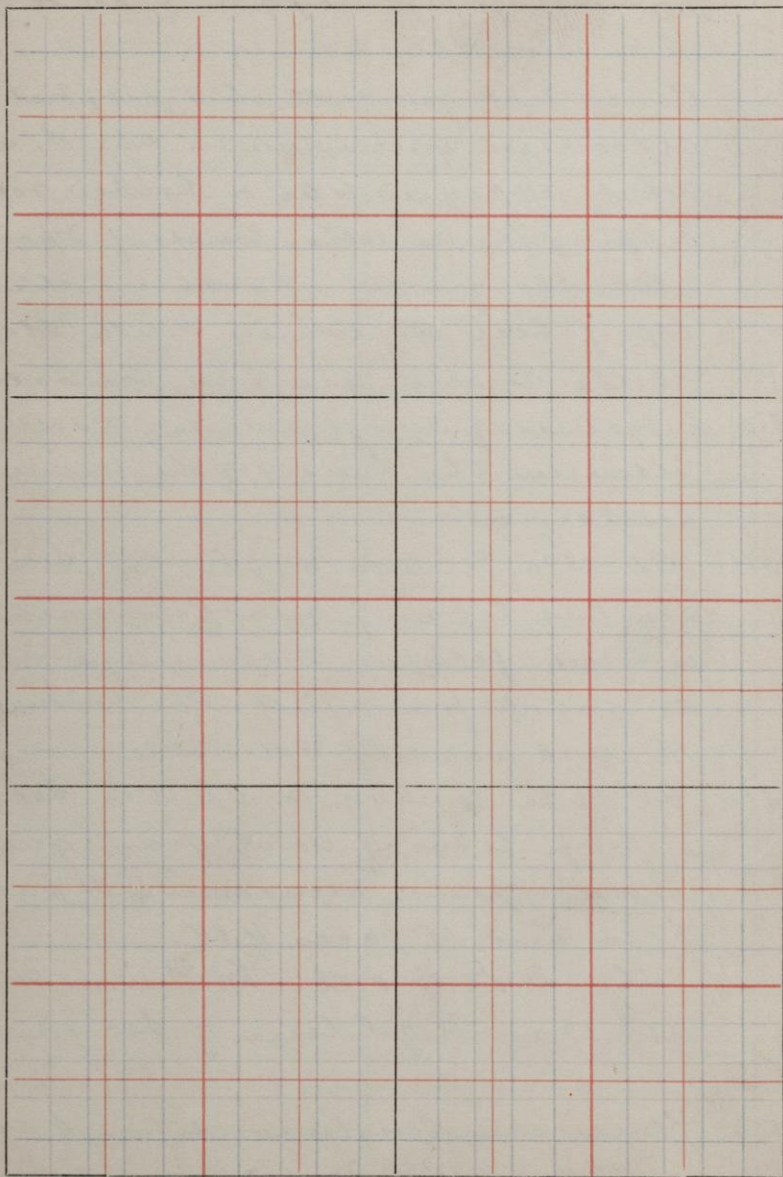
The D.S. & A. R.R. was struck  
at 1200 N. of S. line of Sec 13.

✓ 19513 Greenstone Conglomerate on S. side  
of R.R. at 381 W. 1035 N. of S.E. cor  
Sec 13.

T.

14

R.





July 6/91

Again ran S. from D.S. & A. R.R.,  
 starting at 1600 W 1104 N y S.E.  
 Cor. Sec. 18. T. 47. R. 27. As far as  
 S. line of Sec 18 the country is swampy  
 and sand lies.

Just S. of the line however in  
 the main street of Saginaw  
 location were found ledges of quartz-  
 ite, striking N  $75^{\circ}$ - $84^{\circ}$  E and  
 dipping  $45^{\circ}$  N. The difficulty in  
 determining true bedding planes  
 was in this rendered easy by ripple  
 marked surfaces.

The locations of the most impor-  
 tant ledges are as follows

278 E. 90 S y N. W Cor Sec 19

278 E. 85 S of " " " " "

290 E. 100 S " " " " "

300 E. 70 S " " " " "

305 E. 65 S " " " " "

290 E. 125 S. " " " " "

380 E. 95 S. " " " " "

412 E. 90 S. " " " " "

445 E. 70 S. " " " " "

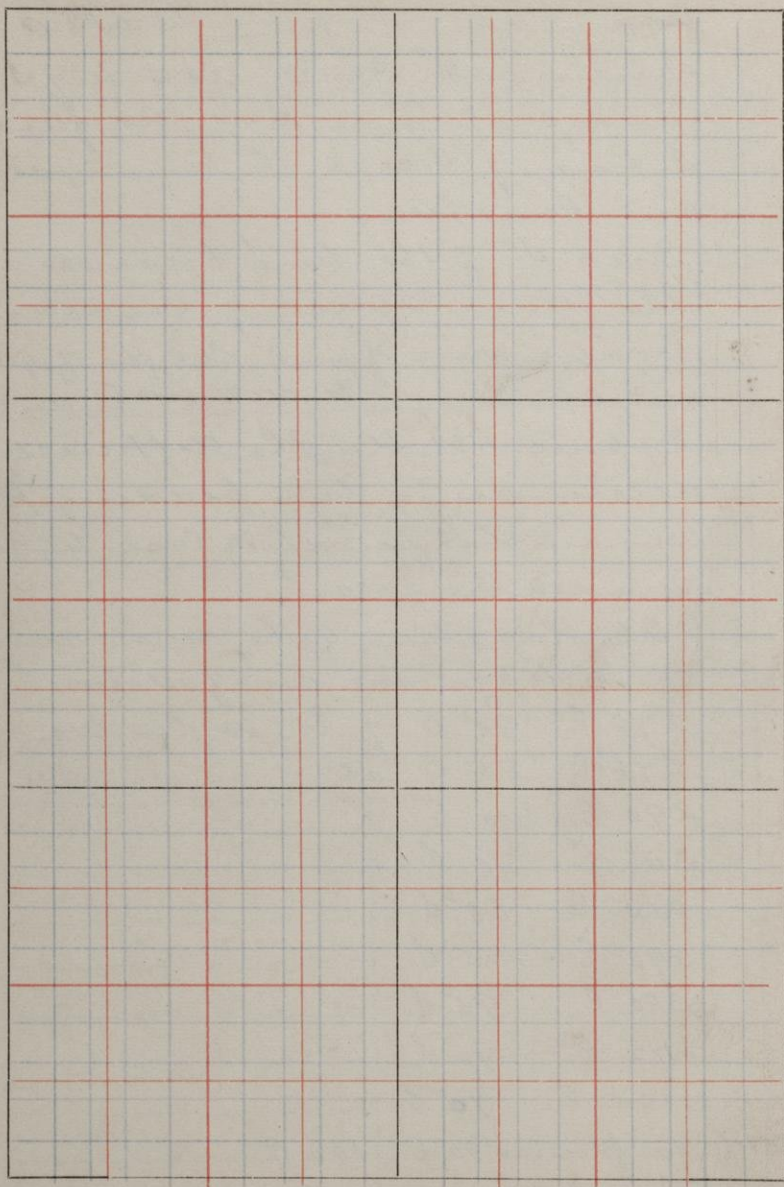
19514 is from 290 E 100 S.

The ledges are low, unobtrusive,

T.

16

R.



such as would have probably been overlooked in a wooded country.

At 1145 E. 96 S. the ledge consists of interbedded quartzitic and quartzitic slates, striking nearly E.W. and dipping N. at high angle. The contact of the two rocks is very apparent. They are conformable.

✓ 19515 1555 N 1930 N of S.E. Cor. Sec 19 T 47. R. 27. Slaty variety.

✓ 19516 A little further S. at 1600 N of 1830 N of S.E. Cor. Sec 19 is a small ledge of more ferruginous quartzite a little coarser in texture than the more purely quartzitic phases. The ledge is about 15 ft E.W. and 4 ft wide.

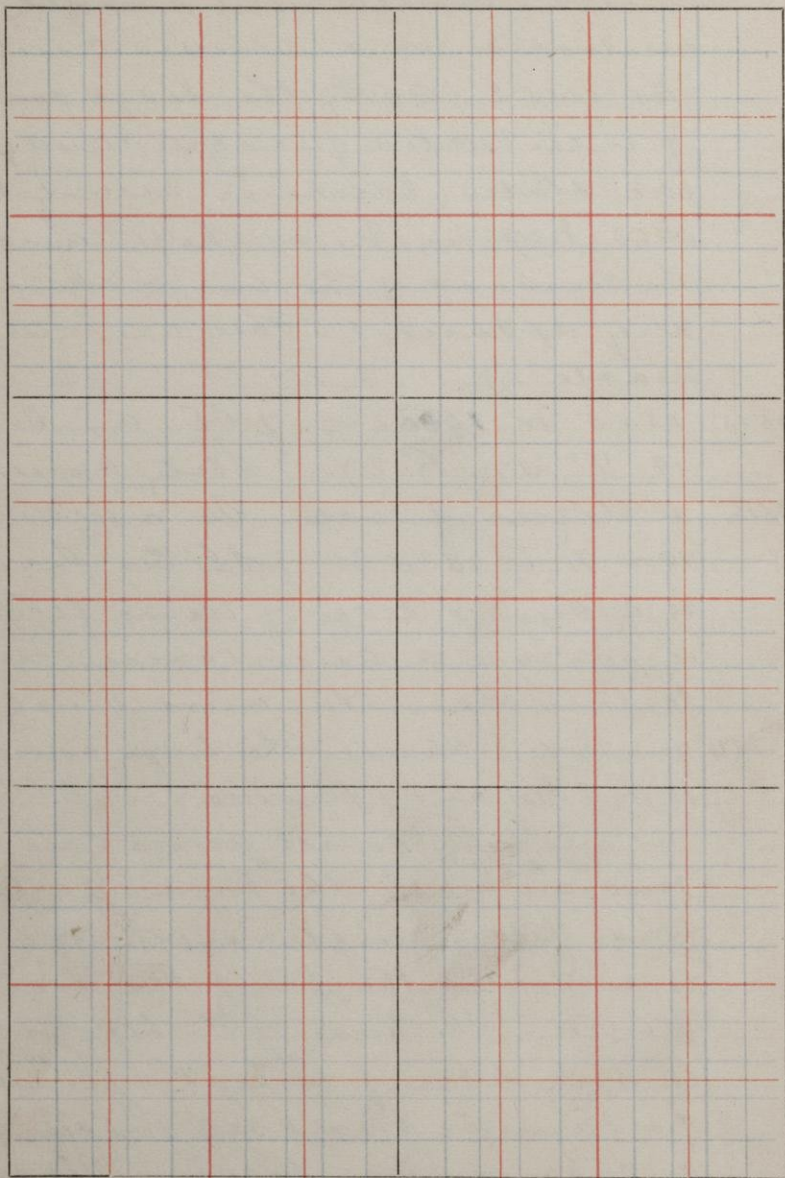
As we pass south across country road we reach the bottom of a hill whose top is conglomerate in which is situated the pit of the Goodrich Mine. The base of the hill is covered with ledges of Jasper conglomerate containing bright red Jasper, quartz and banded ore pebbles. The ground mass is coarse, fragmental, and



T.

14

R.



of the same composition as the fragments.

The ledges located in this rise are at

1550 W. 1500 U of S. E. Cr. Sec 19.

1530 " 1490 U " "

1515 " 1520 U " "

19517 is from ledge 1530 W. 1490 U.

The ledge at 1515 W. 1520 U is a large one 20 ft E & W and about 15 in width. In it pebbles of the various included rocks are well exposed so that they can be plainly seen.

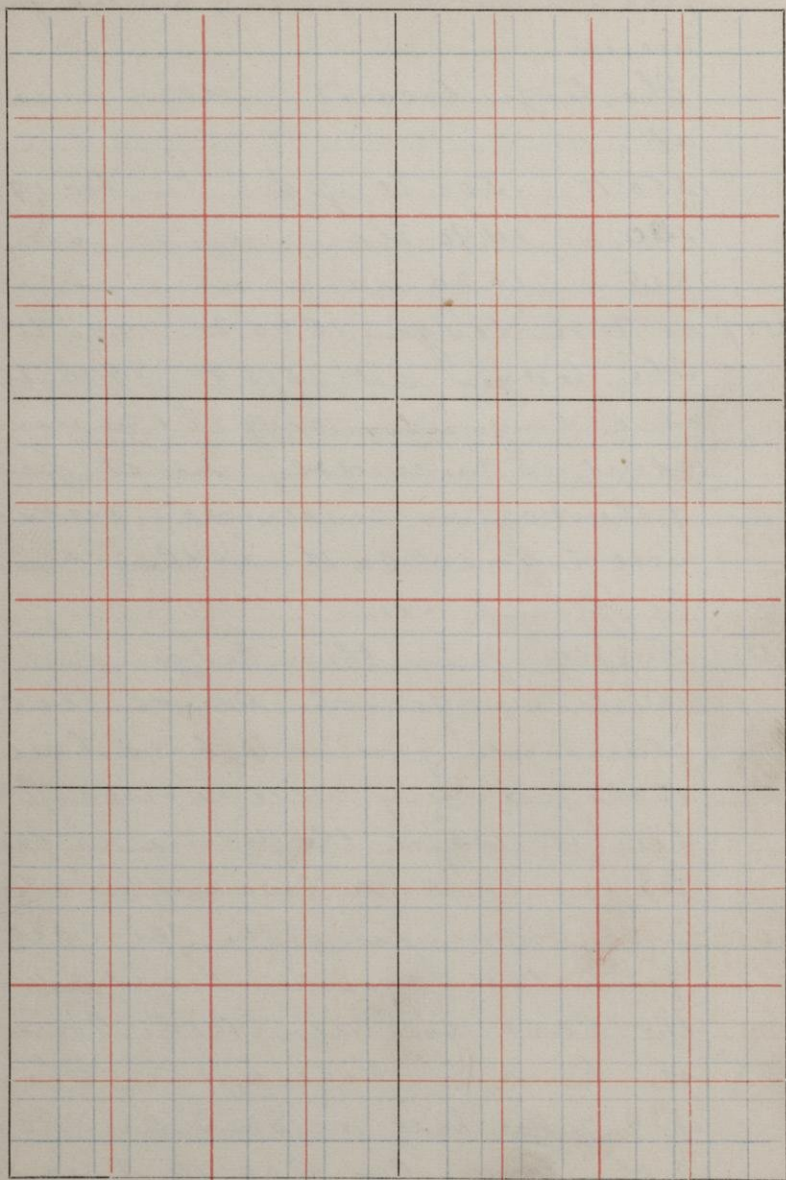
19518 Pebbles from this ledge.

A little further south the conglomerate forms a high hill, where rocks are very well exposed. The hill in which the mine is located overlooks a swamp in the East separating the Goodrich from the Saginaw location. To the East and also to the South the knob is precipitous. The N. E. end of the hill is 660 S and 490 E. of the N. W. Cr Sec 19 T 47 R. 27. Here the rock is a very coarse

T.

24

R.





jasper Conglomerate with immense pebbles of jasper, banded ore, quartz, etc. A little further south the cementing material is largely ore forming what has been termed an ore-conglomerate in the description of the First Mine. South of this again is the jasper Conglomerate.

An unconformity between the conglomerate and the older formation, exposed on the south side of the top of the hill has been examined and pictured by Prof. Van Stille (Amer. Jour. Sci.).

19519 Jasper and ore conglomerate from 1510 W 1340 N 7dE. Cor Sec 19. T. 49. R. 27. The pebbles in this measure in many cases from 6-7 inches.

19520 Ore conglomerate a few paces further south.

19521 Pebbles from conglomerate south of ore conglomerate, and near the contact mentioned.

On the dump heap of the mine are many fragments of ore



and of schistose greenstone

- 19522 Schistose greenstone } from Inupheaf.  
19523 One }

The relation of the greenstone to the breccia of course not be determined.

The strike of the schistosity of the one conglomerate is about  $10^{\circ}$  N of E and the dip almost vertical to the north.

At the contact the underlying rock is much contorted and sometimes is slightly brecciated, the one band crossing the chert in every conceivable direction. A little further from the line of contact the banding are more regular.

At 1255 N. 1600 W of S.E. cor 19, a pit has been sunk in these rocks, with its north wall determined by a greenstone dyke

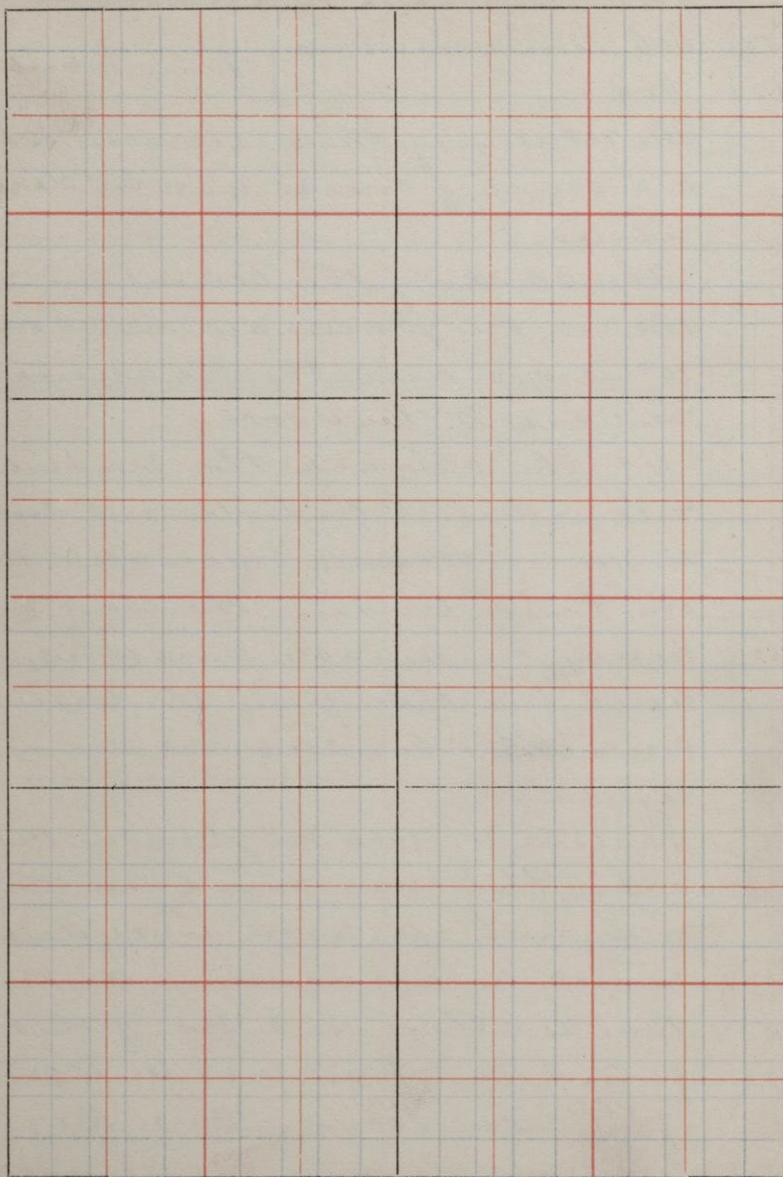
- 19524 Banded chert and one of the older formation from 1280 N. 1590 W of S.E. cor. Sec 19. T47. R.27.  
19525 Greenstone from the dyke at 1255 N 1600 W of same corner



T.

24

R.



This dyke is 6 ft wide and runs about E.W.

The slates or cherts in the pit strike nearly N.W., but in many lines, while the dip is S.W.

At the South of the conglomerate bluff is a low level stretch of ground in which no rocks were seen.

At 970 N. 1600 N of I. E. Cir Sec 19 is a little pit, dug in a little rise in the plain. No rock could be seen in place either in the hole or in its vicinity.

19576 Quartzite from the dump heap of the pit, representing the material occurring most abundantly in the gravel.

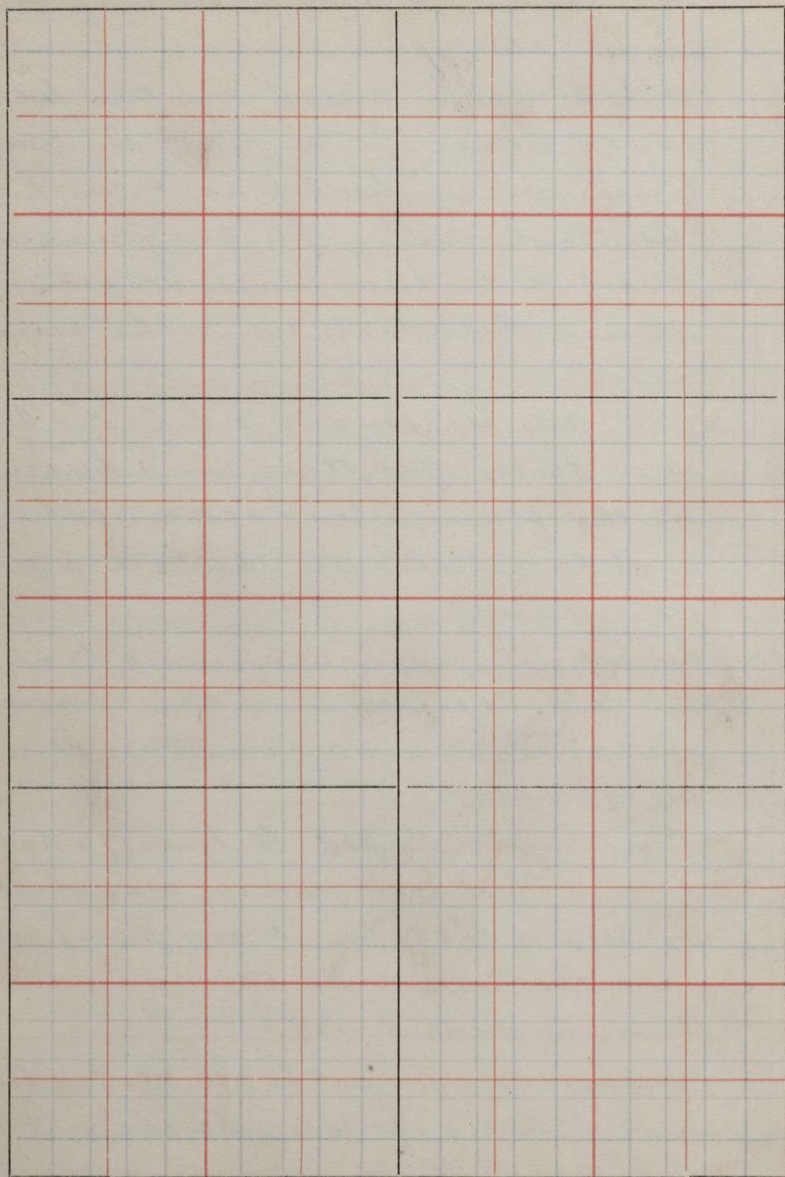
Continued South  $\frac{1}{2}$  mile, where found that our pacing was short ca. 100 steps. That is 2100+ paces took us to the line. In the map the error is distributed.

Corrected up at the N.W. Cir Sec 30 and started fresh, passing South to a little knob in whose north side was found to contain a

T.

26

R.





Success exposure of contorted gray  
gneiss.

19527 From this hill at 1640 W. 1720 N of  
S.E. cor Sec 30 T 47. R. 27.

From this point went East 250  
paces and North, crossing sand  
hills and swamps, until reached  
Section 19. where at the base of the  
East face of the conglomerate hill  
found another large ledge of gas-  
per conglomerate, with quartzitic  
groundmass, colored brown by  
ochreous material. The ledge runs  
about 72 paces N.E. and is of the  
same general character through-  
out, except that at some places  
it is a little fresher than at others.

19528 From S.W. corner of the ledge  
1430 N and 1470 W of S.E. cor Sec.  
19. T 47. 27.

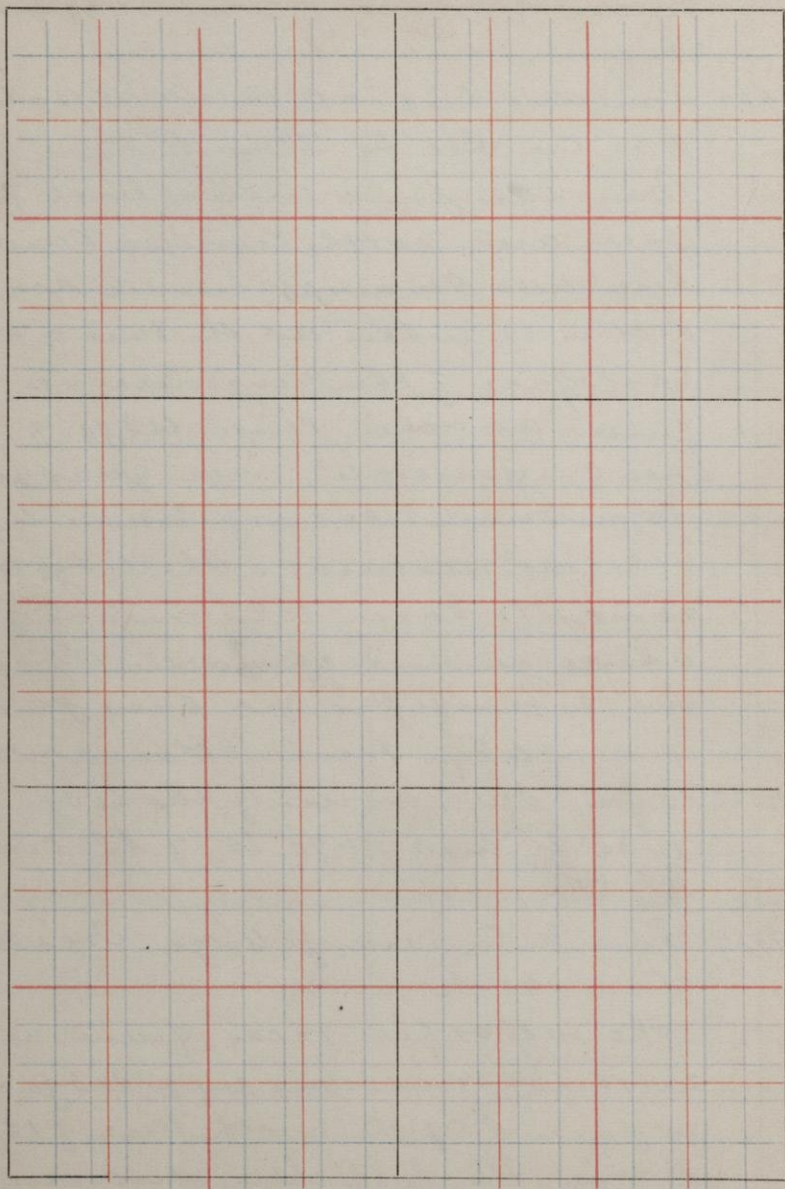
19529 From N.E. end of ledge. Fresher  
than 19528.

The only other rocks found in the  
northern run was in a ledge only  
20 paces S. of the north line of the  
Section. The ledge here discovered is  
about 15 ft long and 7 ft wide.

T.

28

R.





In it is a layer of graywacke and one of quartzite, the former north of the latter, and presumably above it.

19530 Graywacke 1980 N. 1350 W of S.E. cor Sec 19.

19531 Quartzite from same ledge.

Since it was supposed no rocks occurred in the sand plain in Sec 18, at the north line of Sec 19 turned East and went 250 paces to a point 1100 W of E line of Sec. and from here traveled South, finding several ledges of quartzite whose dip and strike could not be determined. The probability is that the dip is very high to the North and the strike nearly E.W.

One ledge is on the South side of an old road and mining for a distance of 44 paces along it. The location of the center of the ledge is

19532 1720 N 1060 W of S.E. cor Sec 19.

Another ledge of quartzite occurs at 1710 N 1100 W of S.E. cor Sec. 19.

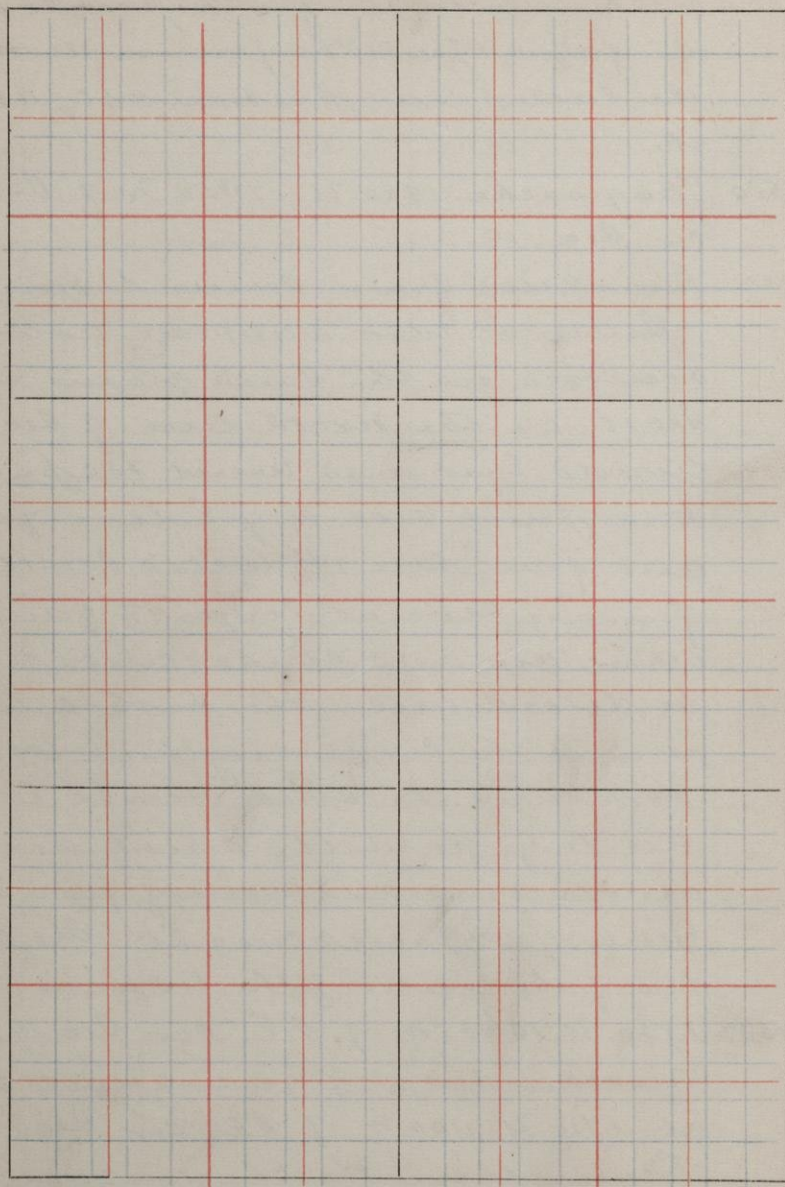
Beyond these the conglomerate again outcrops.



T.

36

R.



✓19533 At 1685 N 1100 W is the East End  
 of one of these conglomerate ledges,  
 and at <sup>corrected J.H.G.</sup>

1670 N 1060 W is a small ledge of  
 the same rock.

At 1670 N 1115 W a large ledge  
 some 50 paces long exposed a good  
 face on which the pebbles are  
 very plain. It appears as though  
 the conglomeratic character becomes  
 more pronounced as we pass south-  
 ward, the pebbles becoming larger  
 and more rounded.

✓19534 From small ledge 1670 N 1100 W.  
 S.E. cor. Dec 19.

At 1630 N 1075 W is another large  
 ledge trending about E.W. Here  
 the fragments and pebbles are  
 quite large, and all lie with their  
 long axes in a single plane  
 Others occur at

✓1610 N 1105 W. S.E. Cor Dec 19

✓1600 N 1115 W " " "

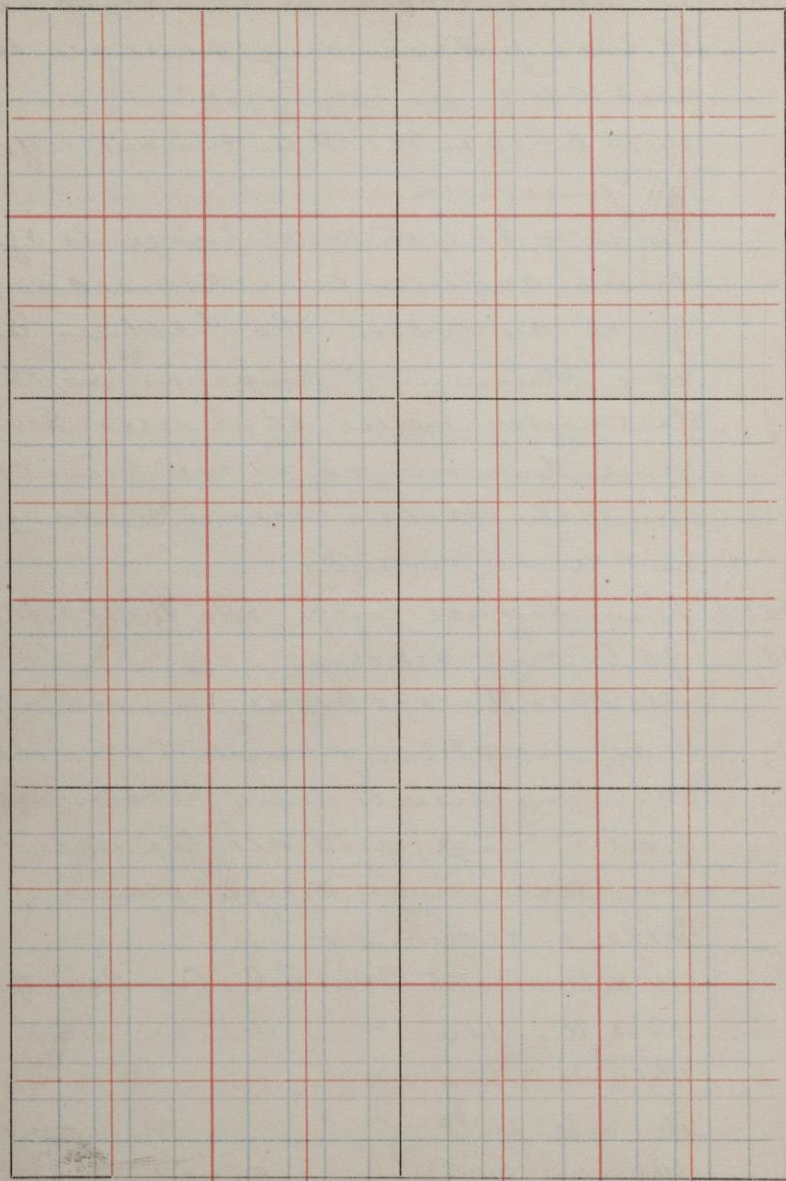
✓1610 N 1125 W " " "

✓1630 N 1140 W " " "

A few others in sight were not  
 located.

32  
T.

R.





a line further S. at 1170 N of S. line sections are several old test pits, from which iron scales and greenstones have been taken, but since the dump heap is so thoroughly mixed with sand, and since no rocks or indications of rocks were visible, it was thought unnecessary to take specimens. Here also begins the ascent of a hill that is quite high a line further East. It is undoubtedly a piece of rock belonging to the older formation.

19535

At 1100 N, 1100 W of S.E. cor Sec 19, on the North slope of the hill is a large ledge of slaty material looking like some of Rominger's gray ones. The ledge is well banded but the dip and strike were not ascertained with accuracy. The strike appears to be about  $40^{\circ}$  E of S and the dip about  $20^{\circ}$  to the N.E. Further up on the hill at 1070 N. the strike is N.E. and the dip  $40^{\circ}$  to the S.E. This is probably the true dip and strike as the observa-

19537 At 1035<sup>N</sup> is a bare knob on  
the side of the hill overlook-  
ing other ledges, and thus  
affording a fine view of the  
country. The rock differs but  
little from the neighboring,  
but is more crumbled.



thin was made in a large ledge that is undoubtedly in place, whereas the preceding observation was taken in small ledges that were not certainly in place. Both this ledge and the one lower is heavily magnetite.

19536 Iron layer in this ledge, that resembles strongly the chert pebbles in some of the conglomerates.

At 1000 ft. is another ledge. It trends NE and is 56 feet long. The strike is in general also NE, but this is quite variable, while the dip also quite variable is in general to the NW. The rock is chert and flagstone, differing but little if any, from the ledges sampled.

At this point reach top of the hill, which on its south slope exposes other layers of the same rocks, apparently slightly more slaty and jointed than those on the north side of the hill.

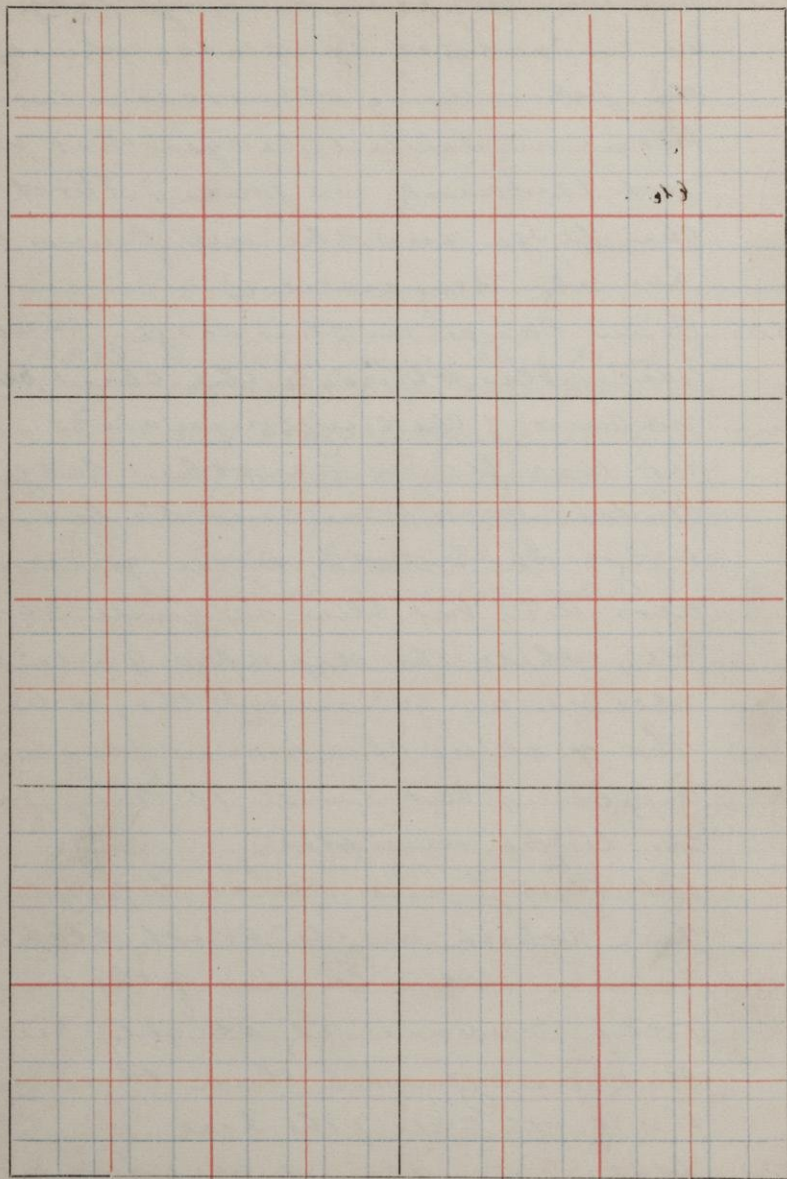
19538 Slate with almost vertical dip at 925 ft. 1100 ft. SE. on Dec 19.



T.

36

R.



19539 920 N. 1075 E of SE. Cr. Sec 19.  
This appears like a granite face,  
though north of this ledge, about  
15 paces is a ledge of rock like 19538  
etc.

Continued S. to 400 S of N line  
Sec 30. Here ascended a hill, which  
must be the extension of the gran-  
ite hill to the west. No ledges of  
any kind however were seen  
in it.

Returned to road at 725 N. 1100  
E of N.W. Cr. Sec 19 and ran west  
150 paces then north, skirting  
the chest hill on south and west  
sides.

19540 at 725 N. 1215 W of SE. Sec 19.  
Found low ledge or ridge probably  
a border of material discovered  
in hill.

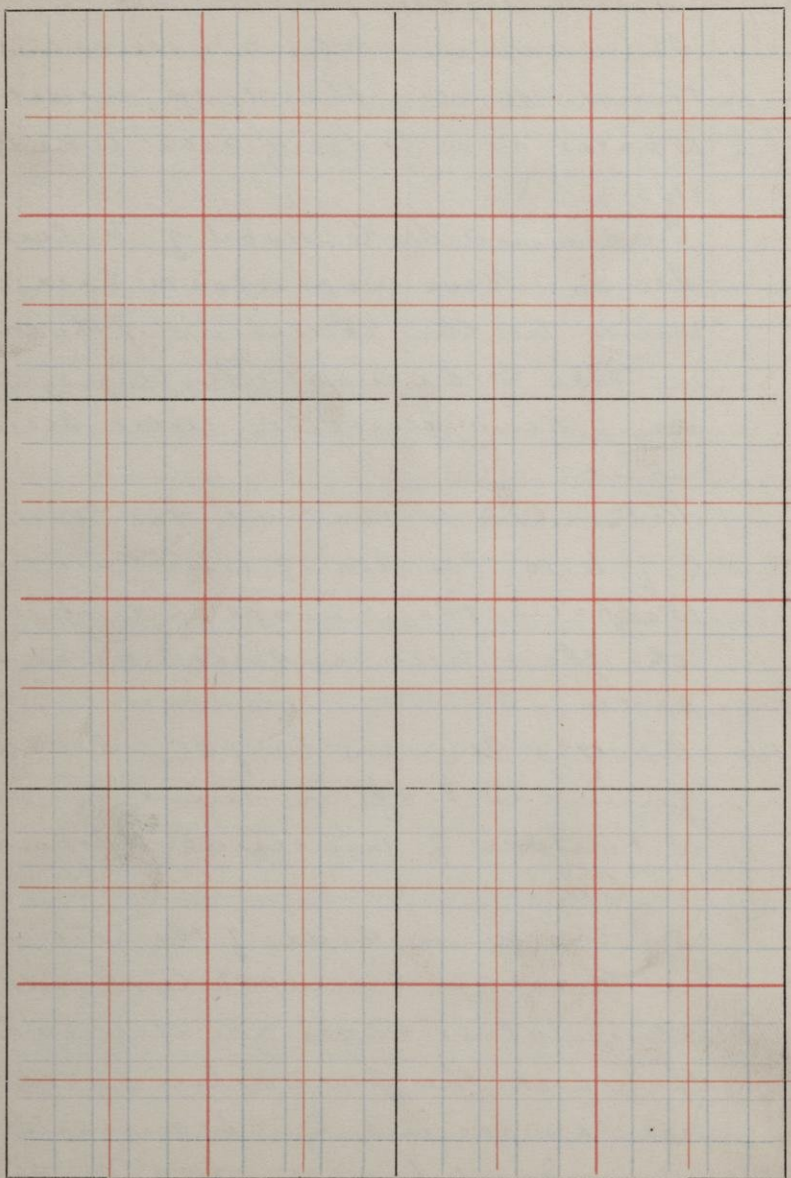
On the west side of the hill at  
its base are several test pits,  
along whose edges are dump heaps  
of which the prevailing rocks  
are represented by specimens

19541 From dump heaps, 1250 W. 861

19542 N of S.E. Cr. Sec 19.

28  
T.

R.

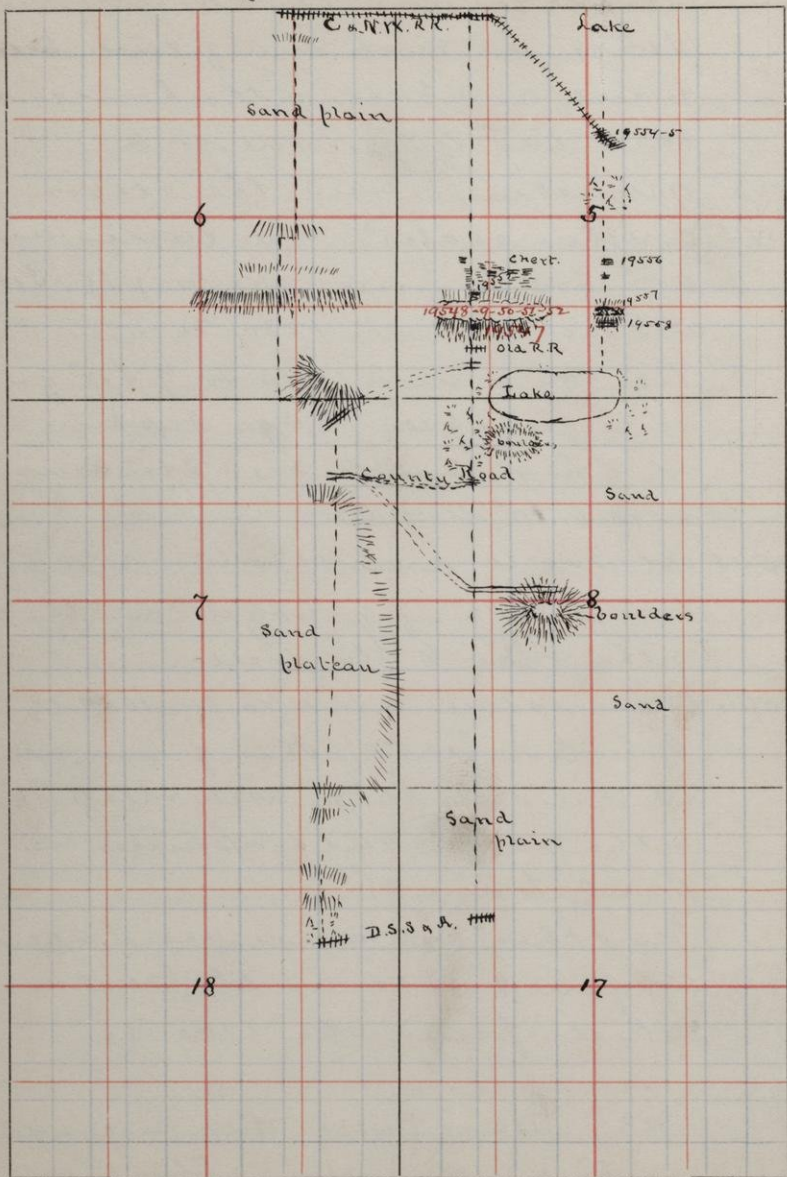






T. 47

R. 27





July 8/91.

Ran north from R. R. at 300 west of E line Sec 18 T 47 R. 27, without seeing rocks of any kind, as far north as the C & N. W. R. R. running along the N. line of Sec 6. in the same town.

Upon correcting up at the north line of Sec 6, found ourselves so far out that ran back again in practically the same line, viz as follows -

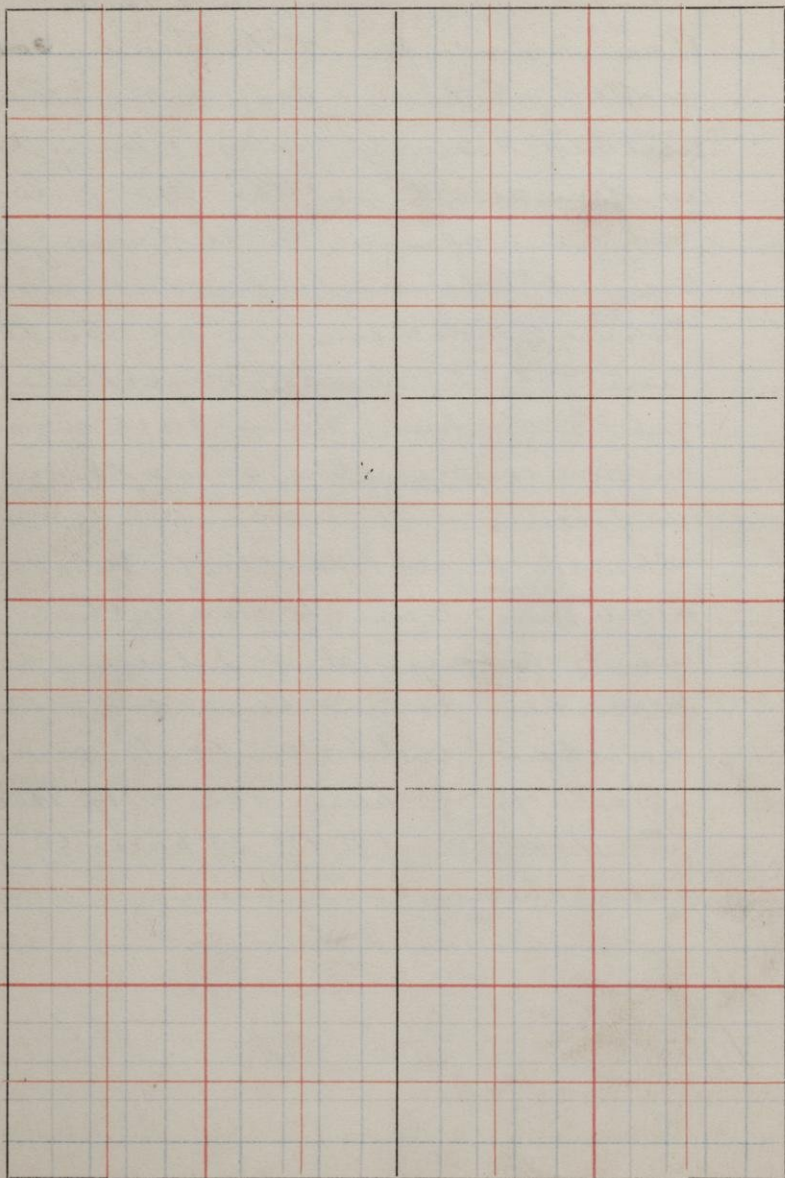
Started S. at 500 W of N.E. cor Sec 6, and ran to 1100 S then west 100 and S. to line of Sec. From here went East 300, the track to D. S. S. & A. T. R. R., crossing it at 765 S and 335 W of N.E. cor Sec 18. (N.B. 35 paces W of where should have been)



T.

42

R.



July 10

Went in from D.S. to A. R. R. at  
 400 E of W line Sec 17. T<sup>47</sup> R. 27  
 and ran north over sand plains  
 and hills to north line of the  
 Section, crossing roads and swamps  
 as indicated on the map. Found  
 N.W. Cor Sec 8, and corrected up  
 from it, making Oley's location  
 1400 S 1600 E of N.W. Sec 5 (Mer-  
 rian's book) 1800 S and 500 E.

At 400 N of the S. line Sec 5  
 rises an abrupt cliff of green  
 stone, marked by very peculiar  
 characteristics. The main mass  
 of the rock is a coarse grained  
 unaltered Diabase or Camptonite?  
 with lath-shaped feldspars and horn-  
 blende.

19547 400 N. 1600 N of S.E. Cor Sec 5. T<sup>47</sup>.  
 R. 27. Run south side of cliff  
 half way up.

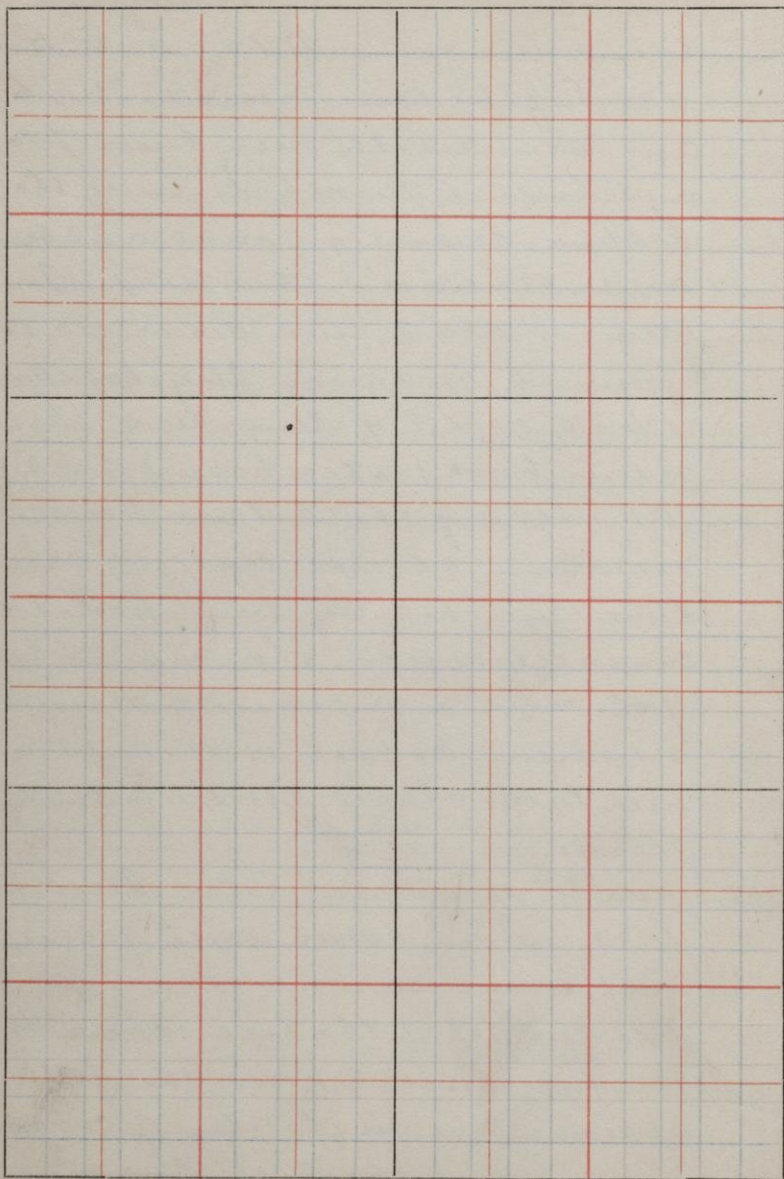
On the top of the hill where smooth  
 surfaces are exposed, the feldspar  
 appears in patches of coarser  
 grain, and the rock has a red  
 tinge

19548

T.

44

R.





A little to the east at top the feldspar  
became redder and rock is much  
coarser.

19549

Certain patches here look like  
inclusions, but are probably only  
accumulations of one or another  
mineral.

19550

What appear to be true inclusions  
are fine grained and red like  
a very fine granite, or a fine  
grained Diabase with red feldspar.  
Near their edges they are marked by  
a tinge of green, which may rep-  
resent a contact rim.

Certain other patches are bright  
green of that peculiar shade char-  
acteristic of Epidote. They may be  
only epidotized granite fragments.

19551

19552

Again irregular vein like  
patches of chlorite are intermin-  
gled with the greenstone 'Schlieren'.  
They seem to mark slipping  
planes.

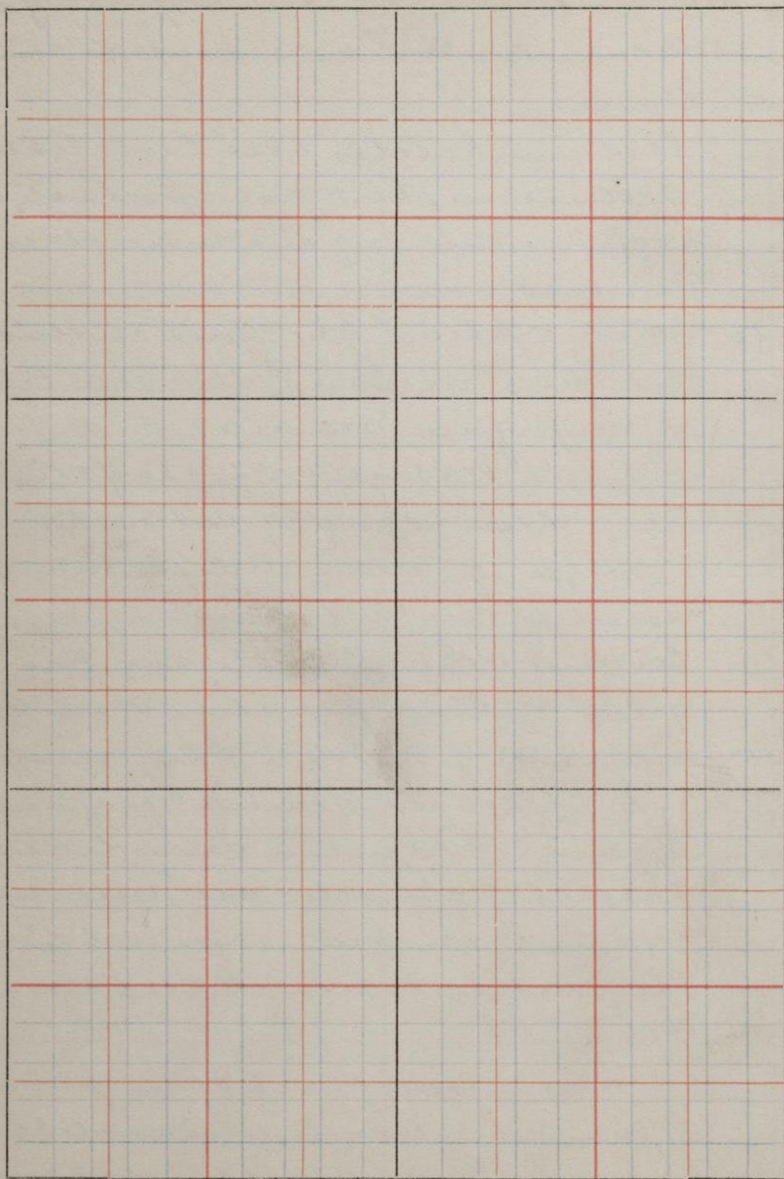
A close inspection of other portions  
of the ridge would undoubtedly  
yield some interesting results.

The ridge gradually dies out

T.

4/10

R.



at the East at 1200 W of the East line of the Section (5), and through out its entire extent it is steeper to the South than to the North.

Upon the North side at point where crossed the ridge is an abrupt ledge of the greenstone and just North of its base is a low plain with a few little hills or rocks scattered here and there are small but numerous exposures of a cherty rock.

The ledges of this rock located were as follows

19553 1535 W 505 U of S.E. Cor Sec 5.

1525 " 510 do.

1530 " 535 do.

1523 " 565 do.

1535 " 633 do.

1535 " 650 do.

1520 " 650 do.

1485 " 650 do.

1380 " 650 do.

1365 " 650 do.

1360 " 650 do.

1333 " 650 do.

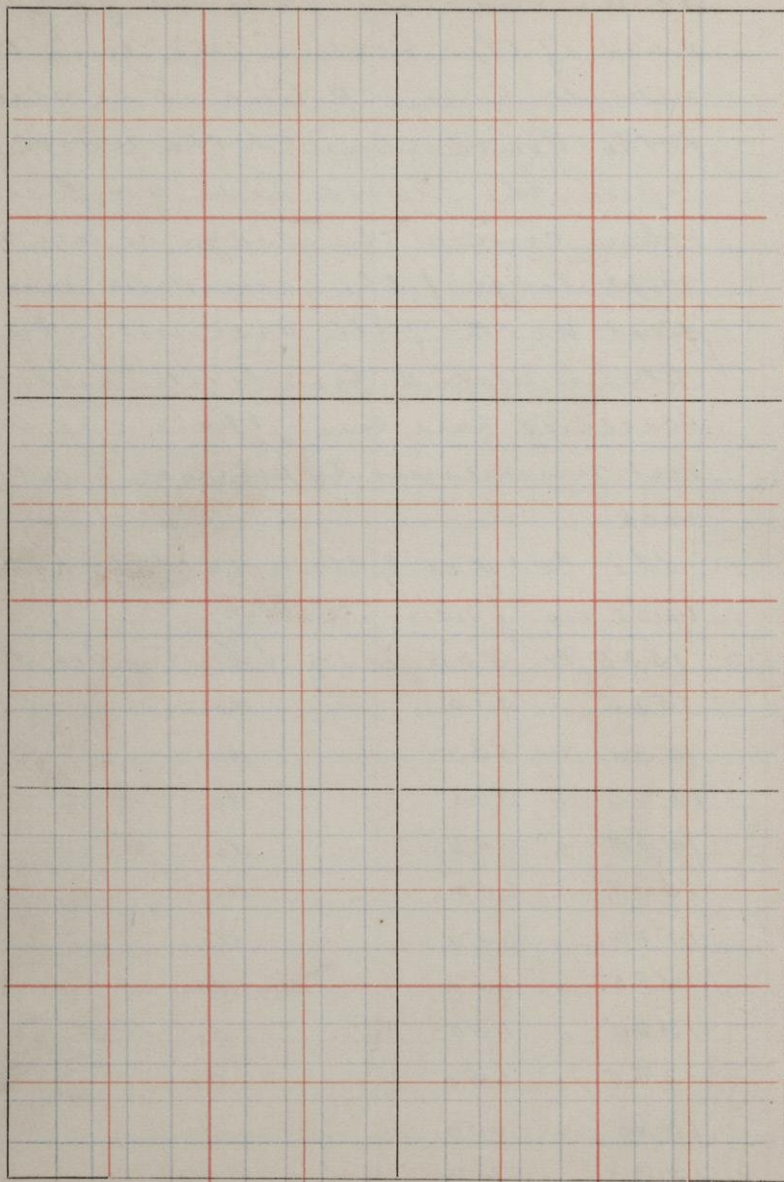
1348 " 670 do.



T.

48

R.



|                   |     |                                           |
|-------------------|-----|-------------------------------------------|
| 1333 N            | 670 | N of S.E. cor Sec 5.                      |
| 1325 N            | 680 |                                           |
| 1325 "            | 680 |                                           |
| 1340 "            | 700 | Strike 50 S of E. Dip<br>almost vertical. |
| 1360 "            | 710 |                                           |
| 1370 "            | 705 |                                           |
| <del>1385</del> " | 700 |                                           |
| 1385 "            | 715 |                                           |
| 1450 "            | 650 |                                           |
| 1600 "            | 575 |                                           |
| 1650 "            | 490 |                                           |
| 1650 "            | 515 |                                           |
| 1650 "            | 760 |                                           |

N.B. If oley's location correct, these  
ledges must be moved 100 paces  
N and 100 paces E.

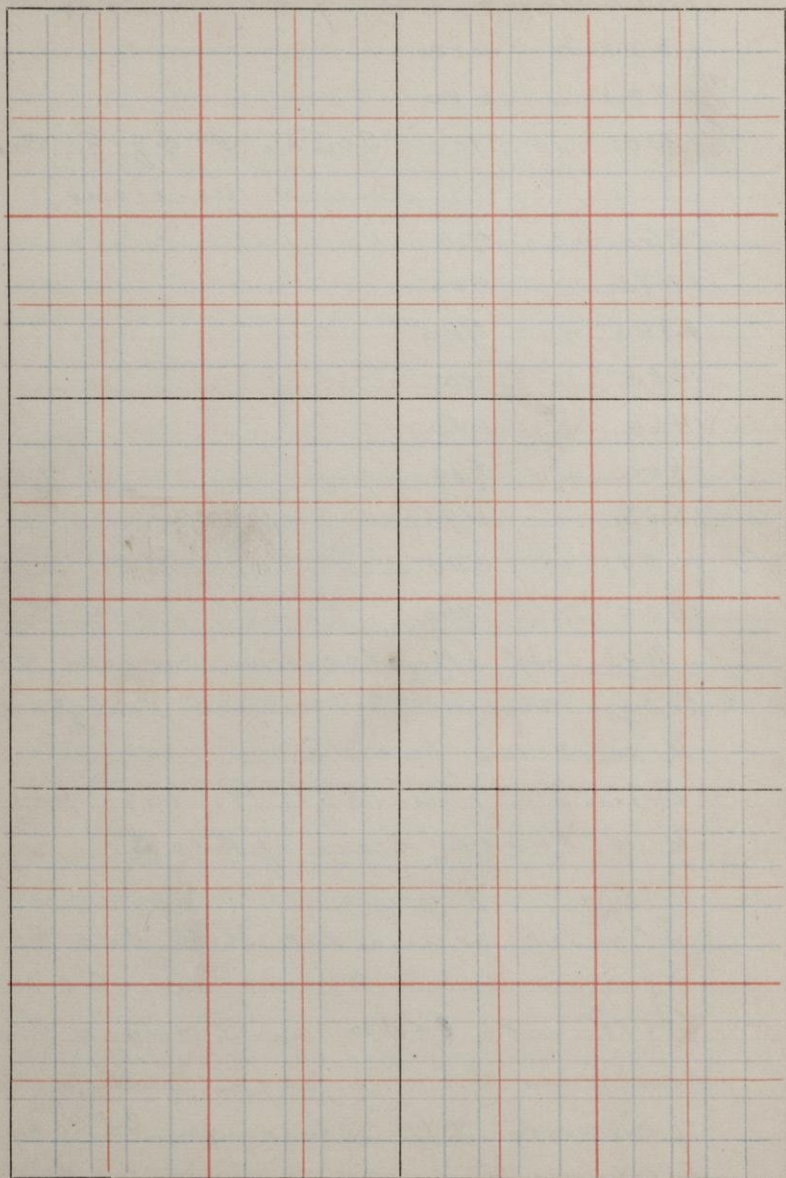
Found C & N.W. R.R. 1690 paces  
N of south line of Sec 5

Started again at N.W. cor Sec  
5, and ran to cut in C & N.W.  
R.R. at 850 N and 1400 N. The  
cut runs S.E. 110 paces, with a height  
of about 7 ft. through black  
slate interbedded with a few  
layers of quartzite. The slate

T.

50

R.





dips nearly vertical, inclined perhaps a little to the South and strikes about  $50^{\circ}$  N of E.

"19554 850 W 1400 N of S.E. Cor Sec 5.

"19555 " " " "

Quartzite interbedded with the slate.

On our S. crossed swamps and plains until reached a point

"19556 860 W and 740 N of S.E. Cor Sec 5, where found large ledge of iron cherts like those to the East. The ledge measured 18 paces E to W and 10 N to S. The rock in it strikes E to W, and the dip is nearly vertical.

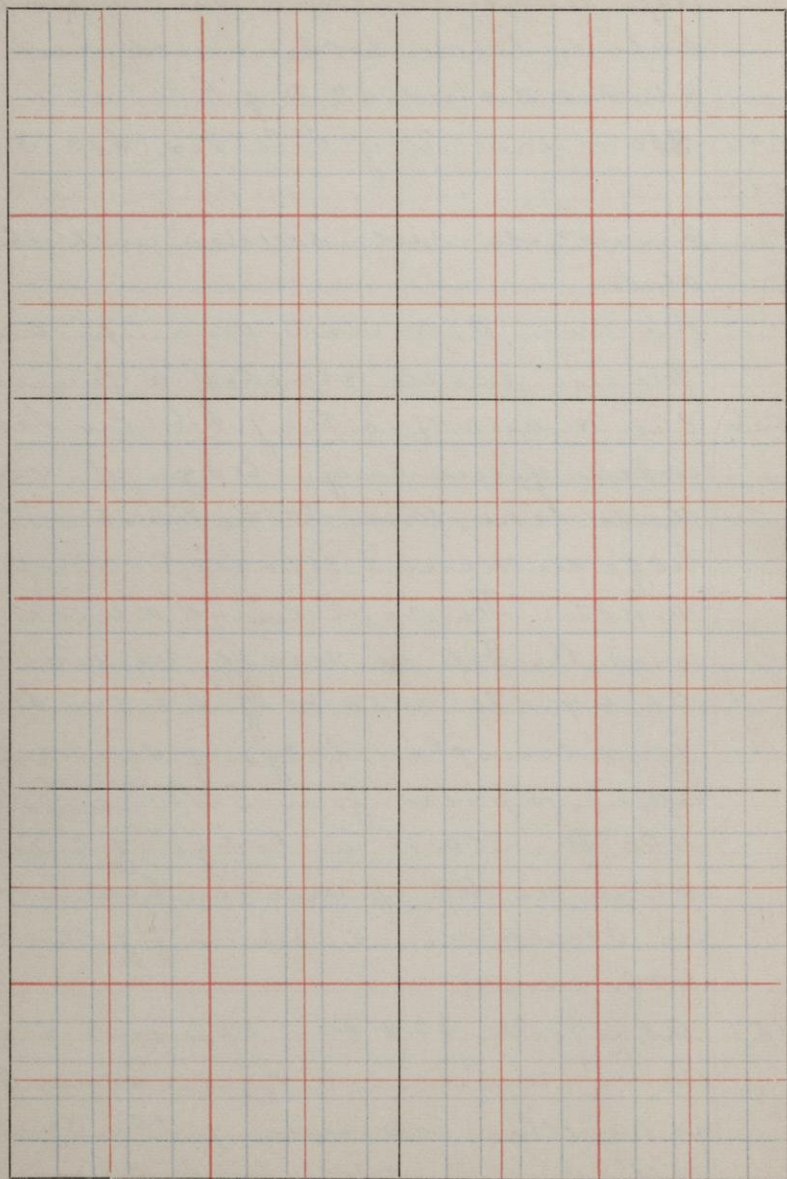
At 676 N, 850 W of S.E. Cor Sec 5, find another ledge of same kind about 15 paces from E to W, and at 490 N. 850 W a ledge of greenstone on top of small hill. It is no doubt an extension of the ridge to the west.

"19557 At 490 N. 828 W (22 paces E of above mentioned greenstone ledge) is another exposure of the same rock from which took specimens. A few paces E of this other ex-

T.

5-2

R.



pisces occur forming a well marked ridge running nearly as far East as the C. & N. W. R. R. Like the main mass of the ridge to the west it had red inclusions etc. A few steps S. of this ledge on the South side of the top of the ridge and along its South slope, is a talcose schistose rock spangled with crystals of some iron oxide, probably magnetite. The direction of the schistosity could not be accurately determined but it is approximately a little S of E at point noted.

N.B. Relations of this rock to gneiss should be carefully studied.

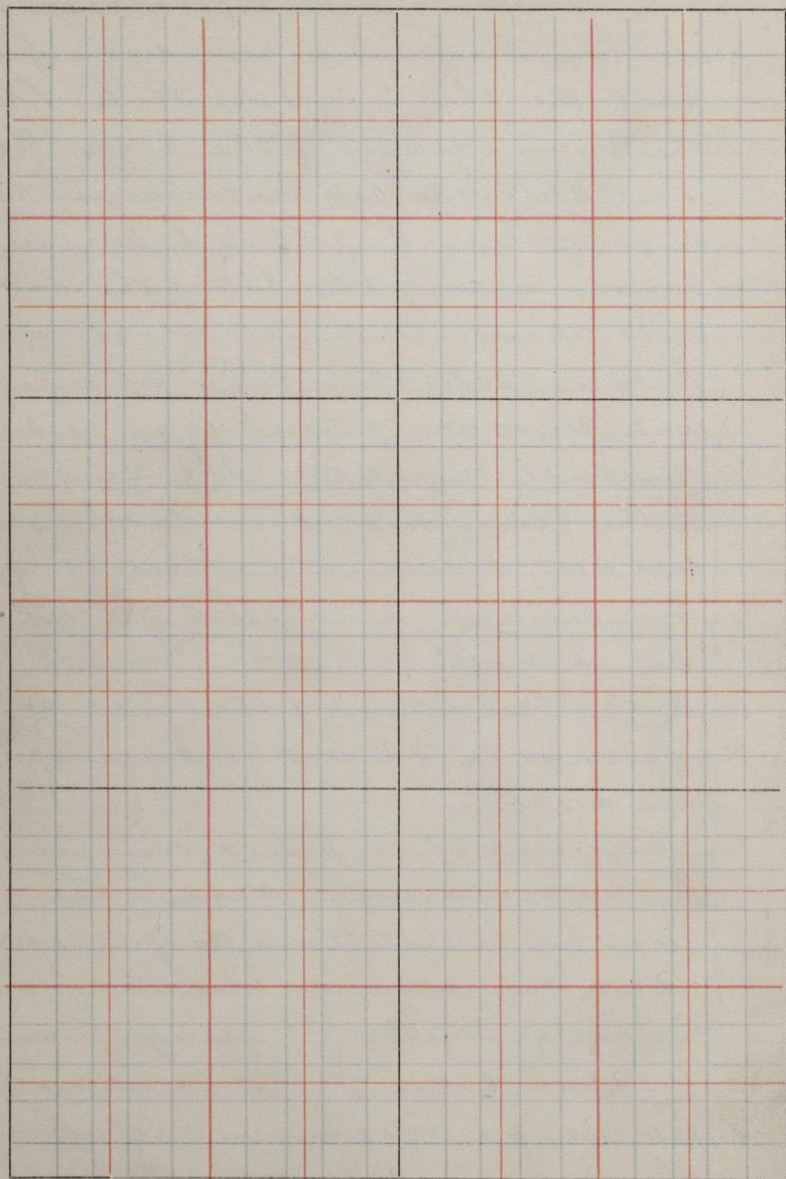
Beyond this point, running S. no rocks were seen. The course here by Smith was so far off that no reliance could be placed in his figures. It may possibly be that some of the locations given above for specimens are wrong. The relations of the rocks to each other are however so simple that



T.

54

R.



it was not thought necessary to  
run the line over a second time

19559 }  
to } In plane table notes, Book 122  
19588 }

19589 }  
19617 } In plane table notes, Book

19618 }  
to } In plane table notes, Book  
19649 }

July 20/91

From 400 E of NW Cor Sec 20. T  
47 R. 27 ran South to road then  
E 100 paces and South in line  
1500 N of E line Sec 20.

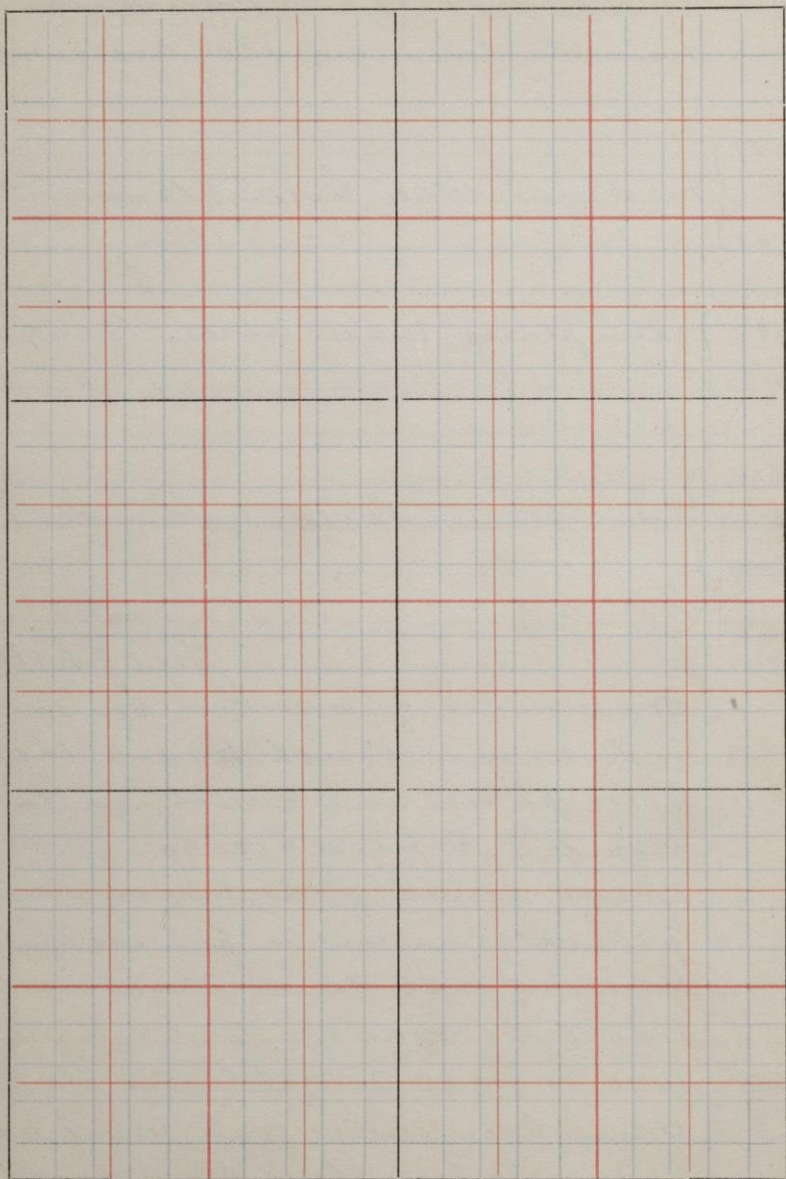
Just South of the north line  
of the section are a few layers of  
white quartzite, on the South  
side of the road

19650 1470 N 1925 N of S.E. Cor Sec 20  
From here went E to 600 E of  
W line of Sec, then S. 100 paces  
and West 100 to 500 E of W. line

T.

56

R.





and continued South on it, crossing cedar swamp and hill, without exposures.

At 1050 S of U line of Sec 29 reached the crest of a hill, whose general outline indicates underlying granite. No ledges, however, were seen on it.

From this point turned East and went 500 paces then North to north line of Sec 20.

- ✓19651 At 950 N. 1250 W. S.E. cor Sec 29 T 47-27 is a low flat lying ledge of greenstone on the north side of a hill, and at 1185 W. 950 N of S.E. Sec 29

- ✓19652 a coarser greenstone on the south side of a hill further East.

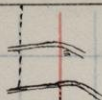
Further East at 950 N 1140 E same corner is a rounded, small knob forming the N.E. corner of a hill. The rock is similar to 19652, but is much fresher. Ledge is 10 paces long.

- ✓19653 At 900 N. 910 W of S.E. cor Sec 20, in the south side of a small chest hill is a small pit in leanings.

T. 47

58

R. 27



20

29



At 1500 N. 950 W. of S. E. cor Sec  
20 is <sup>the west end of</sup> a long narrow pit run-  
ning about 100 feet East to  
850 W of E line of Sec. 20. The  
pit is long and narrow, running  
nearly with the strike of the rocks  
which is N.  $10^{\circ}$  W. The ore is the  
Schistose ore conglomerate, be-  
tween layers of hard jaspers  
conglomerate, with the whole se-  
ries dipping N at  $60^{\circ}$ .

19655 from S. side of pit. Jasper Cong.

19656 Slate ore

19658 from S. side of pit Jasper Cong.

19659 Schistose conglomerate, near  
the Schistose ore, at southern  
edge of the pit.

19657 from low ledge of fine conglom-  
erate at 1520 N. 950 W of S. E. cor 20.  
At 1500 N. 500 W of S. E. cor Sec 20  
is another small pit in the  
conglomerate. On the north side  
of the pit the Schistose conglom-  
erate is exposed, striking  $13^{\circ}$  S of E,  
and dipping  $50^{\circ}$  N.

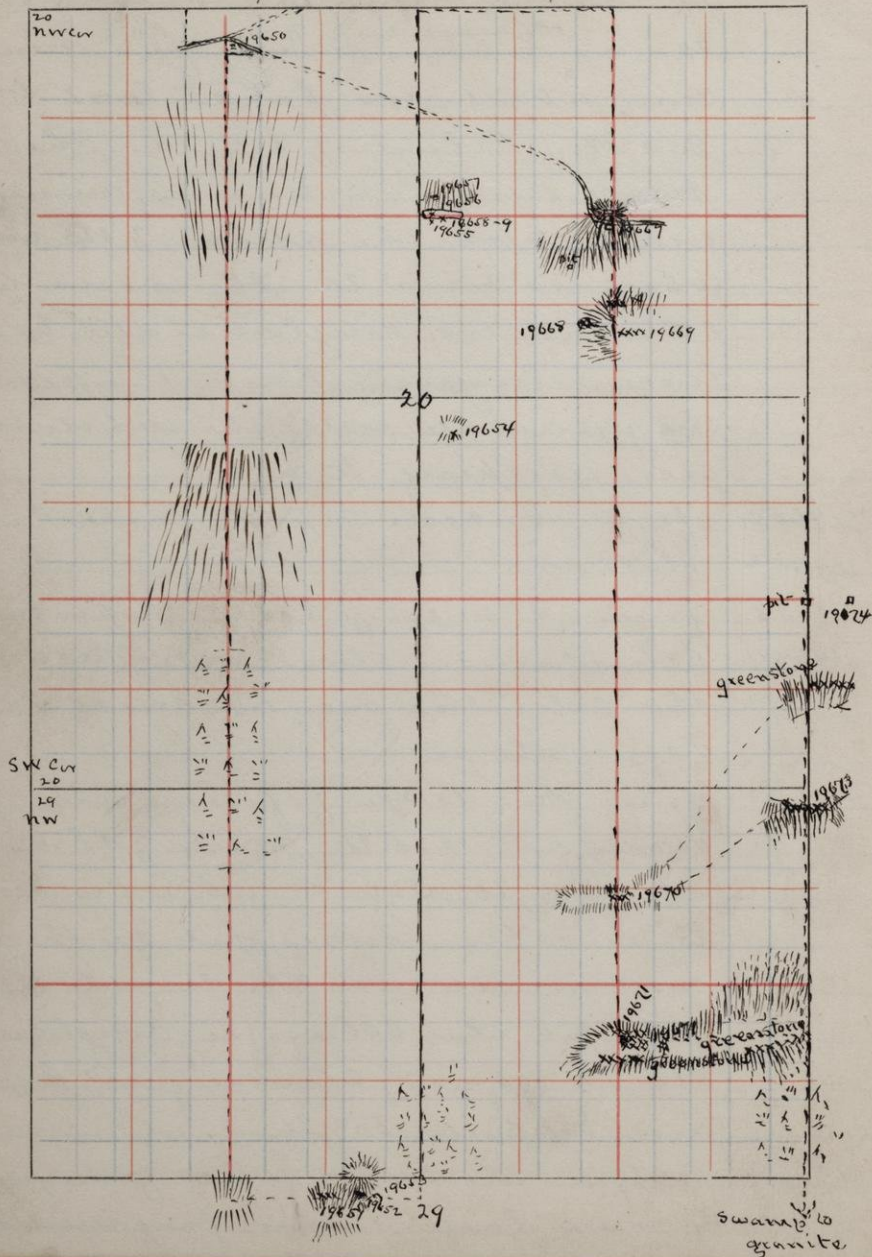
19660 is from the north wall of the pit  
showing large Jasper fragments



T. 47

66

R. 27



in the conglomerate.

July 21/91

19661

Ray and Smith ran north from  
250 E of N.W. cor Sec 20 T<sup>47</sup>R<sup>27</sup>  
At 65 N. 1720 W of S.E. cor Sec 17  
found a small ledge showing 15  
paces E.W. It is a feldspathic  
quartzite. No more ledges were  
discovered in this run, which was  
over plains as far north as  
D.S. & A. R.R.

Here went East 500 to 750 E  
of W. line Sec and S. to Saginaw  
Branch R.R., and beyond to S. line  
of section, seeing no ledges.

Then dropped 500 E to 1250 E  
and went north, find no ledge.  
as far north as D.S. & A. Road.

Dropped another 500 E to 1750  
E. and ran South, now meeting  
ledges as follows:

19662

1

1250 N. 1750 W of S.E. cor Sec 17,  
in low level land, a gray  
quartzite, measuring 15 paces  
E.W.

19663

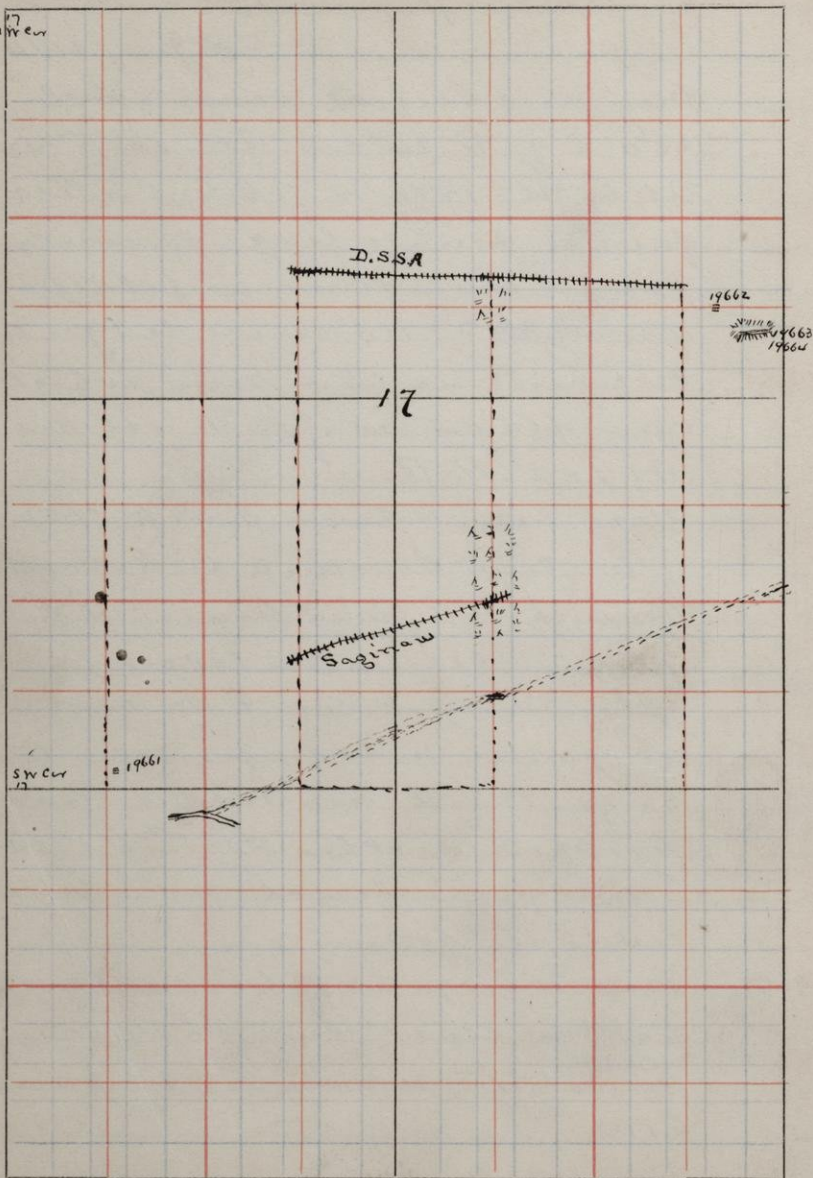
At 1170 N. 100 W, quartzite from  
South side of small hill. Here



62  
T. 47

R. 27

17  
New





is a long ledge running E & W.  
100 paces further E than point  
located. The rock is a fine grain-  
ed gray one, while 5 paces further  
south at.

19664 1165 N. 190 W of S.E. Cor Sec 17 is  
a red feldspathic quartzite

19665 }  
to } Plane table notes. Book  
19666 }

July 23/91

Ran south from 1500 E of U. W.  
Cor. Sec 20 T 47. R. 27

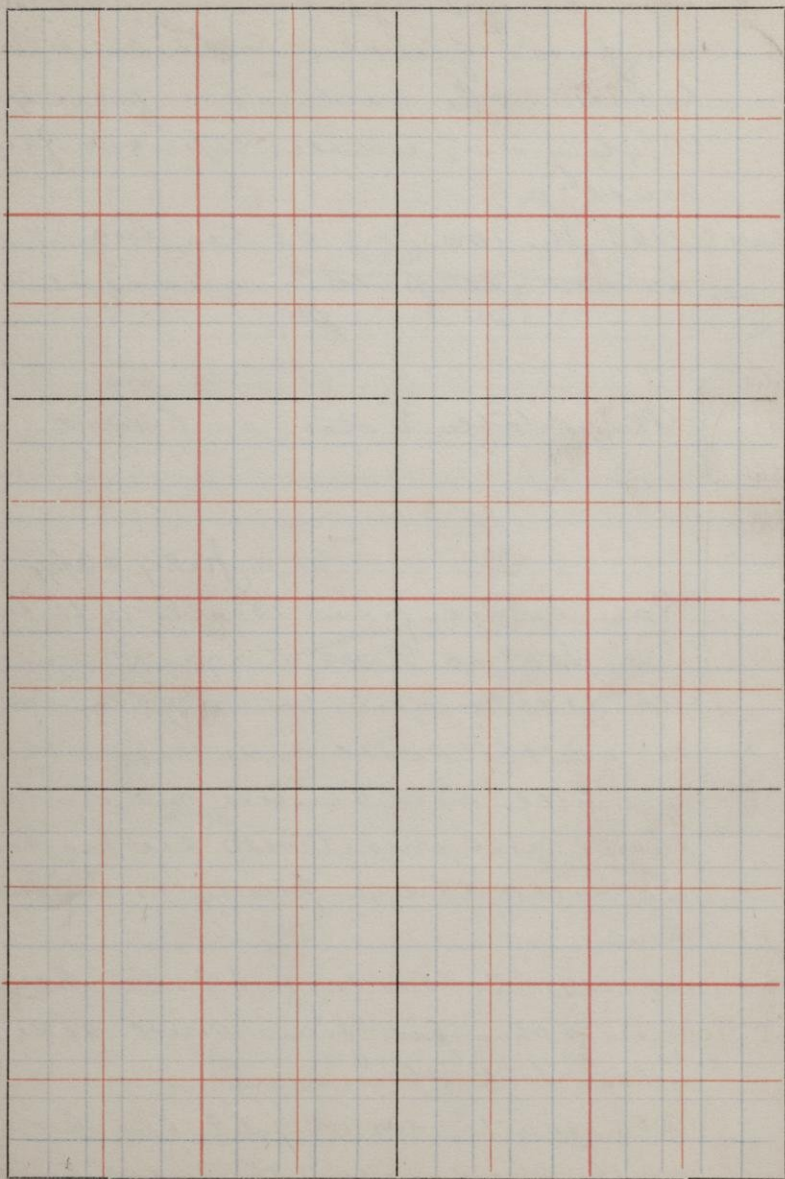
At 1370 N and 615 W of S.E. Cor Sec  
20, on the south side near the top  
of a hill is a small pit in lean  
chert and iron. Could see no rock  
in sight though plenty is in dump  
heap.

19667 At 1475 N. 500 W of S.E. Cor Sec 20  
is another pit from south side of  
which took specimen.

19668 At 1250 N 500 W of S.E. Cor Sec 20  
on the south side of the west end of  
a hill is a low ledge of greenstone

T.

R.





not well exposed

- ✓ 19668 At 1200 N and 600 W. is a round knob in the west end of a hill. This is undoubtedly a greenstone conglomerate in place. It is well exposed and shows clearly the included pebbles.

The same material is again well exposed in a ledge at 1150 N 485 W of S.E. cor Sec 20, from which point the ledge extends east 50 paces as a small precipice.

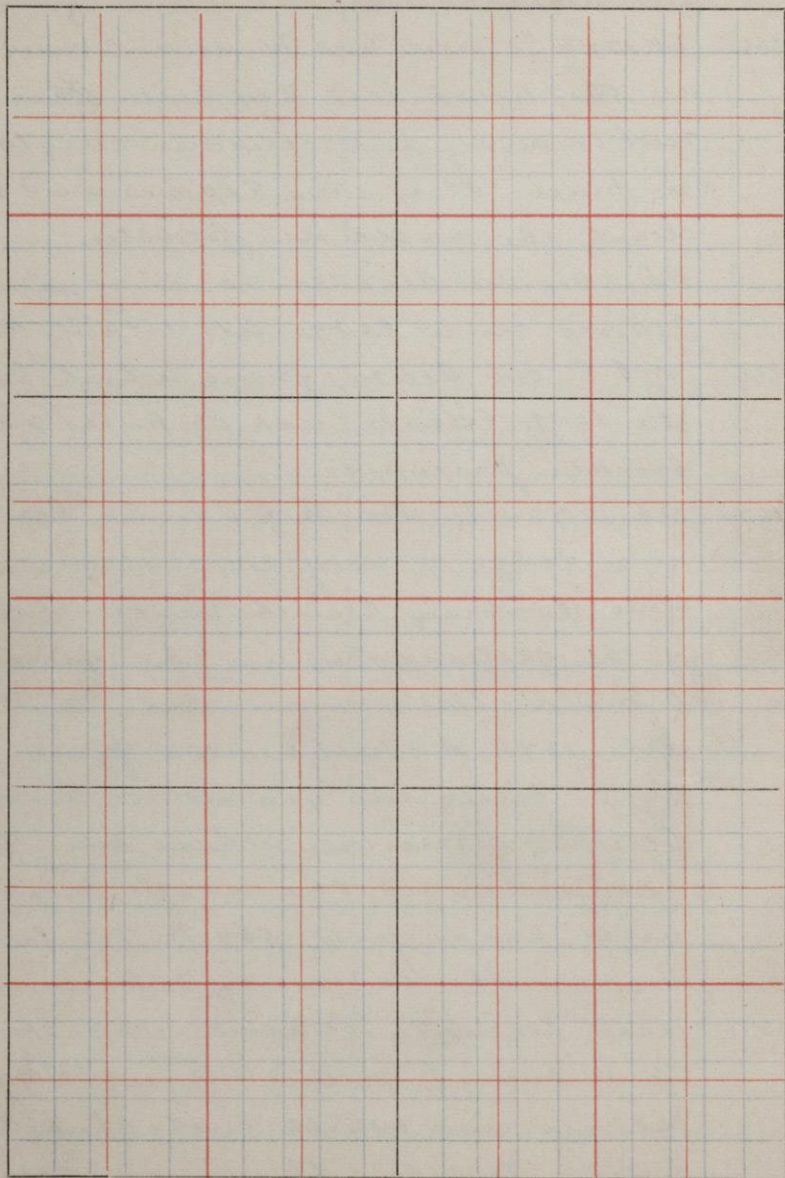
- ✓ 19670 At 1720 N 500 W of S.E. cor Sec 29 is a ledge of very crystalline greenstone, looking much more like one of the greenstones in the granite than a Huronian one.

At 1375 N, separated from 19670 by a little low ground is another bluff of greenstone whose bare face looks toward the north, and whose west end is just 500 W of E line of Section. The ledge is 35 paces wide and runs east about 50 paces. It is a coarse greenstone, with green chlorite and white lath-shaped crystals of feldspar showing in weathered surfaces.



66  
T.

R.



At 1375 N. and 330 W. is another large ledge of greenstone, precipitous to the South.

At 1375 N went East 500 paces to E. line Sec 29, keeping all the while on a hill on whose sides are numerous ledges of the same kind of rocks as found further north.

When struck section line went South to 660 North of S. line when found granite?

Then retraced steps and ran north along the line

At 1950 N of S.E. cor Sec 29, on south side of a hill is a bare ledge of greenstone 10 paces wide and 30 paces long from E to W.

At 240 N of S.E. cor Sec 20 is another ledge of greenstone measuring 100 paces E of section line. It is on the north side of a hill, overlooking low ground, extending all the way to the large hill South of the Louthian Mine.

In this low ground are two pits, one at 500 N. of S.E. cor Sec 20 (?) and the other 100 E of this (?) Do

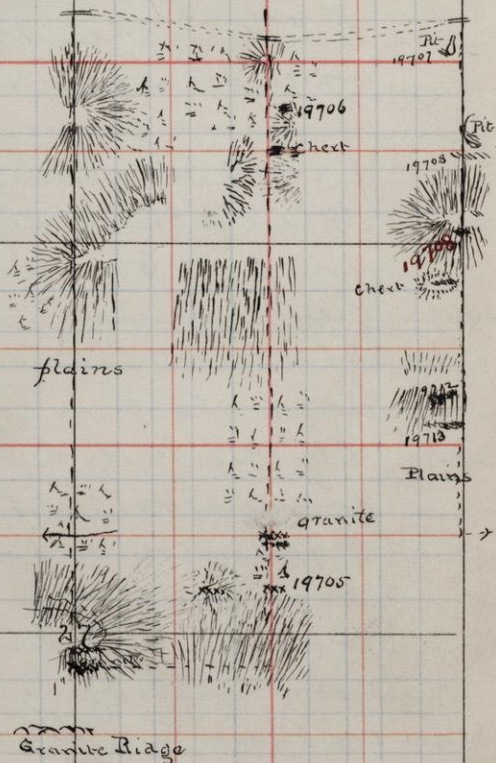


T. 47

R. 27

22

sw cor  
22  
27  
nw cor





- ✓ 19674 the Easterly pit the rock is in situ  
in pit. It is a lean sheet.
- 19675 Iron dump heap of shaft No 3. Low-  
throp mine.

19676 }  
to } Plane Table Notes. - Book  
19691 }

19692 }  
to } Plane Table Notes. Book  
19704 }

July 28/91.

Started at 1000 W 600 N of S.E. Cor.  
Dec 22. Turn R 27 and ran south  
to granite, without seeing rocks  
until reached a point 925 N.  
1000 W. of S.E. Cor. Dec 27. Here  
found large ledge of granite  
in the S.E. slope of a high hill.

Further south 180 paces is the  
main granite ridge.

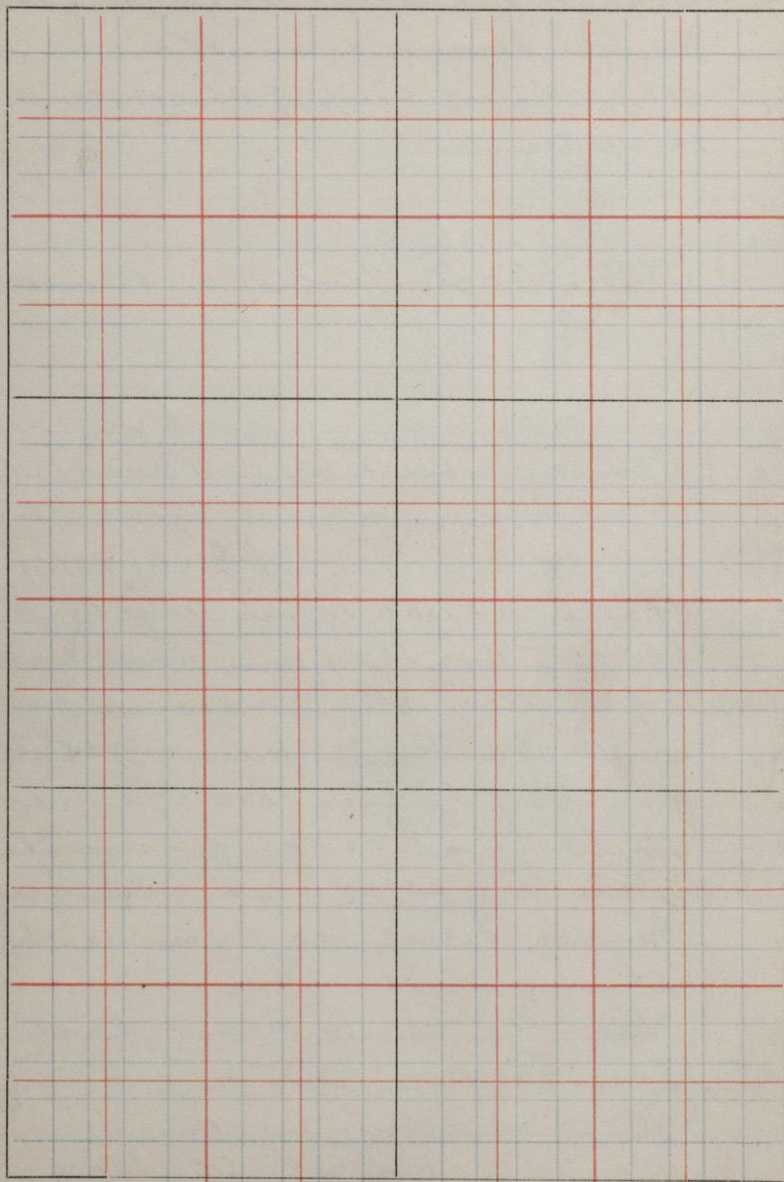
From this point went East 500  
paces to line 500 W of E line of  
Dec 27 and ran north.

At 1120 N. 659 W of S.E. Dec 27 is  
another large ledge of same rock.

T.

69

R.



19705 At 1120 N and 500 W another small ledge same rock on north side of hill, and at 1230 North 500 W a low lying ledge on the north edge of a swamp.

At this point heavy thunder storm arise so was compelled to stop.

July 29

Started south from road at 550 N. 500 W of D.E. cor Dec 22. T47 R27. At 370 N 445 W of D.E. Sec 22, is a flat ledge on the north-west side of a very gradual incline. The rock is an iron chert, striking W 20° N and dipping very high, apparently W.S.

19706

At 270 N. 445 W is another small ledge of same rock, but with layers much contorted.

About 50 paces E of this one is another ledge of same rock.

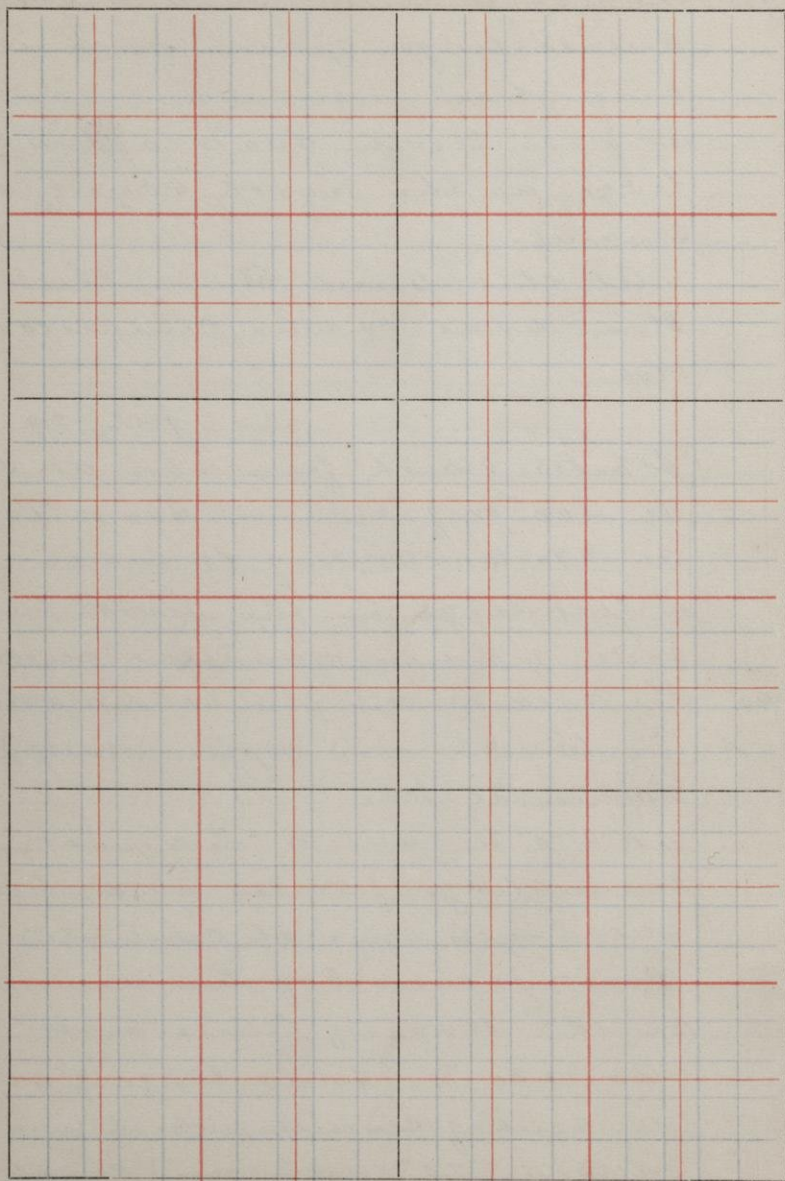
At 1230 N. found ledge of granite north of swamp, which was located on 70° N. and north of this about 30 paces a very large



T.

71

R.



ledge of granite.

A second storm causes another interruption in this day.

July 30/91.

Started from road to run S on East Sec. line of Sec 22, T47 R27, Road is here 600 ft of S.E. cor. Sec. About 500 paces N of S.E. cor. Sec. and a few paces ~~west~~ of the line is a pit in the older iron formation. The rocks are the old iron-ore and are well exposed in the pit and on the side of the hill South of the pit, about 20 paces from the edge. The layers dip  $40^{\circ}$  N and strike  $35^{\circ}$  N of W.

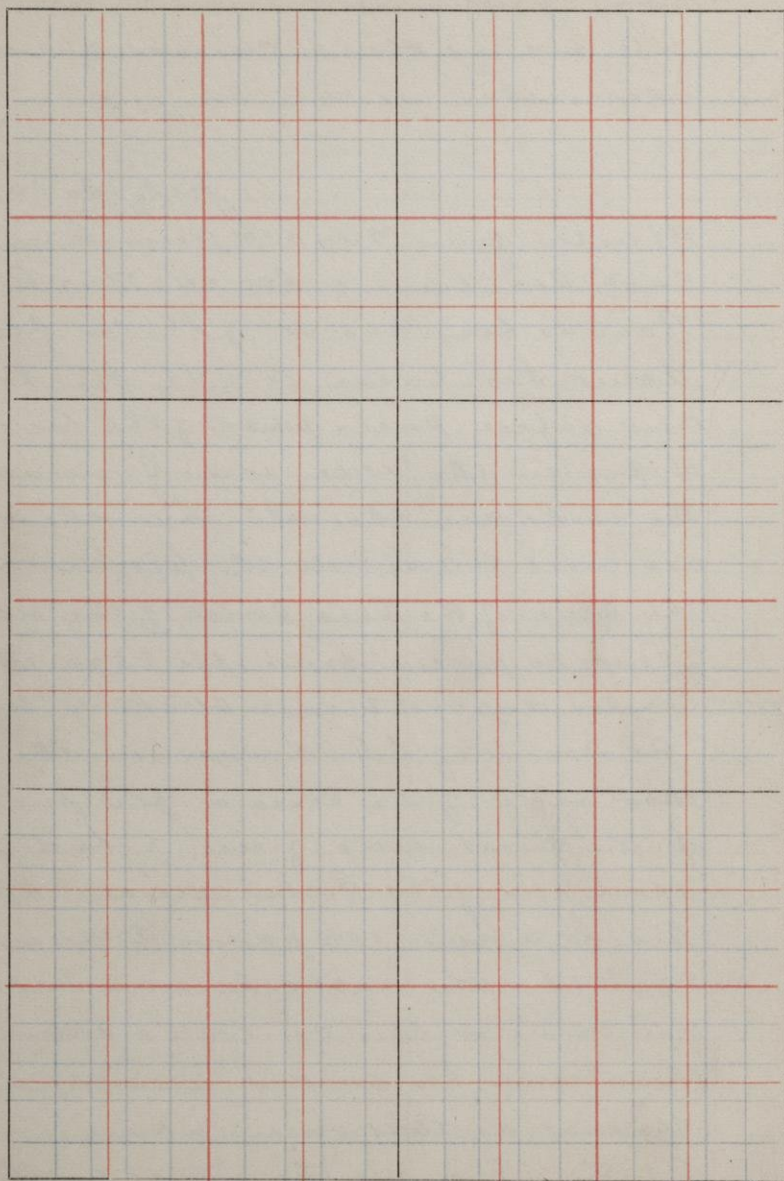
✓ 19707

At 300 ft of S.E. corner, on the east side of the line a few paces, is the west side of one of the large open pits of the Foster Union. The pit is about 100 paces E & W and 80 N & S. The rocks here as before are more or less contorted iron-ore with same dip and strike in general as that given above.

At the S.E. end of the pit is a schistose rock that may be a dyke in

T.

R.





✓19708.

the cherts, and on the south of the pit in the side of the hill is the south-western extension of this. 260 N. D.E. Cr. Sec. 22.

✓19709

At 100 N 20 E of D.E. Cr. Sec 22 near the top of the hill is another ledge of the cherts and at 30 N. just south of the top of the hill is another, larger ledge of the same rocks, more or less contorted but with a general strike  $35^{\circ}$  N of S and a dip to the W of North. The cherts here bear much ore, which is hard and black and thus differs from the worked one of the Fortes mine.

At 110 N. 60 E of D.E. Cr. Sec 22 is the west end of large beds of the same contorted schists with a general strike  $25^{\circ}$  N of E. and a general north dip. This ledge is about 30 ft wide, and it runs 40 paces Eastward in the direction of the strike. In many of the V shaped folds the material is crushed at the apices.

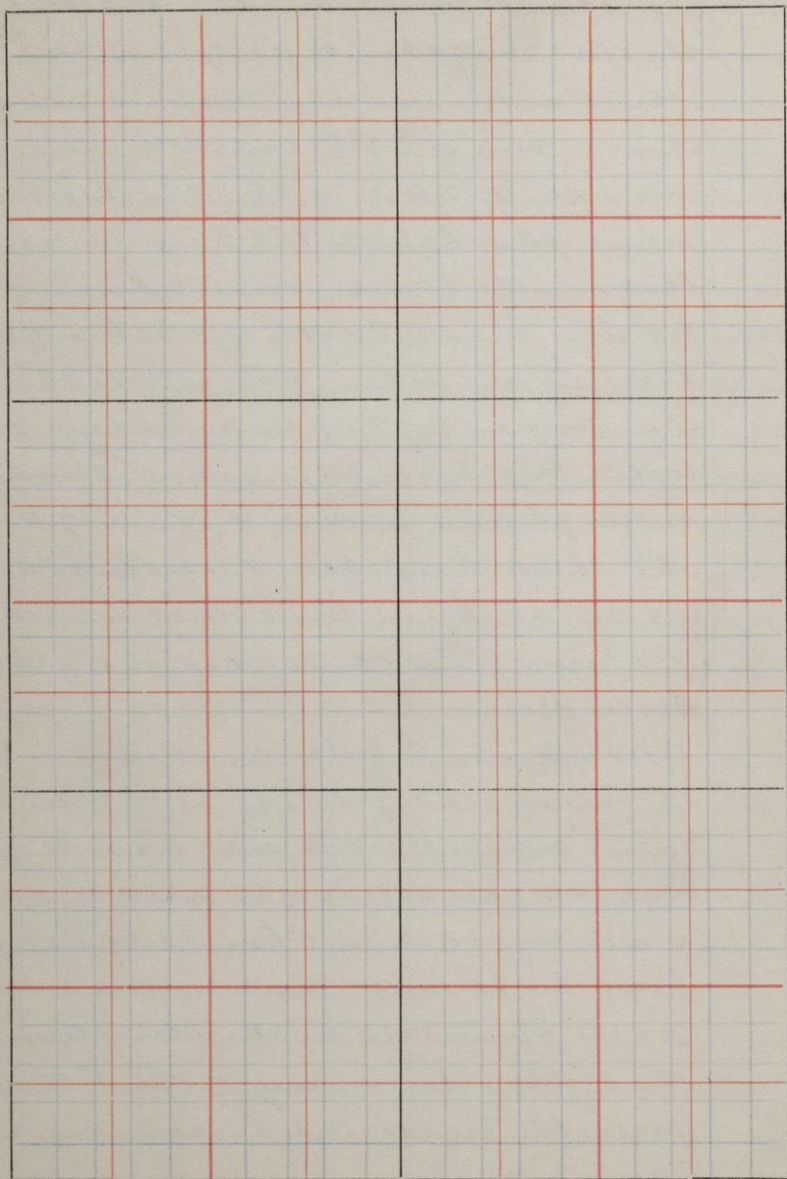
✓19710

The one in the rock is limonitic

T.

75

R.



At 1910 N. 60 W of S.E. Cor Sec 27 is a small ledge of chert etc on the south side of a little knob. It measures 7 ft in width and 17 paces in length, strikes about  $10^{\circ}$  N of W, and dips about  $60^{\circ}$  N.

10 paces E of the eastern end of this ledge is another 15 ft wide and 20 ft long.

19711 1700 N 45 E of S.E. Cor Sec 27. Schistose greenstone from small ledge in the woods.

19712 At 1625 N and 10 W. is the East end of a round knob of greenstone. The knob extends 50 ft further west, and at its East end it is 10 ft. wide and at west end 40 ft.

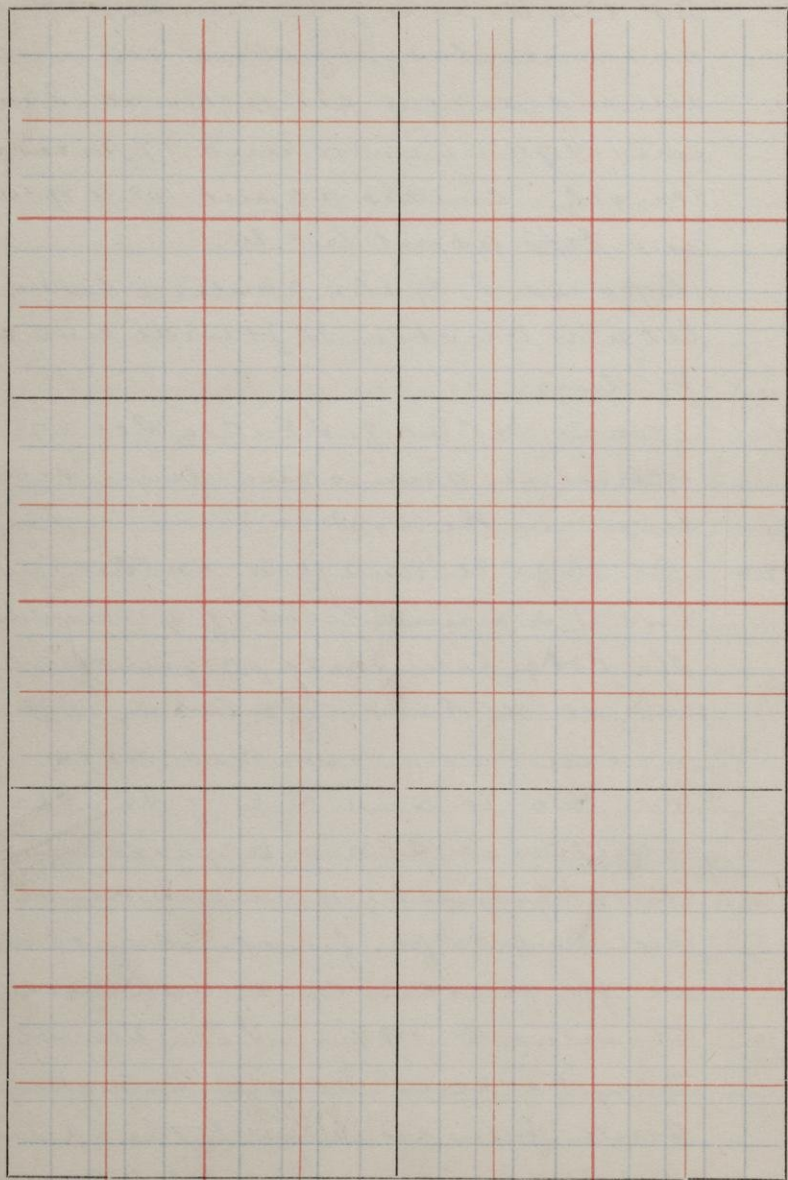
At 1610 N and 15 E of S.E. Sec 27 is the west end of a greenstone bluff forming a round knob, extending 30 ft further south and 100 ft. further east, with rock very similar to 19712. From its top may be seen plains ascending south from its base to the granite, which plains are bounded everywhere on their north side by a



T.

77

R.



great ridge of which the present one  
is a part.

19713 At the base of the greenstone bluff  
at 1550 N of SE. Sec 27 is a small  
ledge of iron chert, striking  $10^{\circ}$  N of  
W and dipping at about  $60^{\circ}$  N. The  
ledge here extends 66 paces west.

At 146 E of this is another ledge  
of the same rock with the same  
dip and strike.

After crossing meadow land be-  
gin to ascend a hill on whose

19714 side at 1170 N and 200 E of SE.  
Civ Sec 24 found ledge of granite  
of the usual coarse red variety?

At 1250 N ran East 500 paces  
to 1500 W of E line Sec. 26. and  
then north.

19715 At 1750 N 1350 W of the SE Civ.  
Sec 26 I 47 R 27, a knob of green.  
stone rises from the plain. Its  
western end is located as above.  
It seems like lenticular in shape,  
though its eastern end was not  
seen.

The eastern extension of the hill  
with the plain exposed a nearly



T. 47

R. 27

 $W \frac{1}{4} P$ 

Lake Tilden

Frída

Foster mine

Lake

greenish  
green

|    |        |
|----|--------|
| 23 | SE Cor |
| 26 | NE Cor |

26 N.E.C.

26 N.E.C.

Summit  
Mn.

Field

# Plains

Plains 19720  
-21-27

Plains

W. H. P.  
26

26

Granite

Knobs

Granite

19727

This map does not agree with atlas sheet

Srv Cur  
26

20



80  
bare southern face all the way  
East from where crossed it going  
South. Here however it is composed  
of iron-ochre, the greenstone having  
eroded just above the point  
from which took specimen 19713.

The location of the specimens  
taken from this bluff is

19716 1725 N 1580 W of S.E. Cor Sec 26  
The cherts here strike W  $10^{\circ}$  S. They  
are well bedded slates and cherts,  
with a general dip of about  $30^{\circ}$   
to the North.

At 150 N 1500 W of S.E. Cor Sec  
23, turned E and went 125 paces  
then North 50 and E 375, then  
S. 200 to where should have been  
the N  $1/4$  part Sec 26., which has  
ever did not find. [It is probable  
that the  $1/4$  part is a few paces  
further East.]

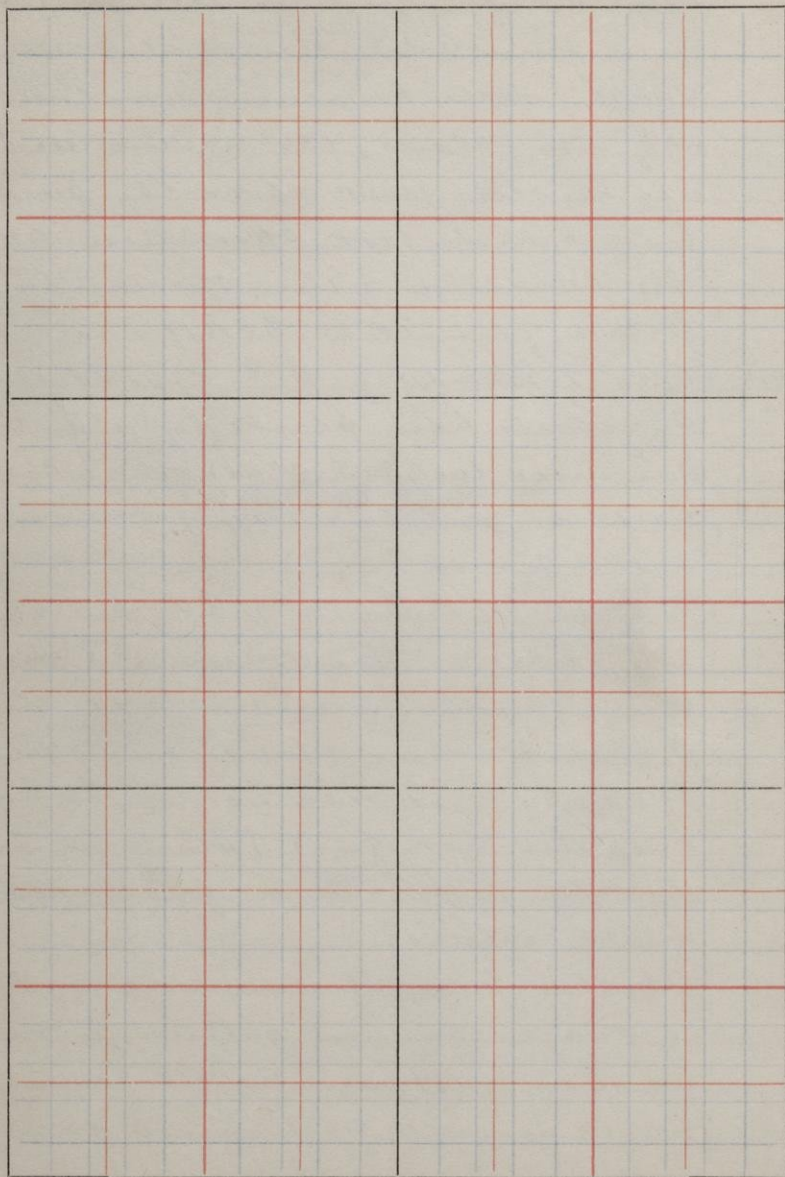
At this point found a large ledge  
of coarse grained greenstone, running  
100 paces westward. At its Eastern  
end it forms a little knob facing  
East.

S.E. Cor Sec. 26.

At 1750 N and 940 W is the west end

81  
T.

R.





19718

of a bare knob of schistose greenstone. The ledges of rock run about 200 N of S, but are not continuous the one with another. They seem to form the west side of a big hill (afterwards discovered to be Summit Mt.)

At 1125 west and the same distance north is the East end of another bare knob of greenstone. Ledge about 60 ft long and 20 ft. wide.

19719

See plat

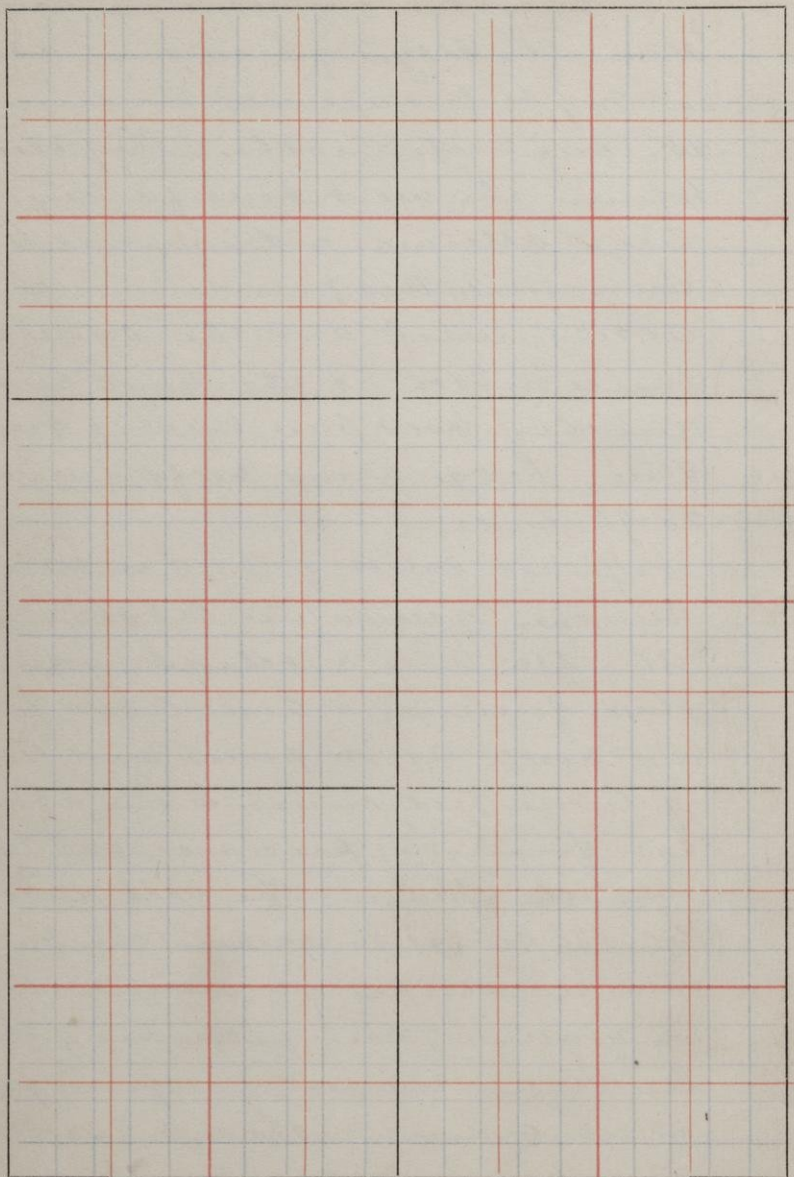
100 paces south of 19719 is still another greenstone ledge.

At 1350 N is a schistose greenstone forming a high ledge facing north. At 50 paces west (1050 W of Corner) it comes to an abrupt end forming a precipice overlooking the plain. The rock appears to be a schistose greenstone, banded with red stripes of a granite-looking material, and including large lenticular masses of a fine grained red granite. The red bands may be very feldspathic portions of the greenstone, but the intense



82  
T.

R.



Siens are undoubtedly granitic.

- ✓19720 Greenstone
- ✓19721 Greenstone with red bands
- ✓19722 Granite inclusion

At 100 paces further South is the north side of another hill, separated from the more northerly one by a little valley.

On the north side of the hill is

- ✓19723 Again found the schistose greenstone.

At 1870 ft. nearer the top of the hill

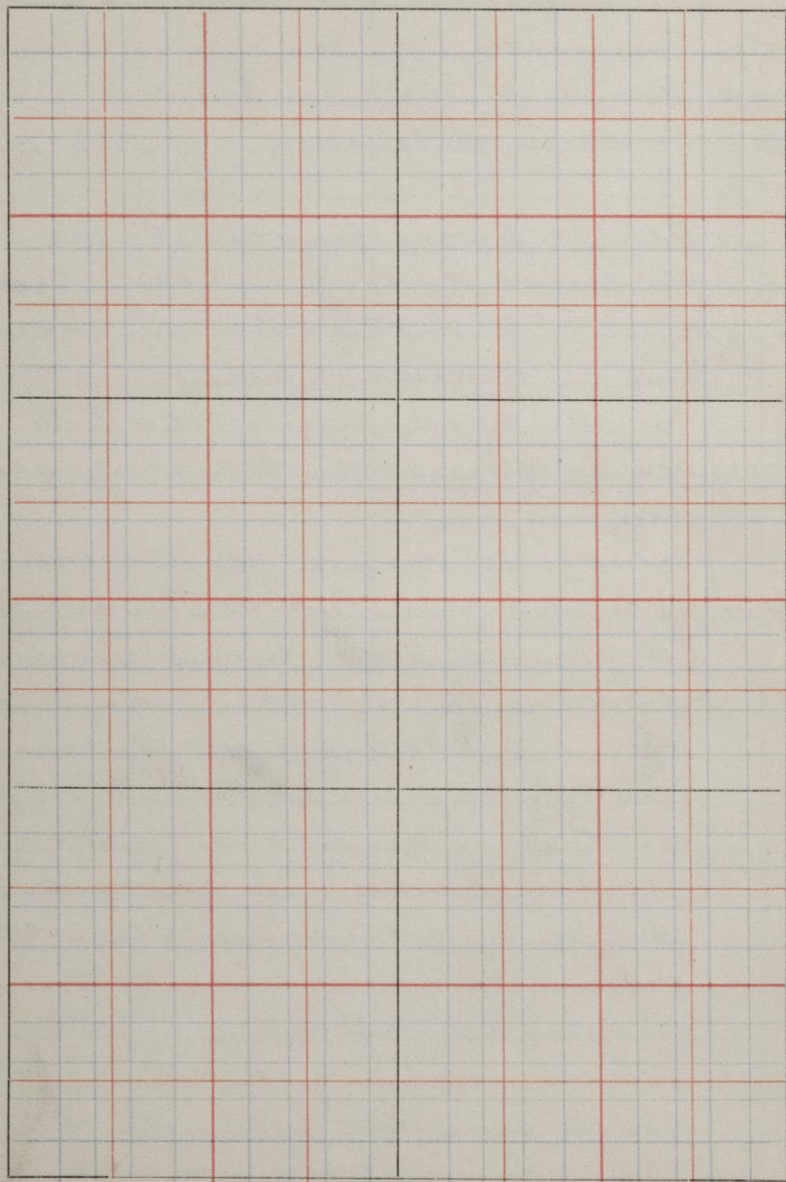
- ✓19724 is a red granite, that occurs in large quantity, but is more like the granite in 19721 than that to the South we went into the granite area. To the west about 40 paces the hill is quite bare, with a knobby protrusion overlooking the plain to the west. Here the granite is very well exposed in large quantity.

- ✓19725 At the bottom of the hill on the South side the schistose greenstone again appears, and beyond this again the granite.

T.

85

R.





The granite extends in the form of small knobs as far south as 500 N of the South line of the Sec 26 and beyond.

19726 Granite from 500 N 1065 W of S. E. cor Sec 26.

At 1500 S. turned East and went 500 paces W of mt - 500 N. 500 N of S. E. cor Sec 26. From here ran north, after having crossed numerous granite ledges in Eastern Run.

19727 On the northern run found a schistose rock, probably a gneiss at 650 N. 500 W of S. E. cor Sec 26, on the South slope of a small hill.

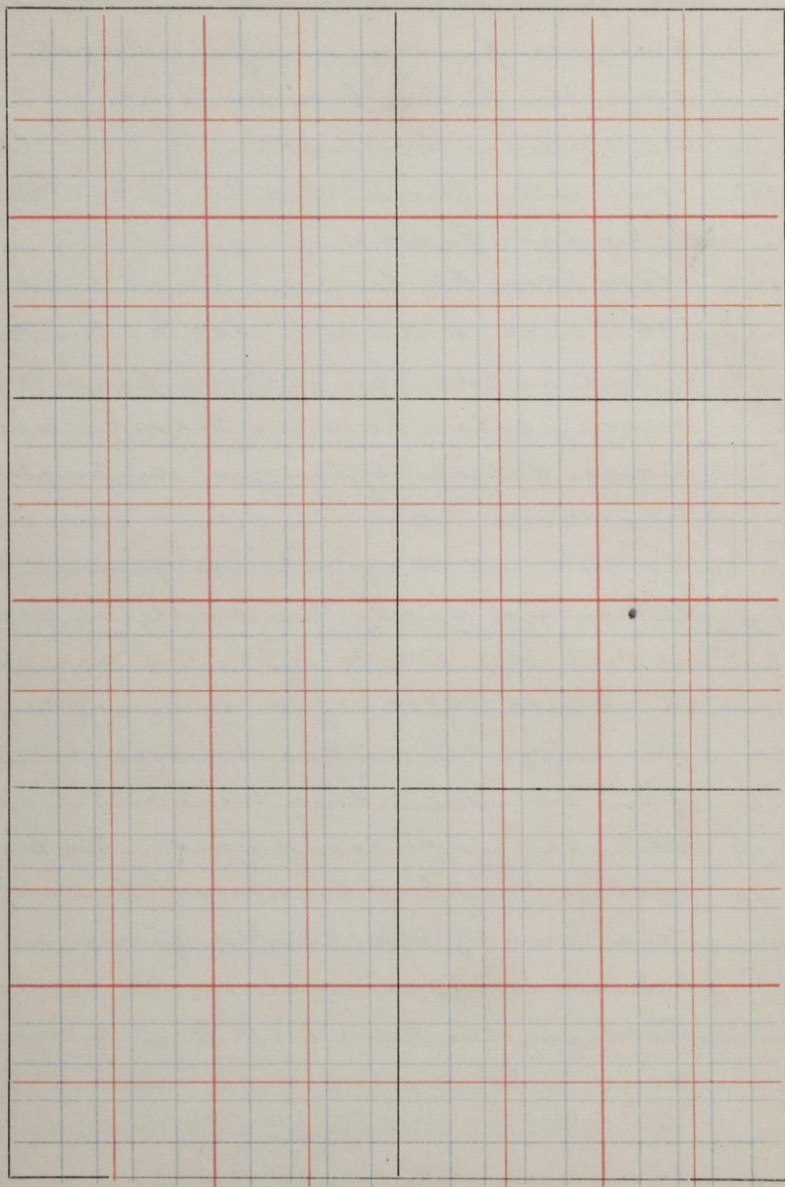
From 425 and 800 N. our course ran between two knobs of granite only 20 paces apart. In a block that had evidently tumbled from one of the cliffs found a schistose greenstone, with granite inclusions and cut by granite veins.

At 990 N. 500 W of S. E. Sec 26, clamber over a series of ragged ledges of granite and schistose

T.

87

R.



greenschist. The latter was seen to intrude the granite? At any rate the greenschist has but little resemblance to those cutting the iron-bearing rocks.

✓19728 Greenschist

✓19729 Granite?

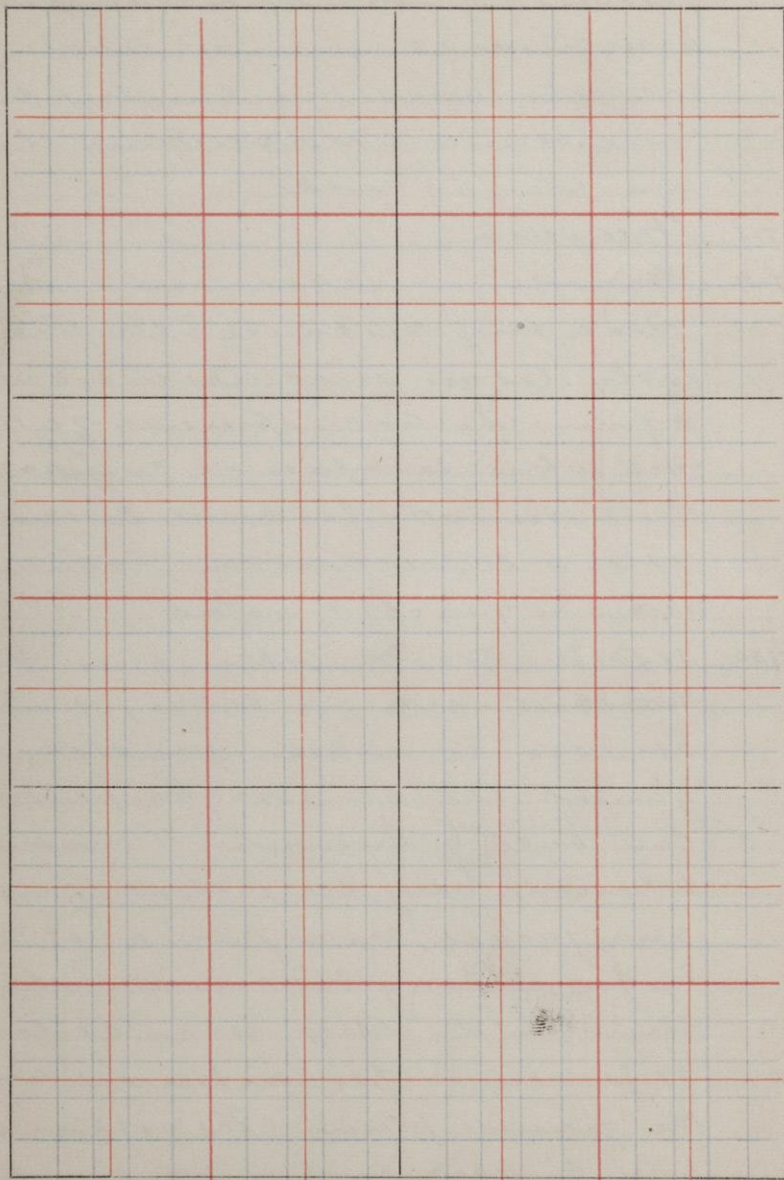
For a long distance E to the rocky ledges just described seem to form the escarpment of a terrace, whose surface is comparatively smooth for some distance. After a little another escarpment is reached, as at

✓19730 1050 N 500 W, where found most northerly granite ledge, and at 1450 N, where abutted against the almost perpendicular side of Summit Mountain, where a very steep cliff of iron and jasper runs about  $20^{\circ}$  N of E for a long distance. Where climbed the cliff it is at least 50 ft. almost perpendicular above the granite plain. The rock is a well banded jasper striking about  $10^{\circ}$  S of W. in general. The



T.

R.



strike is not regular, nor is the dip constant.

Upon reaching the top of Summit Mountain turned to the East, where found at

225 W and 30 N of S.E. cor Sec. 23, found a ledge of iron and Jasper schists.

19702

Only 15 paces E of this is a round knob of greenstone and at 225 W. 40 N. another of the same rock.

Other ledges in sight indicate that the north side of the Mountain is largely composed of greenstone.

At 400 W 225 N of S.E. Sec 23 is another greenstone.

Continued north, down grade until finally came to Lake.

U. B.

Rummers quartzite etc., indicated as existing in the center of Sec 26. is a very quartzose granite, hence, his specific descriptions on page 69 are not found whole. There are indeed schists in the region, but these

R.



are schistose greenstones, rather than true-schists. Some hold granite inclusions; others are cut by granite veins.

July 31/91

On this day cut a line from the W  $\frac{1}{4}$  part Sec 23 to E  $\frac{1}{4}$  part of the same Section as a basis for connection, when working north of this point.

The entire country between  $\frac{1}{4}$  part is marked by bare knobs of greenstone, as is the country between this line and the road to the south.

19703 Specimen of greenstone from 1206  
and 1505  
E of W  $\frac{1}{4}$  part Sec 23.

At 175 E and 40 S of  $\frac{1}{4}$  part is a very abrupt ledge of greenstone. From the Lake Linden to the road S. is a narrow valley between two high ridges of greenstone in which the rock is well exposed.

T.

93

R.

19737

15

19810

Book of Plane Table  
uses

19734 Again on the S. side of the lake is a little greenish point, which is the northern extension of the ridge east of the valley. On the East side of the lake again, on the S. side of the  $\frac{1}{4}$  line is another high bare hill and at 950 E of W  $\frac{1}{4}$  another ledge.

19735 At 1230 E and 403 of W  $\frac{1}{4}$  part on the top of a hill are several large bare ledges, from one of which took specimen.

19736 At 1390 E another ledge of greenstone and at 1690 on north side of another hill is a long ledge of greenstone, running E-W about 400 feet. This rapid review of the land in the northern part of Dec 23 is evidence that the region is one of greenstone exclusively.

19737 to 19810 - See opp. page.

Aug 9/91

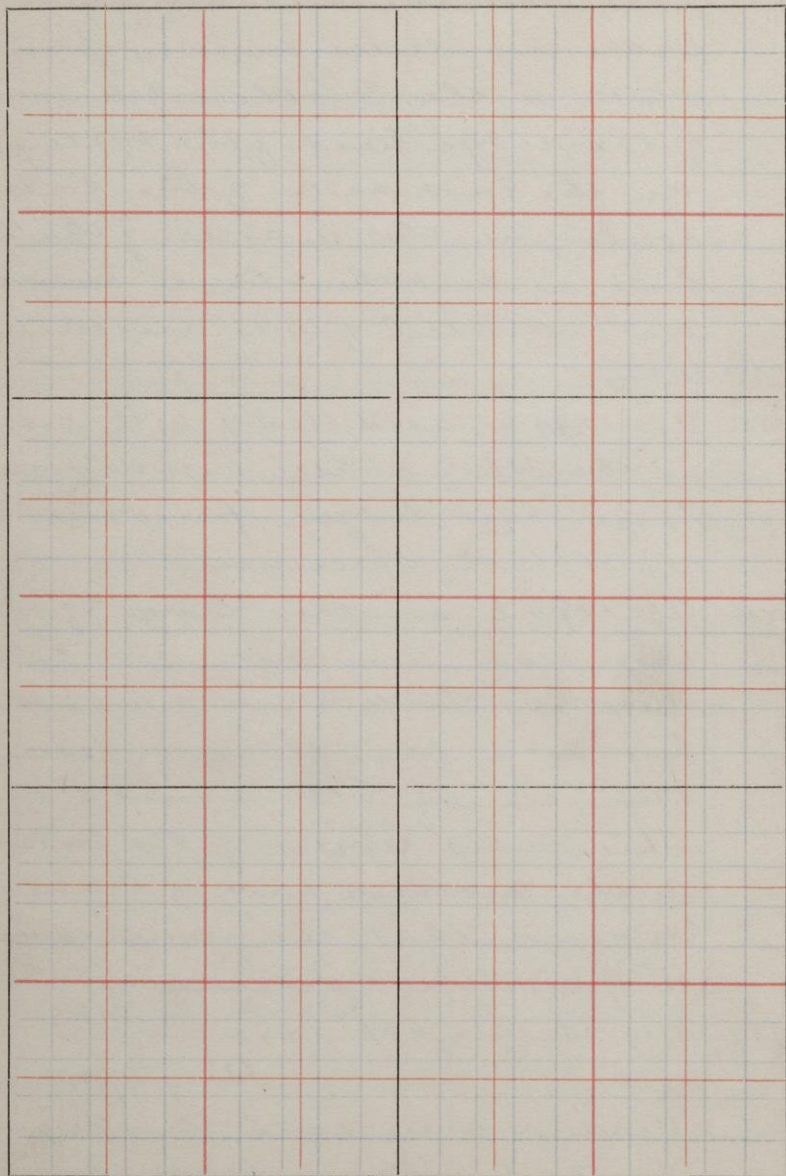
Made a run into the greenstone for the purpose of learning whether or anything besides this rock



8-

T.

R.



could be discovered in the area or not.

Started at 1500 E, 1330 S of U. W. Cr Sec 14 T 47 R. 27 [500 N 670 N of SE Cr] and ran south through hardwood country to S line of Section. At this point came to a high perpendicular bluff of greenstone running E & W.

19811 Specimen from top of bluff continued south down slope of hill to 1500 N, <sup>+500 N</sup> of S.E. corner of Sec 23, seeing many small greenstone ledges as indicated in map.

At 1000 S of N. line of Sec 23, ran East  $W\frac{1}{4}$  part (this is same  $\frac{1}{4}$  part as attempted to find at other times but in vain. It is probably in the yard of boarding house), and then north.

In running East skirted the north side of a line of greenstone in which ledges are exposed at intervals.

19812 At 410 W. 1025 N of SE Cr Sec 23

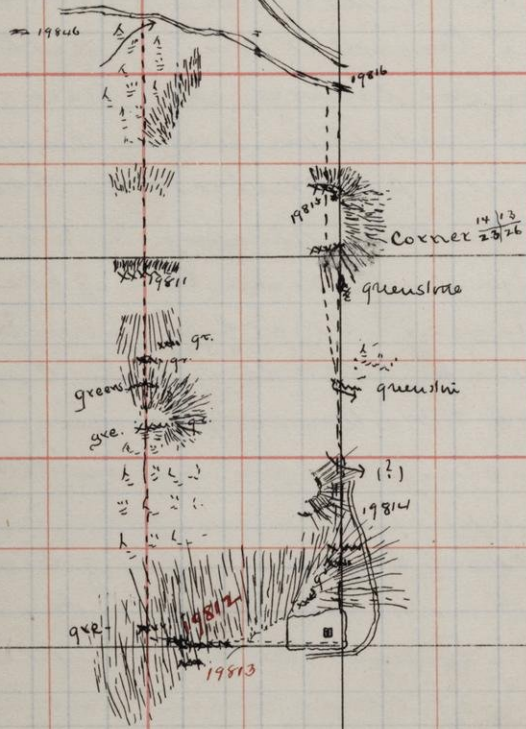
97  
T. 47

R. 27

14

13

Lake  
Ogaen



23

24



took specimen, and  
 19813 at 400 N. 960 E of S.E. Sec 23  
 another

In running North from the  $\frac{1}{4}$   
 post Smith was so far out  
 that can use only a small  
 number of his locations. Since  
 these were corrected by Aley, so  
 that locations given are prob-  
 ably nearly correct. In other  
 cases they are not sufficient-  
 ly close to be of service to omit  
 them. The rock however is all  
 greenstone, so that the ledges are  
 not of great geological im-  
 portance, especially since North  
 and Smith limits of the green-  
 stone area are correctly given.

19814 about 1300 N of S.E. Cor Sec 23  
 (greenstone) and about 50 paces  
 East.

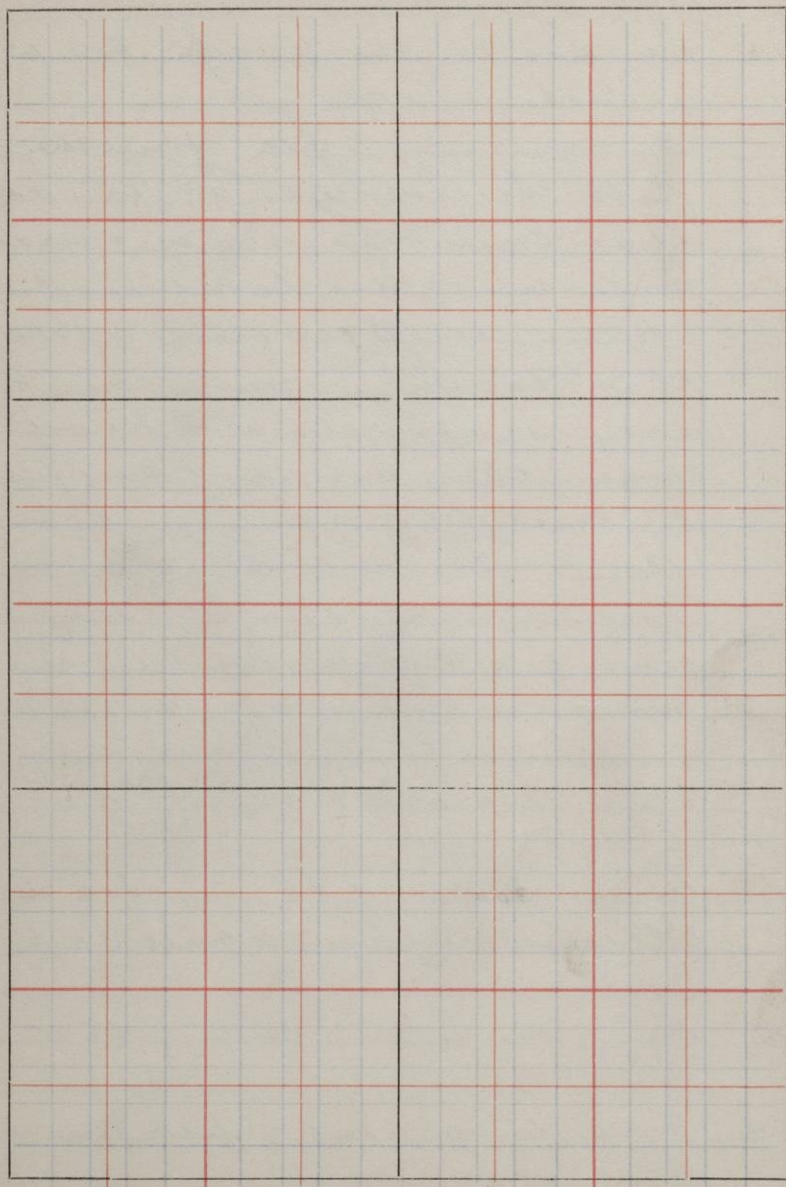
19815 From 200 N and 30 W of S.E. Cor  
 Sec 14.

19816 From dump heap of pit from which  
 took 19829-30-31.

T.

99

R.



Aug 10.

On this day made a careful examination of Sec. 14. T47 R22 in company with Charles Alley. Began at 1400 E and 1330 S of NW cor Sec 14 and went north to Lake Sully.

At 1400 E 1170 S of NW cor Sec 14 is a small pit in which are some exposures of iron-ore, that are, however, so covered with sand that it was not practicable to obtain their strike or dip.

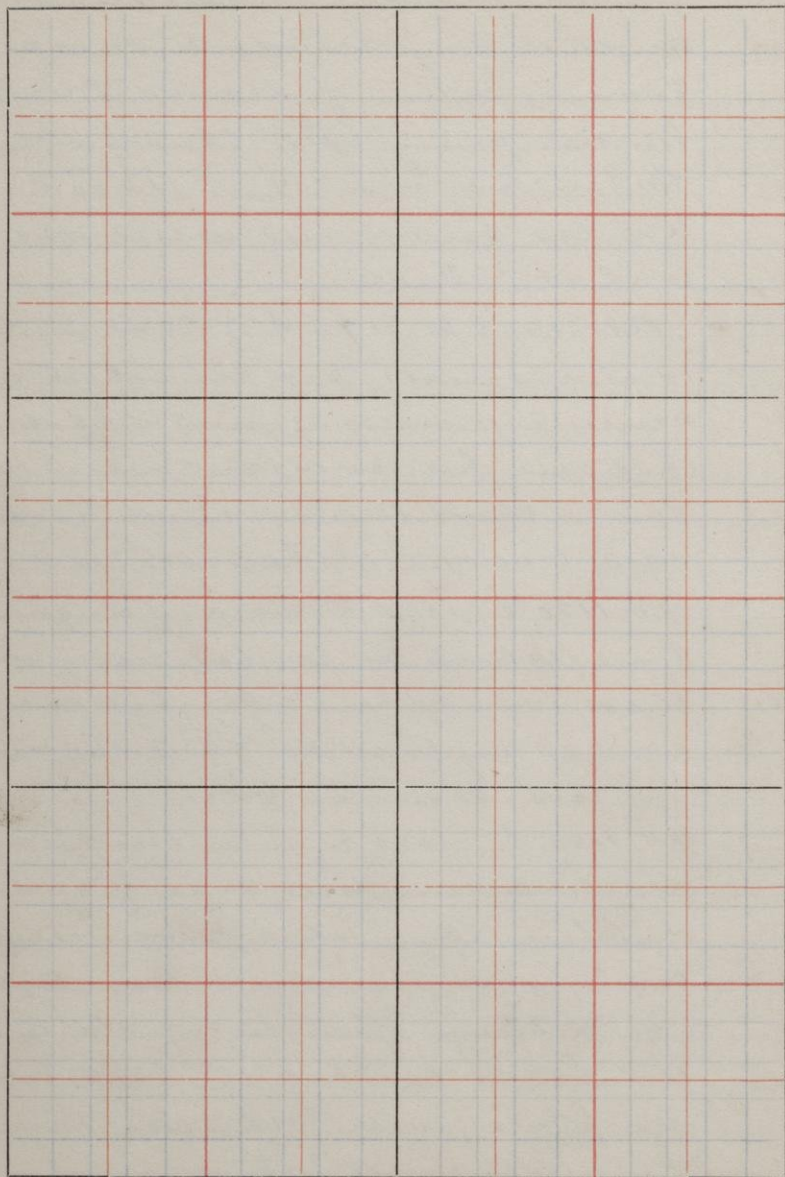
At 1120 S. 1385 E is a larger pit from which a larger amount of iron-ore was taken. The pit is now covered by logs so that the rock was not seen in place.

At 1100 S. 1380 E is a long narrow trench cutting into side of greenstone hill. From this a small quantity of iron-ore was taken, together with a large quantity of cherty material. In the pit the rocks are in place, with schistose greenstone to the north, then well banded cherts and finally to the south



T.

R.



the ore.

✓ 19819

Ore

✓ 19820

Chert

✓ 19821

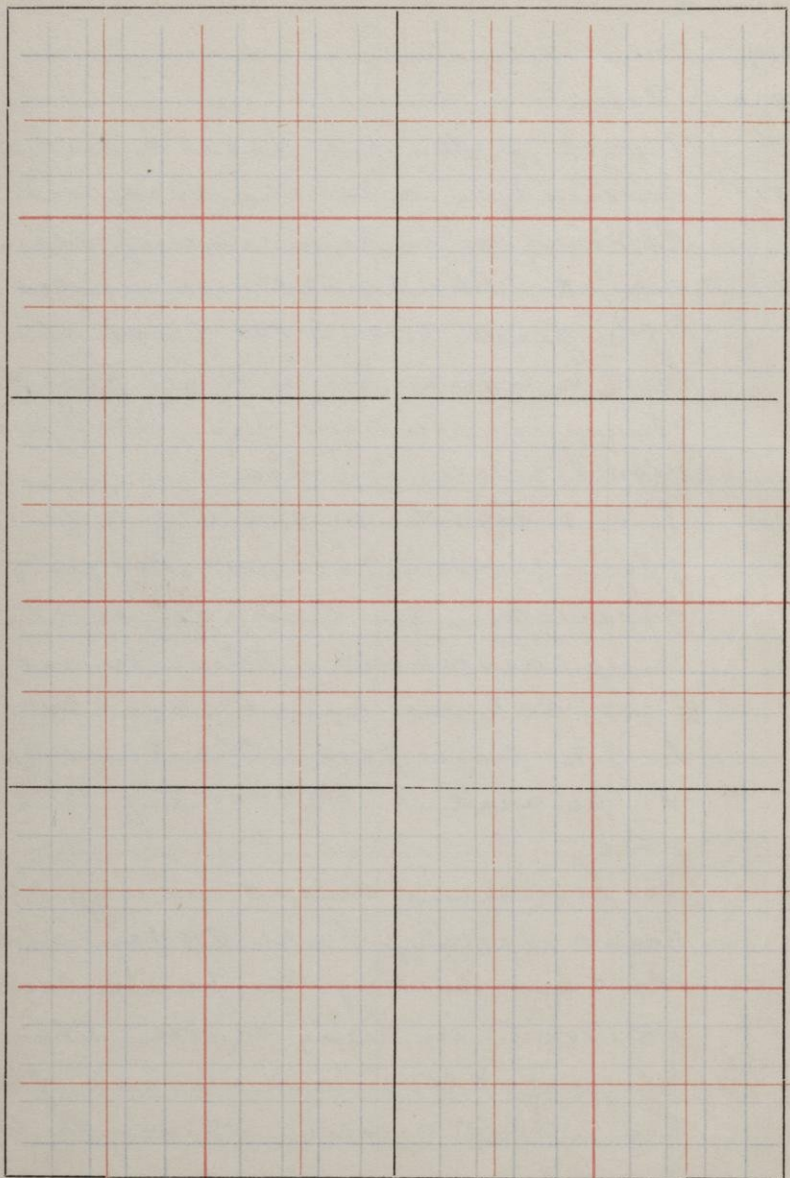
North of the pit rises a hill of greenstone with the rock well exposed in a high wall facing south. The hill shows no ledge to the west, but to the east the rock is exposed as a high bare knob. Specimen taken from 1090 S and 1400 E of New Cr Sec. 14.

Went north to 900 S of N line of sec. finding small ledges of greenstone as indicated on the map (next book), then went East 50 paces and S. 240 to 1400 S. of N. line of sec. the East 40, S. 60 and E to 1600 E of W line of sec.

In running south along the west side of Lake Ogden struck the East end of the bluffs crossed at 1400 E, on way north. These are all steep and rugged, forming a good western shore. The location of ridges will be discovered upon reference to the map.

103  
T.

R.





Location and Names  
of  
mines

Hard One -

T 47 R 27.

Sec 1

- Jackson  
3 SE  $\frac{1}{2}$  SE New York  
9 NW  $\frac{1}{4}$  Barham  
9 S  $\frac{1}{2}$  Lake  
10 } W  $\frac{1}{2}$  Superior  
10 } E  $\frac{1}{2}$  Cleveland  
11 }  
15 N  $\frac{1}{2}$  Lake Angeline  
16 [Matinae]  
6 SE  $\frac{1}{4}$  [Excelsior]  
19 W  $\frac{1}{2}$  NW  $\frac{1}{4}$  [Goodrich]  
19 NW  $\frac{1}{4}$  NE  $\frac{1}{4}$  [Saginaw].  
19 NE  $\frac{1}{4}$  NE  $\frac{1}{4}$  [Section 19]

2 SW of SW  $\frac{1}{4}$  E. New York

T 48 R. 28.

- 32 SE of SW  $\frac{1}{4}$  Boston  
32 SW of SW  $\frac{1}{4}$  Sterling

T 48 R 29

- 29 N  $\frac{1}{2}$  SW  $\frac{1}{4}$  Dalliba  
30 SE  $\frac{1}{4}$  Northampton

T 47 R. 28

- 24 NE  $\frac{1}{4}$  Fitch

Magnetic Slate

T 45 R. 25

Sec 18 SE 1/4 Cheslie

T 46 R. 29

7

Republic

Kloman Columbia

T 47 R. 29

Locations {

11 NE 1/4

Humboldt

2

11 NW 1/4

Edwards

T 48 R. 29

31 S 1/2

Champion

32 SW 1/4

Key Stone

T 48 R. 30.

19 } S 1/2  
20 }

Michigan

T 48 R. 31

28

Steward

24 SW 1/4

NW 1/4 Spurr Let.

T 49 R. 33

9 NW 1/4

Taylor.



Soft Ores

Salisbury Range

|        |        |       |                  |
|--------|--------|-------|------------------|
|        | T 47   | R. 27 |                  |
| Sec 15 | S 1/2  |       | Salisbury        |
| 16     |        |       | L. Superior      |
| -      |        |       | (several miles?) |
| 21     | N 1/2  |       | [Mitchell]       |
| 21     | SW 1/4 |       | Wintthrop        |
| 20     | SE 1/4 | NE    | [Linthicum]      |
| 20     | NE 1/4 | NW    | [New England]    |
| 23     | SW 1/4 |       | Foster           |
| 28     |        |       | Mitchell         |

Seal Lake Range

T 47 R 27.  
Sec 2 NW 1/4 Cleveland Tenn. (Nelson)

T 48 R 27

Detroit

|    |    |             |
|----|----|-------------|
| 35 | SE | Polly       |
| 35 | SW | Cambria     |
| 35 |    | Bessemer    |
|    |    | Forest City |
|    |    | Hartford    |



# Wegauwe Range

T 47 R. 27

Sec 1 SE  $\frac{1}{4}$  S. Jackson  
12 NE  $\frac{1}{4}$  Section 12.

T 47 R. 26

|    |                                   |                                  |
|----|-----------------------------------|----------------------------------|
| 4  | NW $\frac{1}{4}$ SW $\frac{1}{4}$ | Pineer Bessemer                  |
| 5  | NE $\frac{1}{4}$ SE $\frac{1}{4}$ | Lackawana                        |
| 5  | NW $\frac{1}{4}$ SE $\frac{1}{4}$ | Buffalo                          |
| 5  | SW $\frac{1}{4}$ SE $\frac{1}{4}$ | S. Buffalo                       |
| 5  | NE $\frac{1}{4}$ SW $\frac{1}{4}$ | Pineer of Wales                  |
| 5  | SE $\frac{1}{4}$ SW $\frac{1}{4}$ | Queen                            |
| 5  | SW $\frac{1}{4}$ SW $\frac{1}{4}$ | Blue                             |
| 5  | N $\frac{1}{2}$ NW $\frac{1}{4}$  | Wegauwe                          |
| 6  | SE $\frac{1}{4}$ NE $\frac{1}{4}$ | "                                |
| 6  | SE $\frac{1}{4}$ NW $\frac{1}{4}$ | Elba                             |
| 6  | NW $\frac{1}{4}$ SW $\frac{1}{4}$ | E. Jackson (Pendell)             |
| 6  | SW $\frac{1}{4}$ SW $\frac{1}{4}$ | Lucy                             |
| 6  | E $\frac{1}{2}$ SW $\frac{1}{4}$  | [N.Y. Hematite (Grand Carr)]     |
| 6  | N $\frac{1}{2}$ SE $\frac{1}{4}$  | [Onion (Himrod Hematite)]        |
| 6  | SE $\frac{1}{4}$ SE $\frac{1}{4}$ | [Baraga]                         |
| 7  | NW $\frac{1}{4}$ NW $\frac{1}{4}$ | Lucy (McCumber)                  |
| 7  | SW $\frac{1}{4}$ NW $\frac{1}{4}$ | [Wheeling]                       |
| 7  | SE $\frac{1}{4}$ NW $\frac{1}{4}$ | Wilmington                       |
| 7  | NE $\frac{1}{4}$ NW $\frac{1}{4}$ | Wegauwe Manganese                |
| 7  | SW $\frac{1}{4}$ NE $\frac{1}{4}$ | Wilmington                       |
| 7  | NW $\frac{1}{4}$ NE $\frac{1}{4}$ | Schack                           |
| 7  | S $\frac{1}{4}$ SE $\frac{1}{4}$  | [Chicago (Cathorn + Spurr)]      |
| 8  | W $\frac{1}{2}$ NW $\frac{1}{4}$  | [Bay State (Indiana, Green Bay)] |
| 8  | NW $\frac{1}{4}$ NE $\frac{1}{4}$ | Beston                           |
| 17 | W $\frac{1}{2}$                   | [Rowland]                        |

Cascade Range

T 47 R 26

Gribben

Carr

Palmer (Pills & L. Sup)

Wheat (Home)

T 47 R 27

$\left. \begin{array}{l} 25 \\ 36 \end{array} \right\} E \frac{1}{2}$

Palmer (inc  
Pills & L. Sup)

T 47 R. 30

Magnetic  
Cannon  
Chippewa



Messrs Lane and Hubbard report  
a fine uniformity, & believe con-  
glomerate and lower one at  
Hoo N. 150 S of N  $\frac{1}{4}$  part Sec 32, Palmer.  
Reached by path from wheat mine.



