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Clements, J. Morgan (Julius Morgan), 1869-
[s.l.]: [s.n.], 1895

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

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 pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or 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, the latter always being expressed from the north; for instance 4025, 250 N., 300 W., Strike, N. 78° E., Dip 50° S. Then follow with a full description of the ledge. 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. 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 x 2½ x ¼ inches will be allowed, but in all other cases *large-sized specimens*, trimmed to a size of 3 x 4 x 1 inches, must be selected, in accordance with section 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. 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. Specimens may 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.

178

✓

Michigan

District

I

1895

J. Morgan Clements.

Legend

— Wagon Road

++++ Rail Road

—→ Stream showing direction of flow.

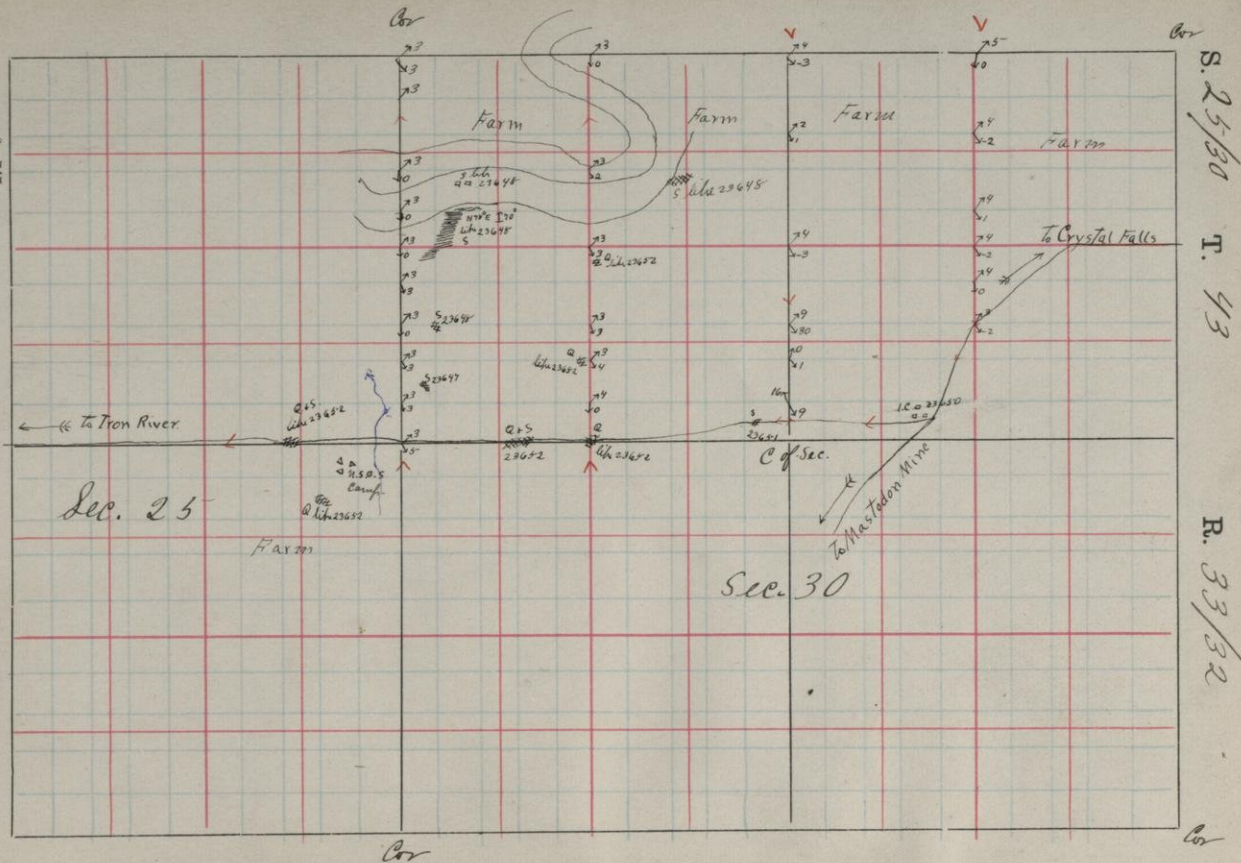
Y

Lines over which and direction
in which traverses were made.

Contour lines when present are
20 ft. apart.

Scale 4 in. = 1 mile except
where otherwise specified.

6-747



23647 N1140 W 1940 SE Cor. Sec. 30-43-32

Edge of black slate. Slate is badly broken up and poorly exposed. Strike of slaty parting N65°W, dip 80°NE.

23648 N1335 W 1900 SE Cor. Sec. 30-43-32

Exposure of slate very similar to preceding but somewhat coarser and a trifle ferruginous. Parting strikes N75°W, dips 83°NE.

Like 23648 N1520 W 1900 SE Cor. Sec. 30-43-32.

Edge of slate like 23648. In this exposure can be seen indistinct bands of different color which I believe are beds. They, the bands do not agree with parting.

For in one place a distinct massive grey quartzite bed which alternates with the ^{reddish} slate. Strike N78°E, dip 70°N.

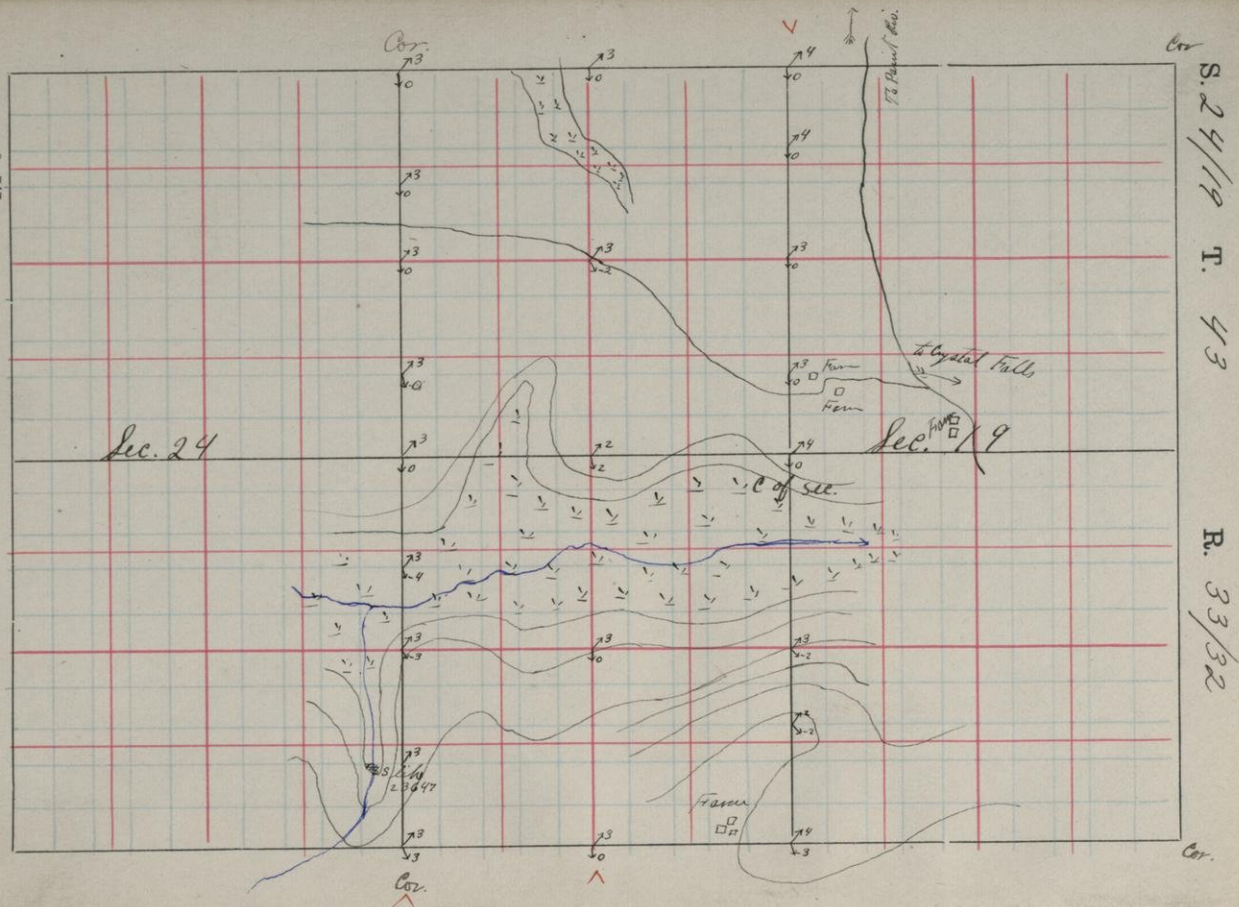
We now begin descending to N. and in about 125 feet reach foot of ridge. Test pits here have brought same slate to surface.

23660 N1060 W 670 SE Cor. Sec. 30-43-32

Near here we find large dip and variation. Specimen from test pit with Jasper on dump.

23651 N1060 W 1075 SE Cor. Sec. 30-43-32

Exposure in road of greenish slate, in places ferruginous.



23652 N1000 W1700 SE Cor. Sec. 30-43-32.

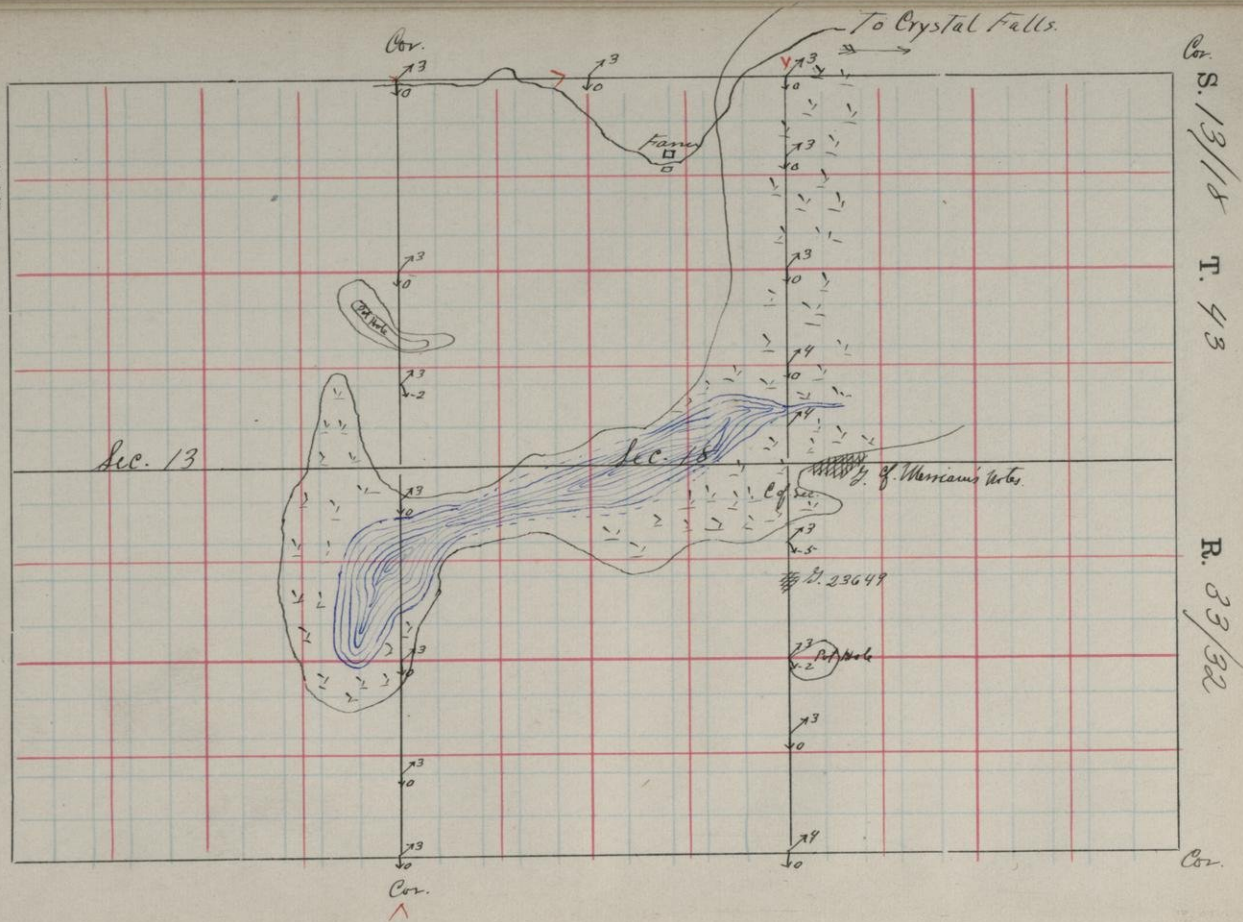
Exposure in road of black (carbonaceous) quartzite (23652) and black slate like 23647. Contact of Q+S. not exposed so can't get strike and dip.

like 23647 N200 W75 SE Cor. Sec. 24-43-33

Waterfall over ledge of black slate like 23647

like 23648 N1690 W1280 SE Cor. Sec. 30-43-32

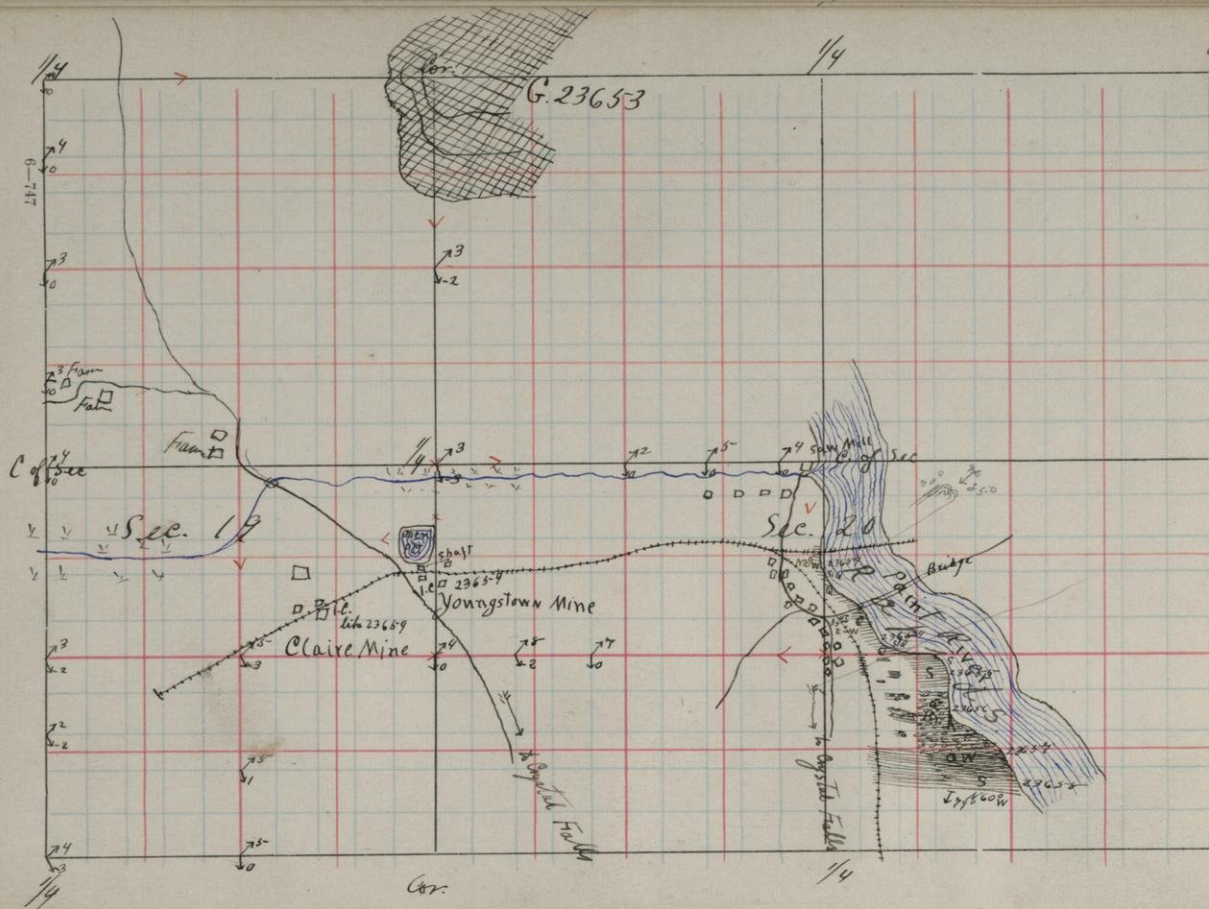
Same black slate as that found $\frac{1}{2}$ mile west of this point outcropping like it also on N. slope of ridge. Slate bands very much contorted so that can't get strike and dip.



23649 N 72.5° W 1000 SE Cor. Sec. 18-43-32

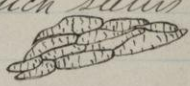
Ledge of dense greenstone 23649 and granitic
tuff like that lying just SE of this. See
Merriam's map. Can see no relation between
the dense greenstone and the tuff.

Br. S. 19/20 T. 43 R. 32



23653 N1900 W100 SE Cor. Sec. 19-43-32

Here begins a large hill of granstone, the hill is nearly bare, rock being exposed nearly everywhere, especially on steep sides. Rock is an aphanitic gray granstone like specimen 23653. On W. side of hill the rock shows spheroidal parting and at one place where slipping has apparently taken place, the spheroids are all pulled out, elongated, parallel to direction of slipping, and are full of cracks which are perpendicular to the direction of slipping. Cf. sketch. Cracks seem to have been the result of an actual pulling apart of the spheroids. The whole mass is now thoroughly cemented by a very friable ^{very} quartz which seems to contain some CaCO_3 .



spec
this has gotten
lost!

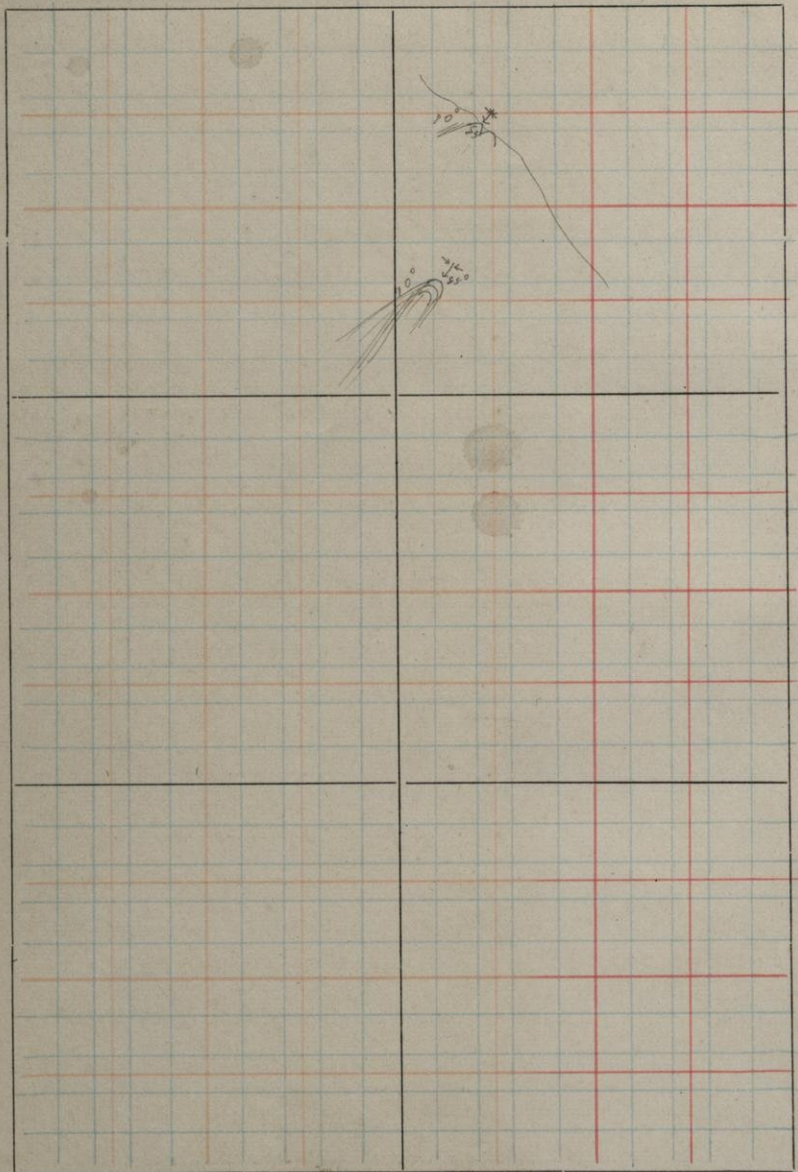
23654 N790 W1060 SE Cor. Sec. 20-43-32

This point is just S. of saw mill and creek cutting Paint River and almost under R. R. bridge. There begins here ~~the~~ crop out in the right bank of the river thinly bedded almost slaty ferruginous quartzite. The beds are very much crumpled and it is difficult to get a good strike and dip. It looks to

S.

T.

R.



we as if this was near the axis of a synclinalorium with axis dipping about 85° SW. The general strike of beds seems to be N 70° W. The beds apparently bend around to W. and form ridge running nearly E-W, the same ridge crossed in Sec. 30-43-32 when running N on line between R.S. 33/32 Just S. of Argo bridge the strike changes a little and seems to be E-W with dip of 85° S.

These quartzite beds continue to be exposed in river bed for nearly 300 paces to the S where the gray slates begin.

23655 N500 W700 SE Cor. Sec. 20-43-32.

Here begins a greenish slate, following the thinly bedded quartzite. The slates are about 300 ft thick and then begins at

23656 N400 W700 SE Cor. Sec. 20-43-32

a peculiar cherty breccia like specimen. The fragments seem to be flat ^{angular} pieces of quartzite and slate cemented by ferruginous chert. It looks somewhat like a reibungs breccia.

It runs & break up very easily as it weathers and it is difficult to get a good or even fair specimen. Slate fragments are rare and I could not positively identify them though thought they looked like quartz. This breccia is about 160 feet thick. It grades up through a slaty graywacke at

23657 N 240 W 640 SE Cor. Sec. 20-43-32.

which is about 50 ft thick into a slate 23658 at

23658 N 235 W 640 SE Cor. Sec. 20-43-32

Strike of slate 23658 is N 60° W, dip 77° S. The unconformity indicated by the breccia and graywacke must be very slight as the strike and dip on both sides of it i.e. below and above it show only moderate disagreement.

Outcrops continue on to S. but section is as taken here by Weidman and carried on to S.

23659 N 700 W O.S.E Cor. Sec. 14-43-32

Shafts and open pit of the Youngstown Mine. Workings now abandoned and

6-747

Cor

Cor S. 26/25 T. 43

R. 33

Ag

← To Iron River

Sec. 26

Sec. 25

C off Sec 34 → to Crystal Falls.

Poor Farm.

Co. 49

7
full of water. Specimen seems to
be average grade of ore taken
from near old stock pile.

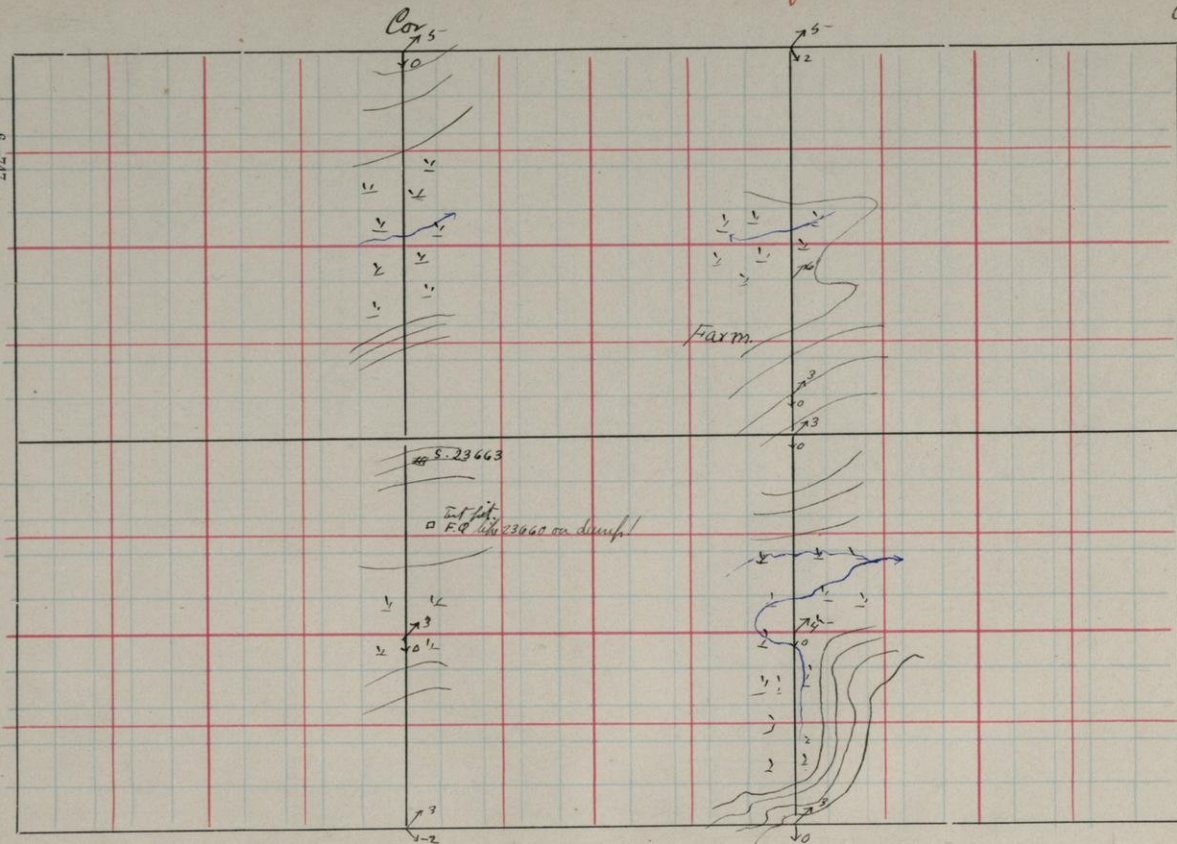
About 300 paces west of the
Youngstown are the shafts and
buildings of the Claire Mine.

It is now also abandoned. Ore
seems to have been of same
grade as was found at the Youngstown.

Cor.
B. 35/36 T. 43 R. 33

Cor.

6-7/17



23663 N950 W1980 SE Cor. Sec. 36-43-33

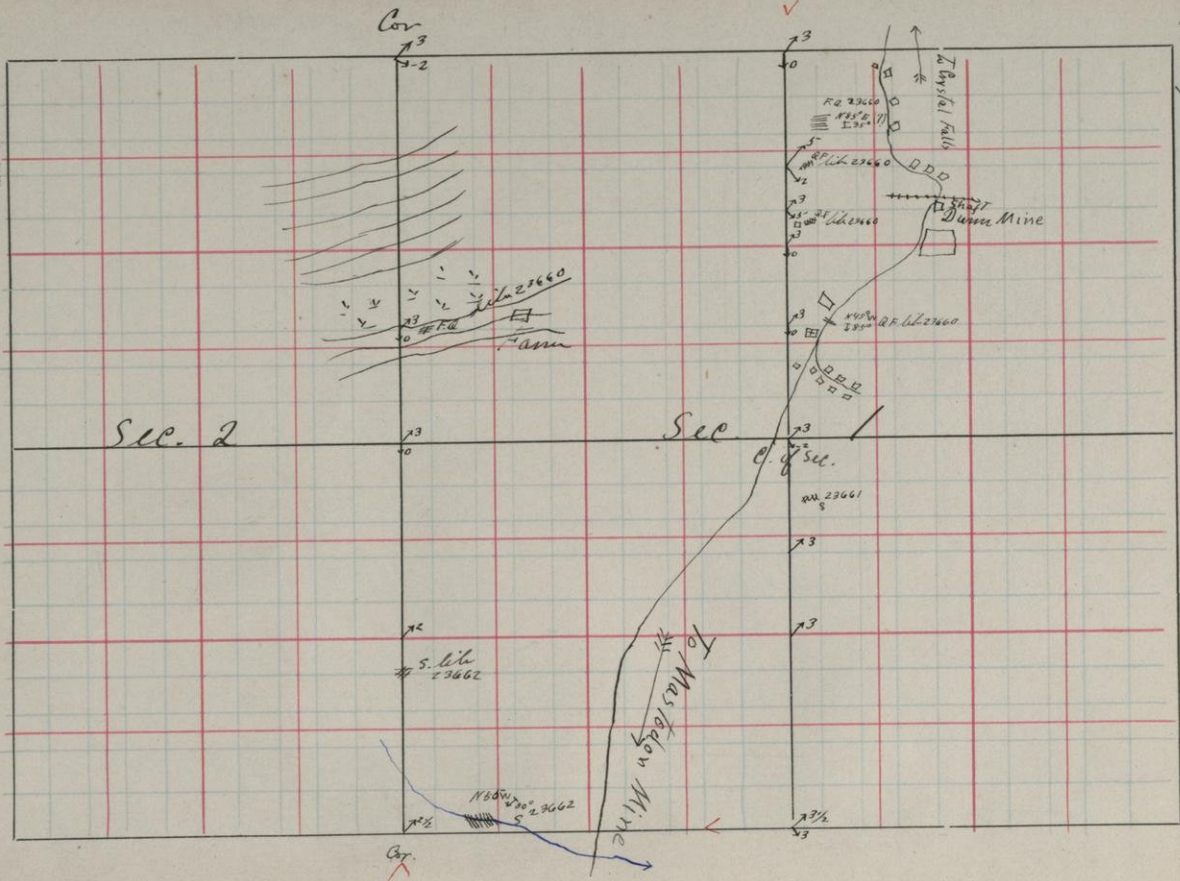
Small exposure of black slate. No strike
nor dip to be made out.

6-747

Cor.
2
2

42 T.

B. 33



23660 N18 40 W 900 SE Cor. Sec. 1-42-33

Exposure of ferruginous quartzite. Strikes N85°E, dips N35° though are not sure of strike and dip on account of broken condition of ledge.

The Drum to the east of this is in this ferruginous quartzite and yields a soft one, non-ferrous of very good quality. Occurs in pockets having no relation to layers of granitoid.

23661 N 860 W 950 SE Cor. Sec. 1-42-33

Surface exposure of black slate. Can't get strike and dip.

23662 N40 W 1770 SE Cor. Sec. 1-42-33

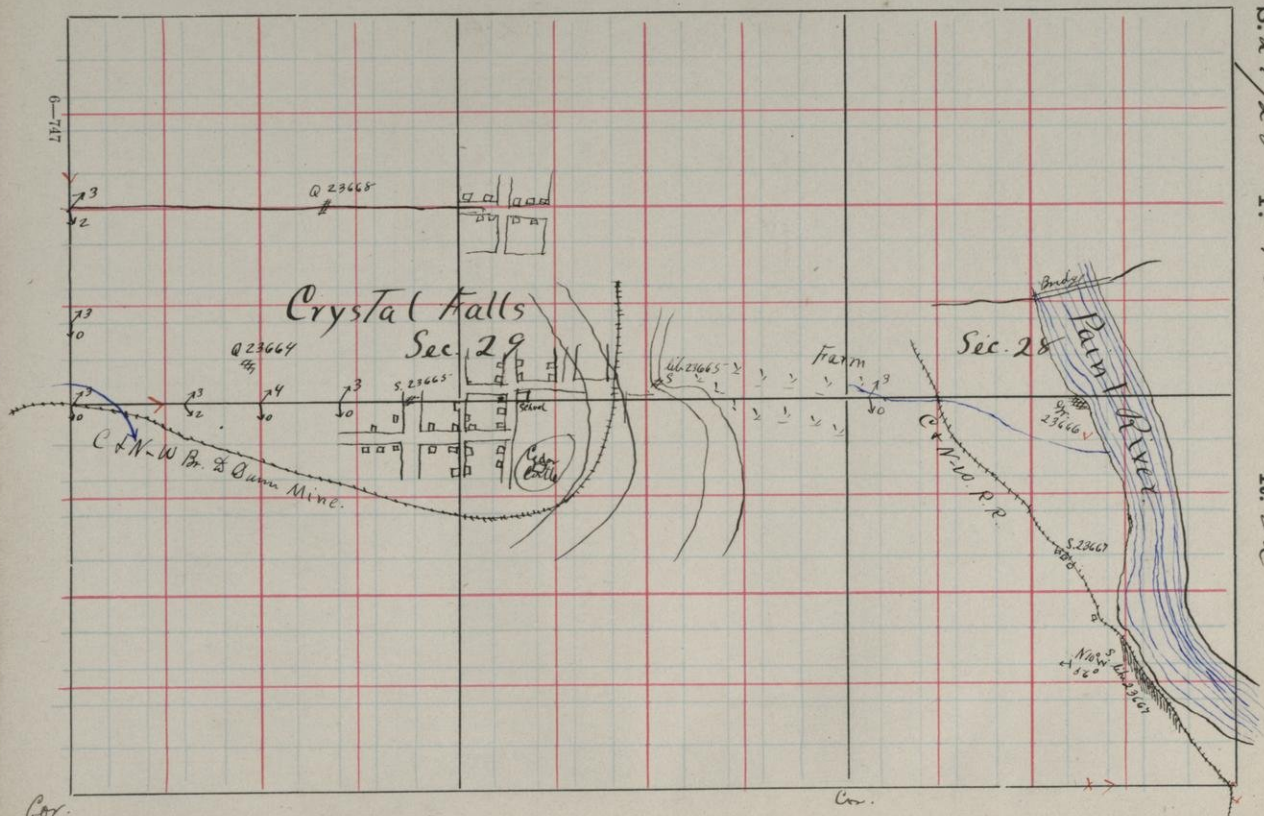
At this point there begins in bank and bed of stream an outcrop of black slate which continues to W about 60 paces. Strike N55°W, dip 80°SW.

Cor.

Cor.

S. 29 T. 43

R. 32



Cor.

Cor.

23664 N1050 W 1520 SE Cor. Sec. 29-43-32

Q Outcrop on W. side of hill, near top, of coarse grey quartzite.

23665 N1000 W 1110 SE Cor. Sec. 29-43-32

S. Small exposure of badly broken, rather, ferruginous, black slate.

23666 N1000 W 1390 SE Cor. Sec. 28-43-32

Gr. Small knob of grey granite on right bank of Parrot river.

23667 N600 W 1400 SE Cor. Sec. 28-43-32

Several ~~expos~~ ^{expos} are found here just on W. side of C. & N. W. R.R. track. The dumps find chiefly grey slate like specimen. In places it is apparently ferruginous and becomes decidedly reddish.

like 23667 N360 W 1225 SE Cor. Sec. 28-43-32

C & N. W. R.R. cuts end of hill and exposes for some distance slate like 23667. In places it is more or less ferruginous. Strike N10°W, dip 56°W.

23668 N1500 W 1355 SE Cor. Sec. 29-43-32

Ledge of ferruginous quartzite in road to Iron Riv. on top of hill just outside of Crystal Falls.

Paint River

S. 32 / 33 T. 43

R. 32

645
2467

To Florence, Wis.

Sand Plain!

Sec. 33

To Crystal Falls

Cor

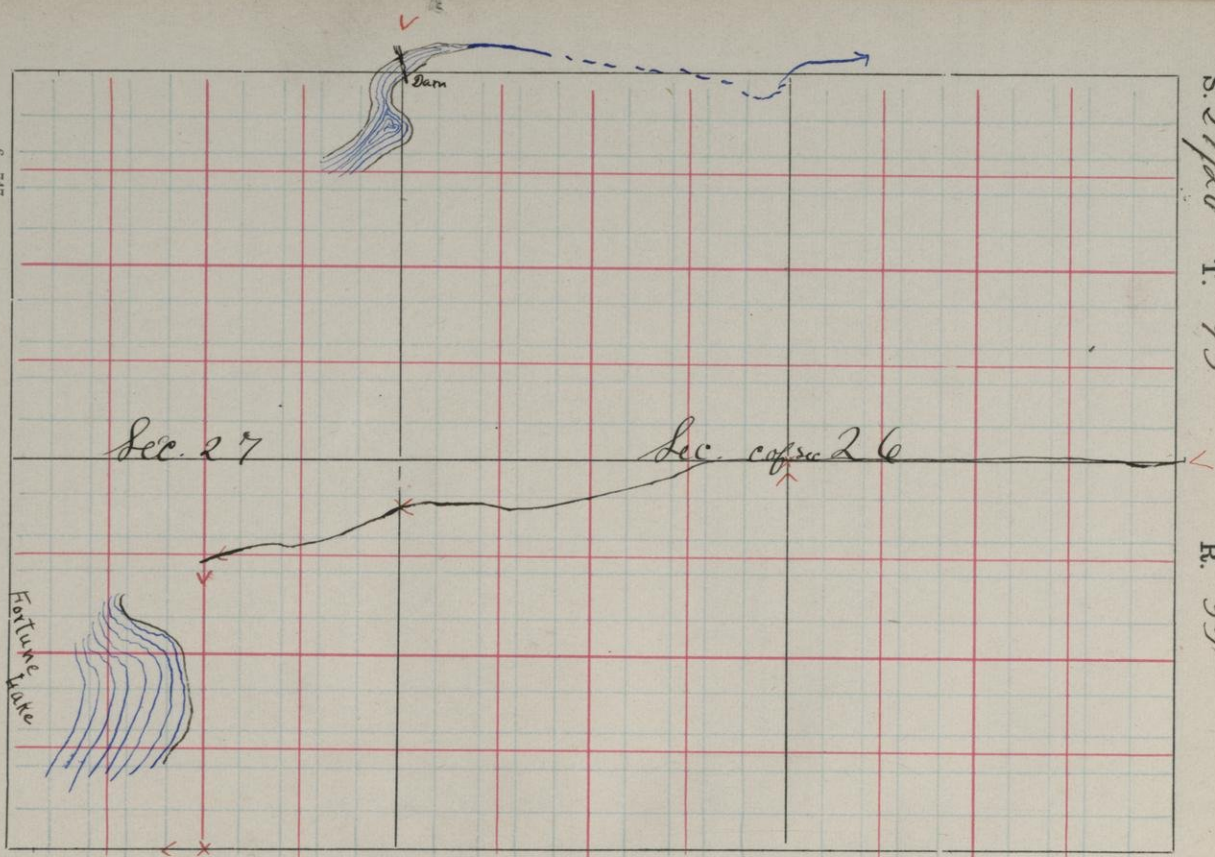
Sec. 32.
C. of Sec.

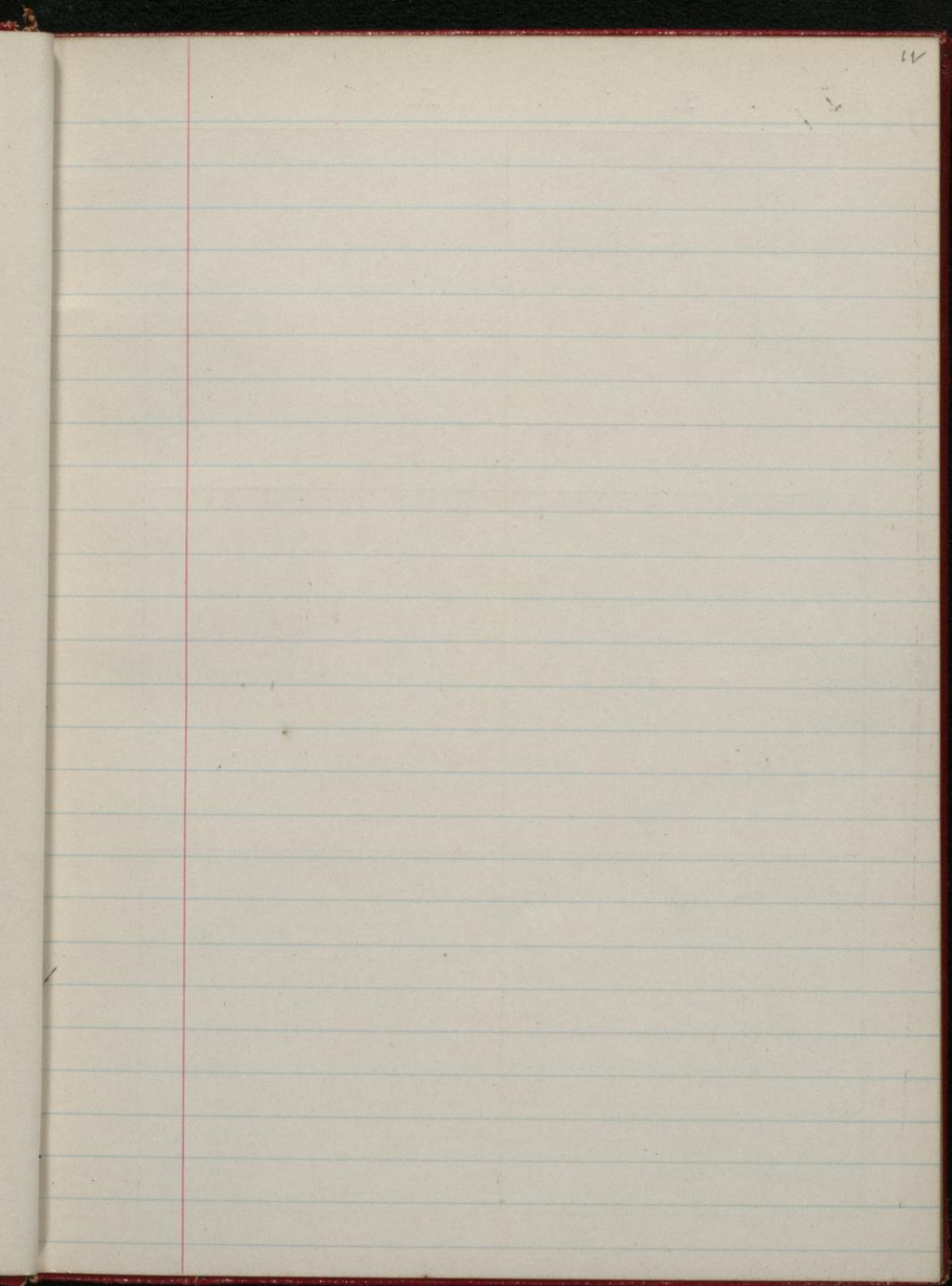
Cor

6-747

S. 27/26 T. 43

R. 33





✓
Cor.

Cor. S2223 T. 43

R. 33

Cor.

Sec. 22

Sec. 23

G. Cop. sec
23669

Wendeman's Note

5.

To Crystal Falls

Quar
Cor.

23669 N 92 5° W 1250 SE Cor. Sec. 23-43-33

Large knob of granstone rises out of
sand plain and extends for 250 feet
to W. of point of location along N side
of a kind of slough.
Shows in places a spheroidal fracturing.

Ln ✓

Ln

S. 15/14 T. 43

R. 33

Sec. 15-

Sec. c of sec 14

Farm

Con

Capital

Ln

6-747

Co.

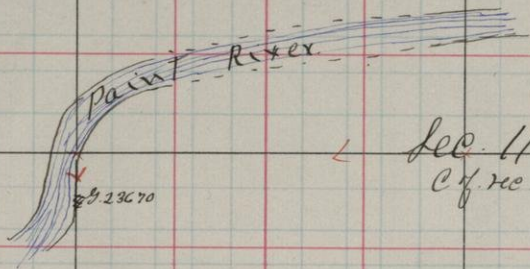
Co.

S. 10/11

T. 43

R. 33

Sec. 10



Sec. 11
C. of. H. C.

Co.

Co.

23670

N 840 W 0 SE Cr. Sec. 10-43-33

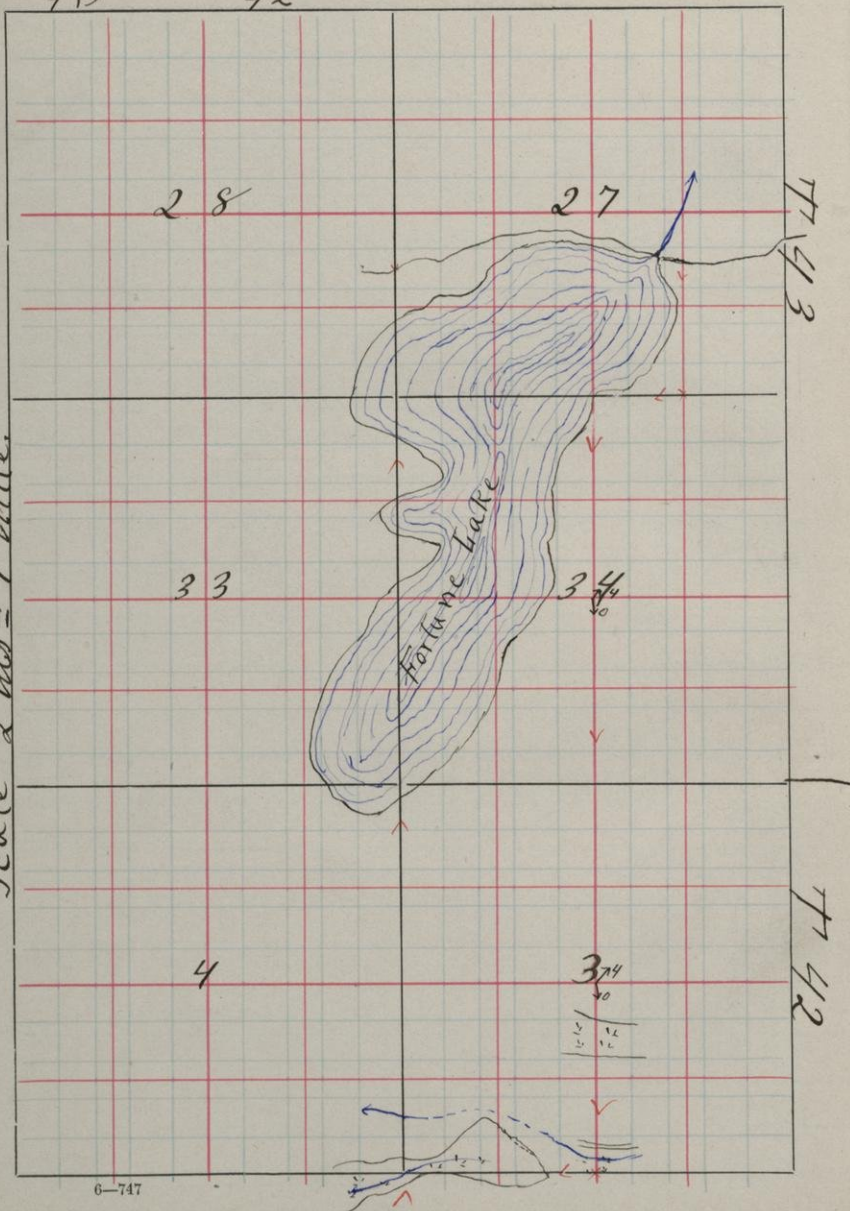
Here occur at this point an outcrop
of dense graystone in right bank of
Paint river.

$$\begin{array}{r} 28 \overline{) 27} \\ 33 \overline{) 34} \\ 4 \overline{) 3} \end{array}$$

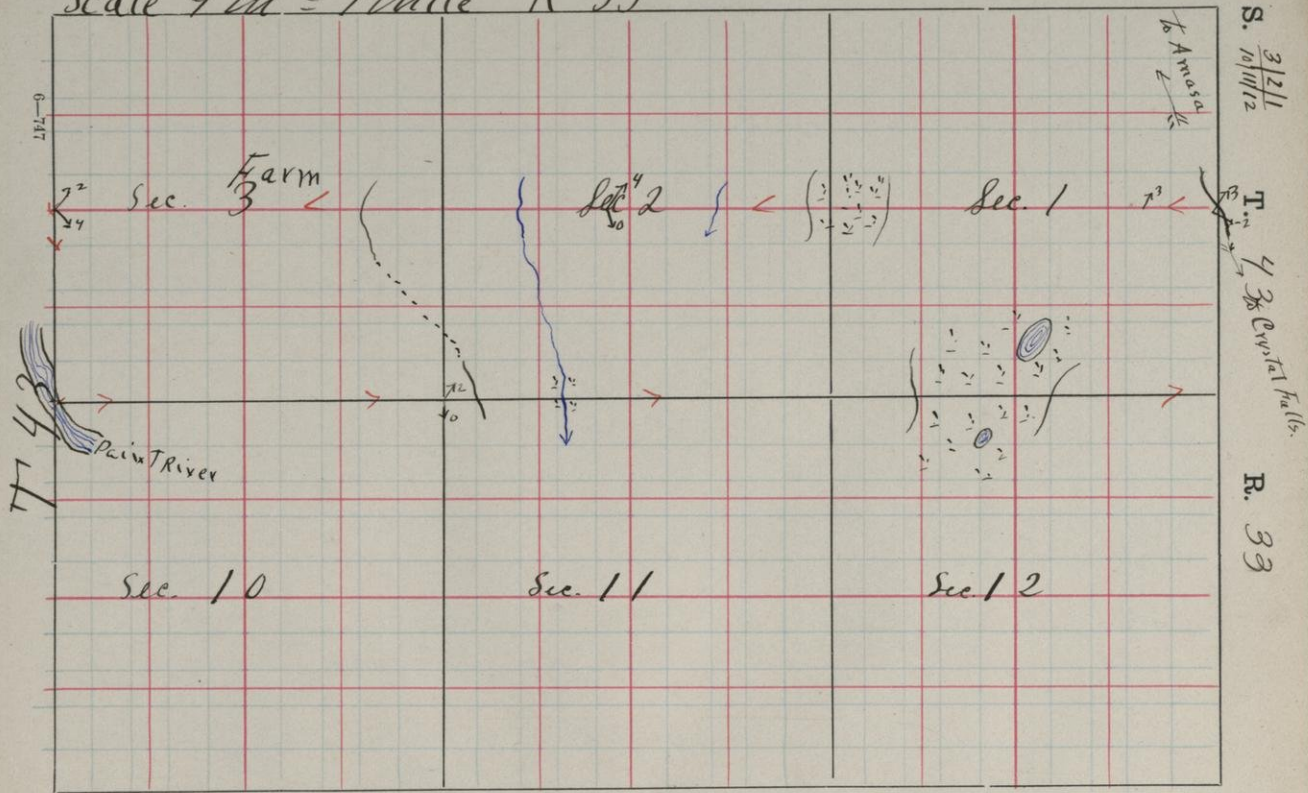
$$T. \frac{43}{42}$$

R. 33

Scale 2 in = 1 Mile.



Scale 4 in = 12 mile R 33



6-747

Cor.

Cor.

S.

29/28

T.

43

R.

33

Cor.

To Crystal Falls.

Sec 28
C of Sec.

Sec. 29

To Iron River

11

Cor.

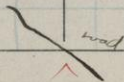
Cor
S. 20/21 T. 43 R. 33
Cor.

0-747

Sec. 20

Sec. 21

road



Co.

S.

17/16

T.

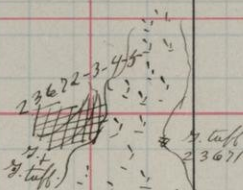
43

R.

33

✓
Co.

xxx 1/2 23670



Sec. 17

Sec. 16
@ of sec

Co

✓

Co

6-747

2367
-6-

2367

23671 N145° W 1075 SE Cor. Sec. 16-43-33

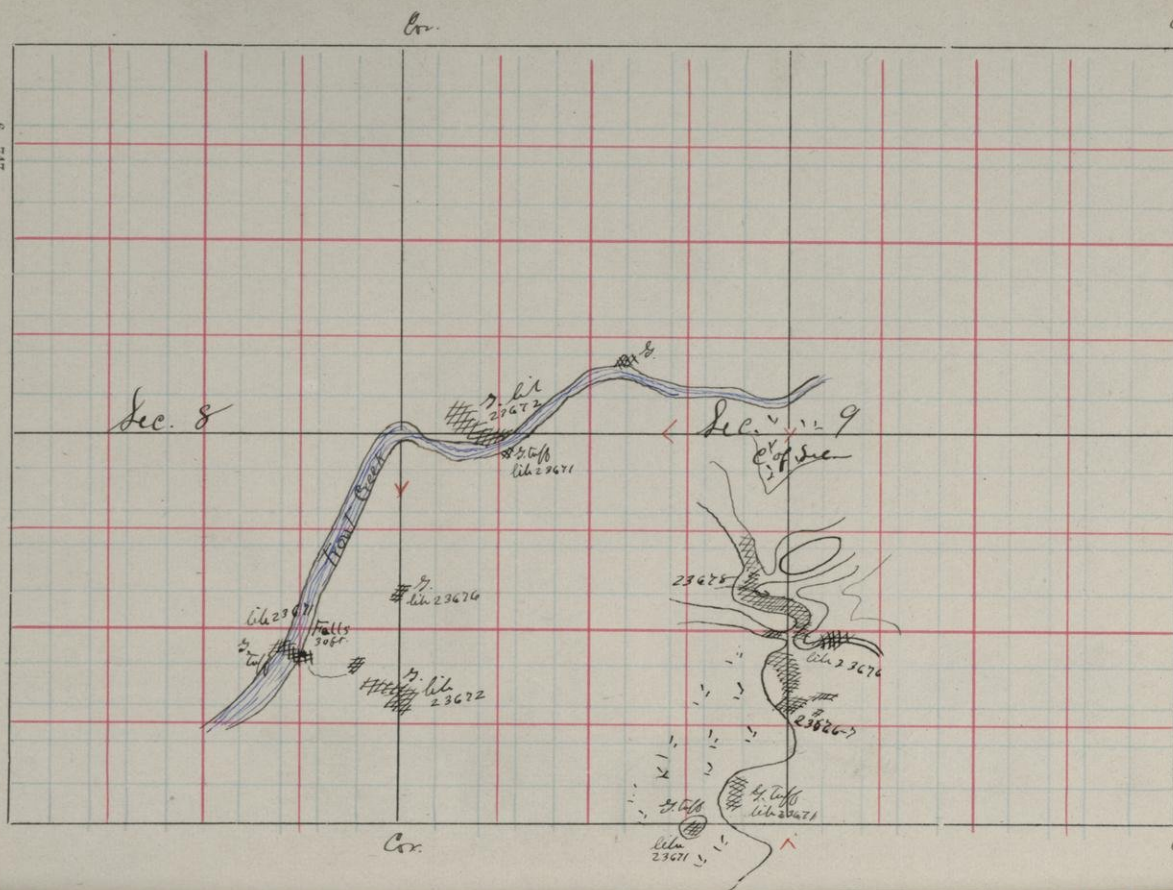
Low outcrop on E side of marsh of greenstone tuff which is very rotten.

23672-3-4 N145° W 1250 SE Cor. Sec. 16-43-33

-5

Just across the marsh from above exposure is a hill of spheroidally fractured greenstone and wave tuff like 23671. Can get no relations between tuff and dense greenstone. The spheroids, of which 23675 is a partial pretty good specimen, vary from 6 in to 8 ft. in diameter and are really flattened or elongated in two directions. The horizontal axes seem to run about NW-SE. In any direction through the rock we thus get elliptical sections. Narrow zone between the spheroids of schistose material. Spec. 23672 is dense core, 23673 is somewhat schistose part between spheroids and 23674 is most schistose portion.

These ledges, exposed by erosion, are surrounded by ridges of drift.



S. 8/4

T. 43

R. 33

like 23670 NO W1200 + N100 W1000 SE Co. Sec. 9-43-39

Exposures of granstone tuff. Fragments are somewhat rounded but not so much it appears to me by H₂O action as by friction at time of ejection perhaps. Moreover can find no indication of sorting of fragments or bedding.

23676-7 N310 W1000 SE Co. Sec. 9-43-39

It looks here as though the granstone tuff to S. graded up into 23676, a fine ash (?), and this in turn is overlaid by 23676 to E. Relations are so obscure that I can make nothing definite out of them.

23678 N590 W0 SE Co. Sec. 9-43-39

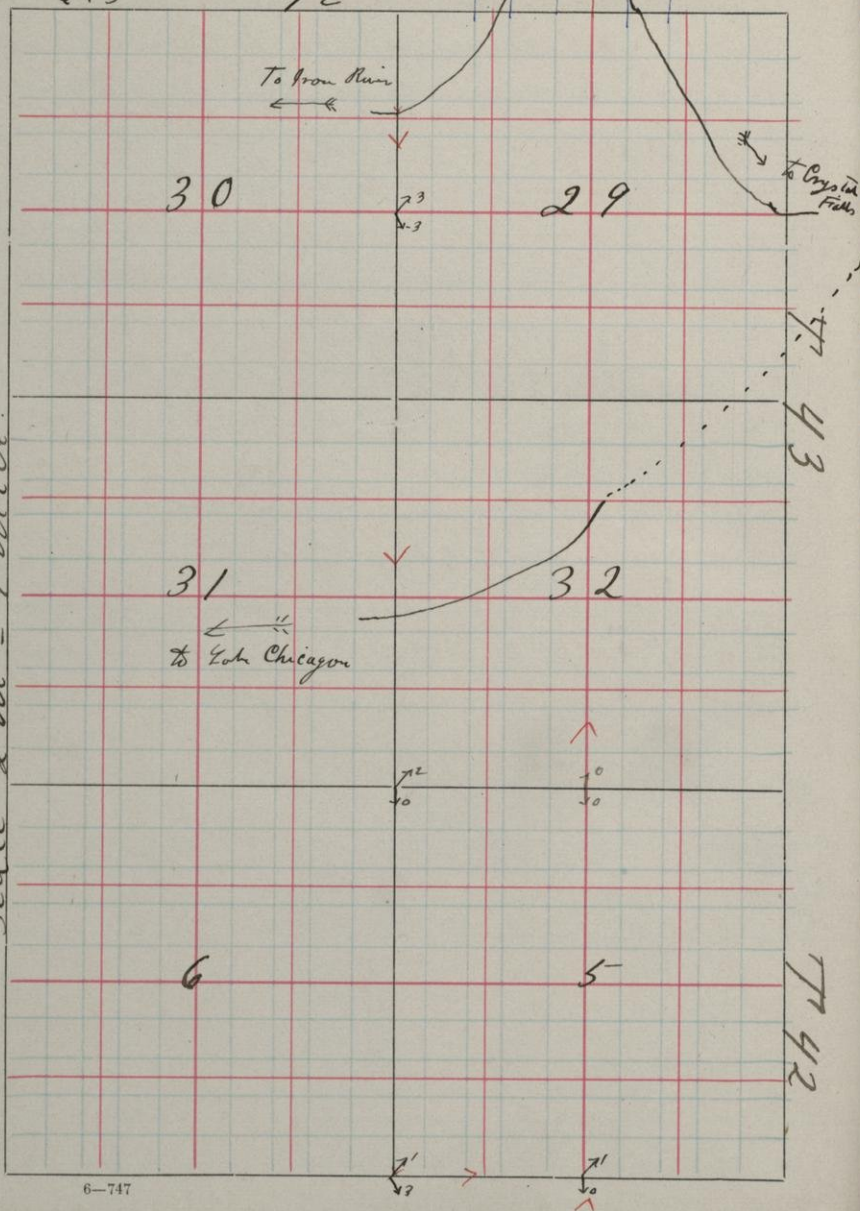
Ridge of aphanitic light gray granstone exposed both to E + W of this point for about 100 feet.

S. $\begin{array}{r|l} 30 & 29 \\ \hline 31 & 32 \\ \hline 6 & 5 \end{array}$

T.

$$\begin{array}{r} 43 \\ \hline 42 \end{array}$$

R.



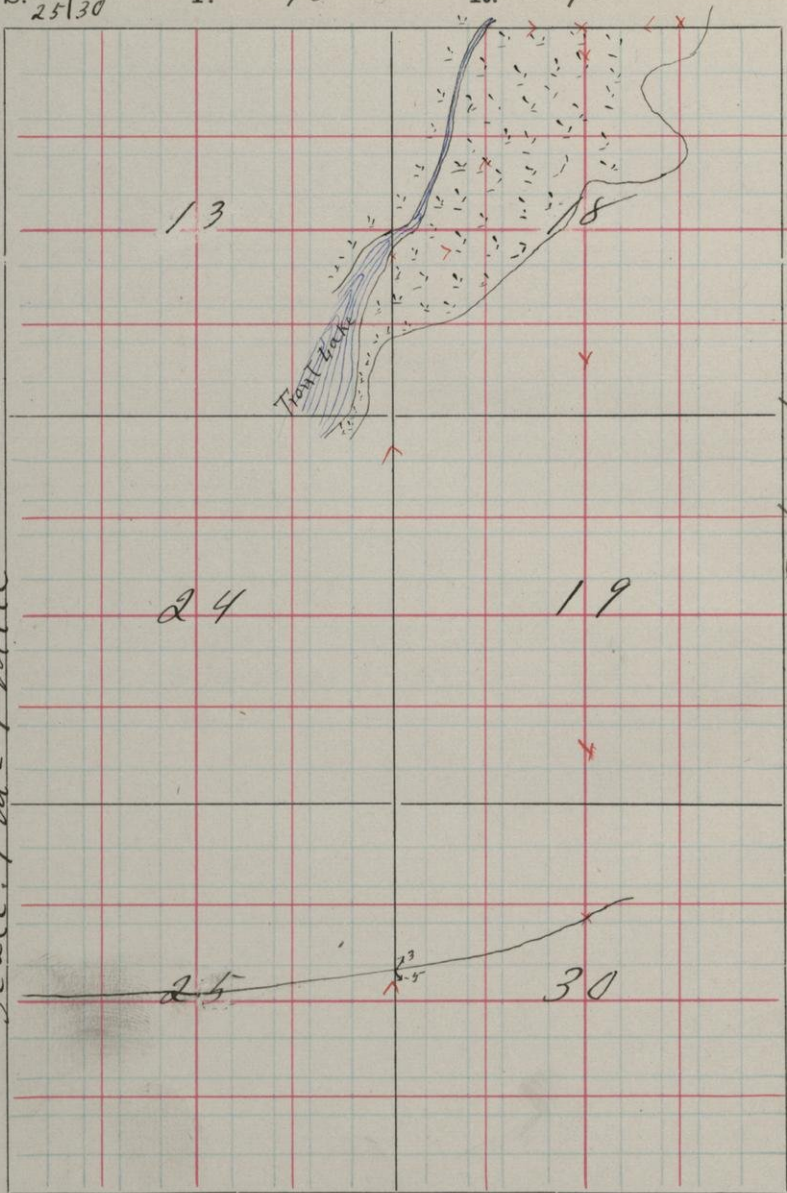
1014
1015

$\begin{array}{r|l} 13 & 18 \\ \hline S. & 24 \end{array} \begin{array}{r|l} 19 \\ \hline 25 \end{array} \begin{array}{r|l} 30 \\ \hline 30 \end{array}$

T. 43

R. 34/33

Scale: 4 in = 1 Mile



T. 43

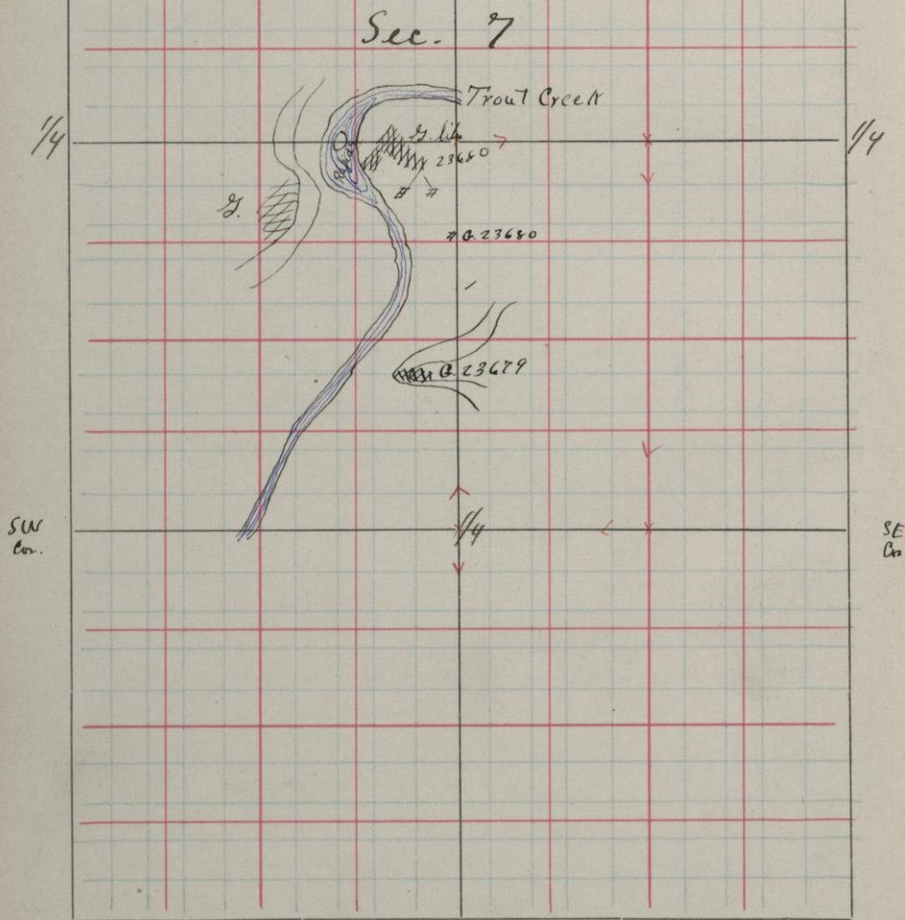
NW
Co.

S. 7

T. 43

R. 33

NE
Co.



23679

N380 W1100 SE Cor. Sec. 7-43-33

Poor exposure on hill of spheroidally fractured,
fine grained, slightly auggdaloidal greenstone

23680

N760 W1010 SE Cor. Sec. 7-43-33

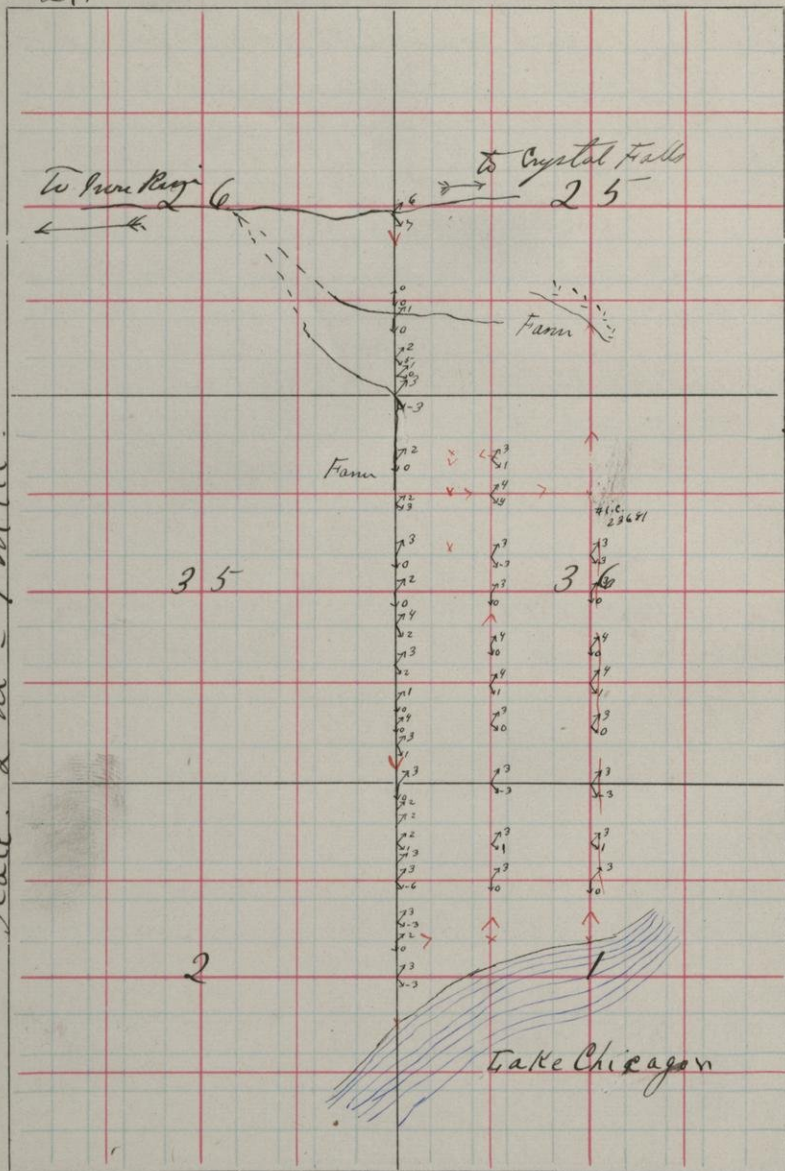
Small ledge of medium grained greenstone

S. $\frac{26}{35} \frac{25}{36}$
21

T. $\frac{43}{42}$

R. 34

Scale: 2 in = 1 Mile.



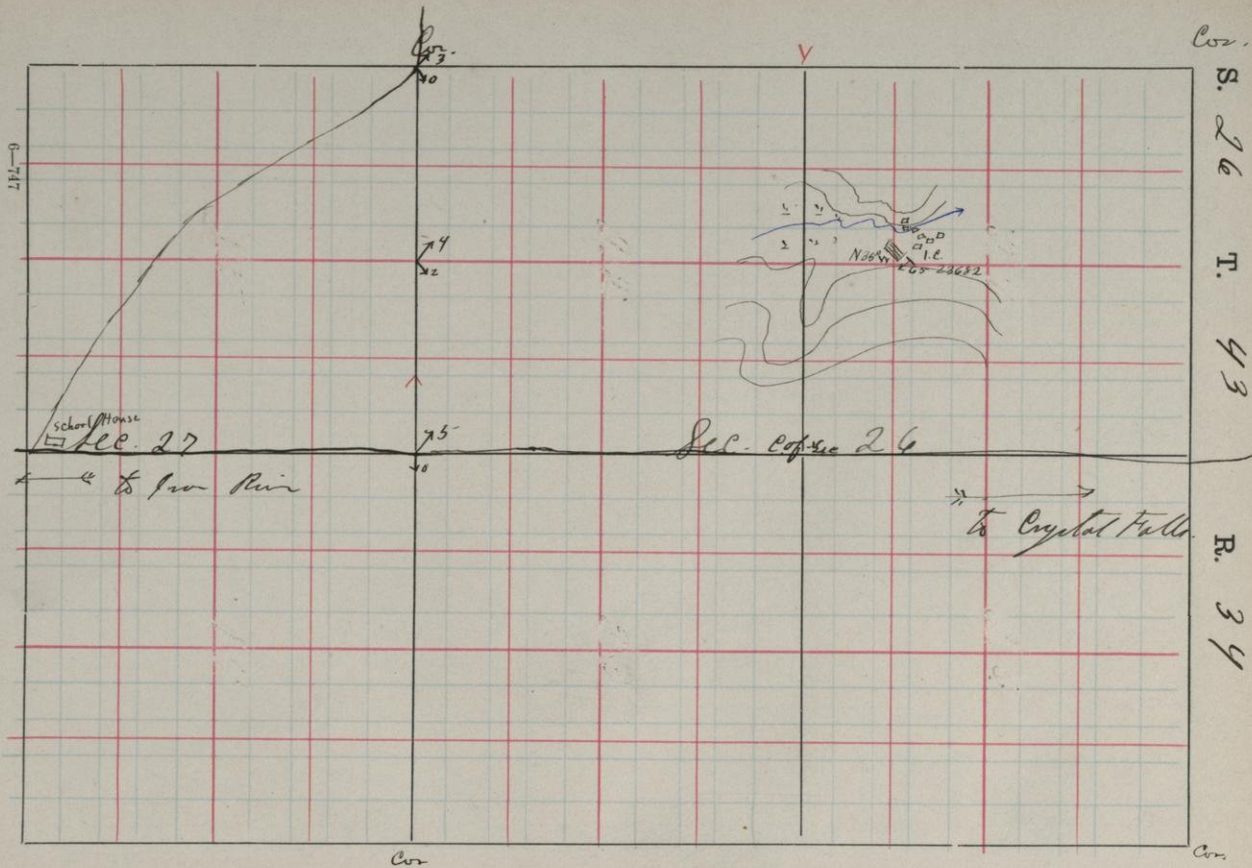
R 34

23681

N 1400 W 960 SE Cor. Sec. 36-43-34

Small outcrop in hardwood forest
of a very ferruginous quartzite about
40 feet long by 15 feet wide.

Can get neither strike nor dip.
Test pits near here but covered in.



Cor. S. 26 T. 43 R. 34

23682 N 1550 W 750 SE Co. Sec. 26-43-34

Open pit which exposes an iron ore, ^{pyrite}.
The only landing is that caused by
the Chert lands. They strike N 35° W and
dip 65° SW.

Several ^{spots} ~~pits~~ around this pit all
have same material on dump.

Find no other exposures near this.

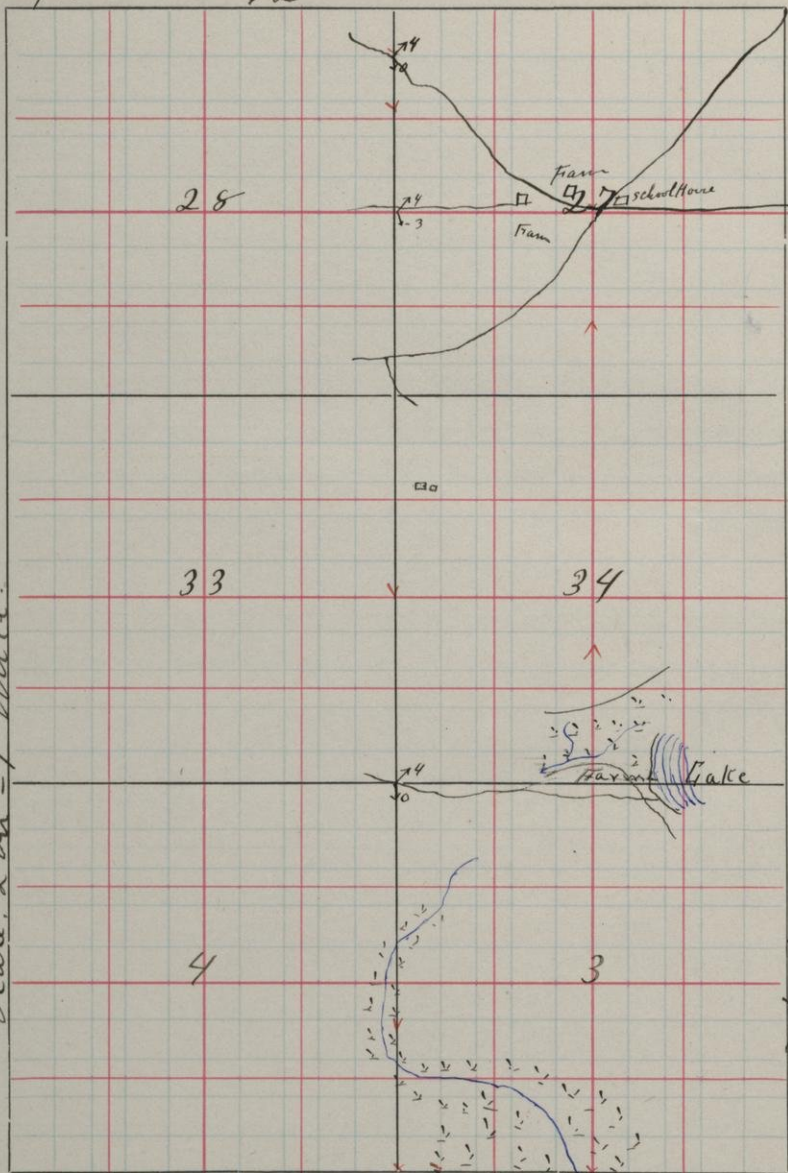
The rather extensive explorations carried on here
were for Wakefield.

S. $\frac{28}{33} \frac{27}{34}$
 $\frac{4}{3}$

T. $\frac{43}{42}$

R. 34

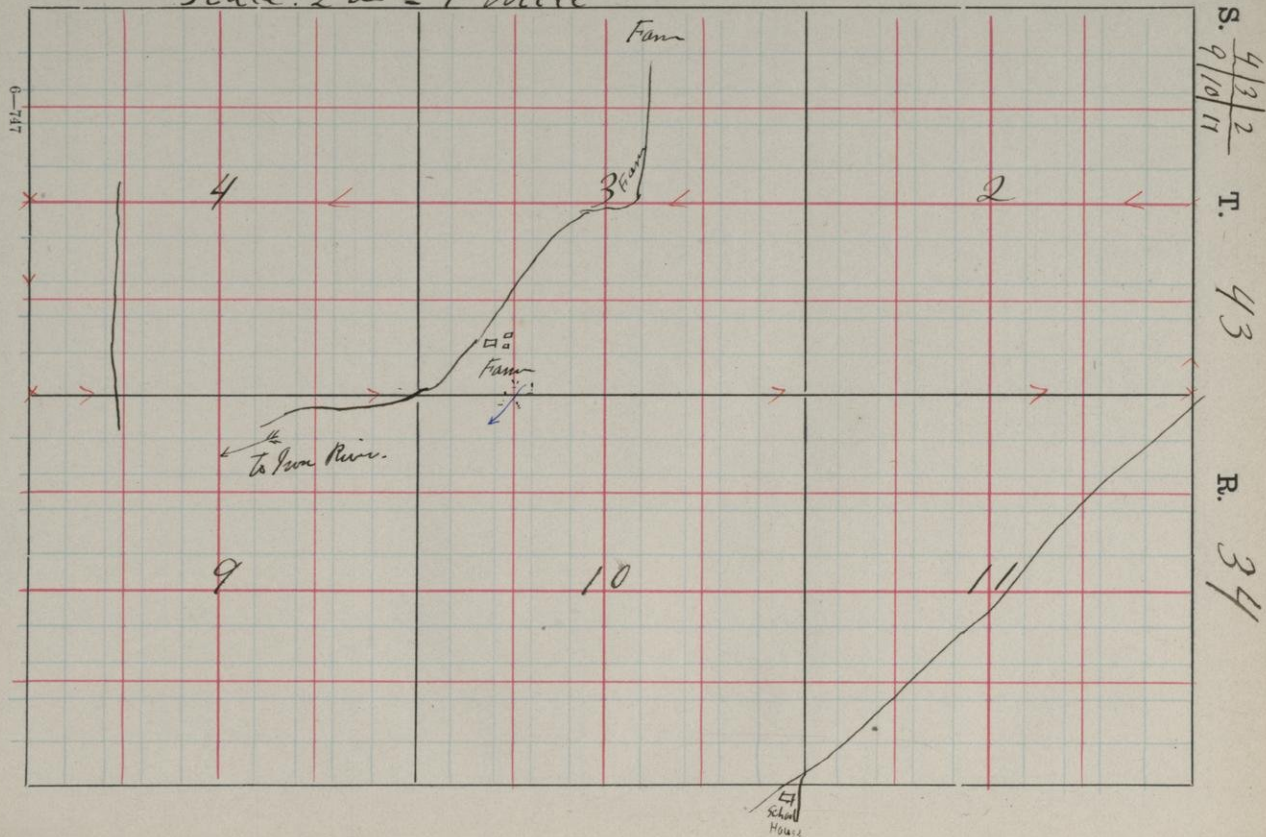
Scale: 2 in = 1 Mile.



6-747

R. 34

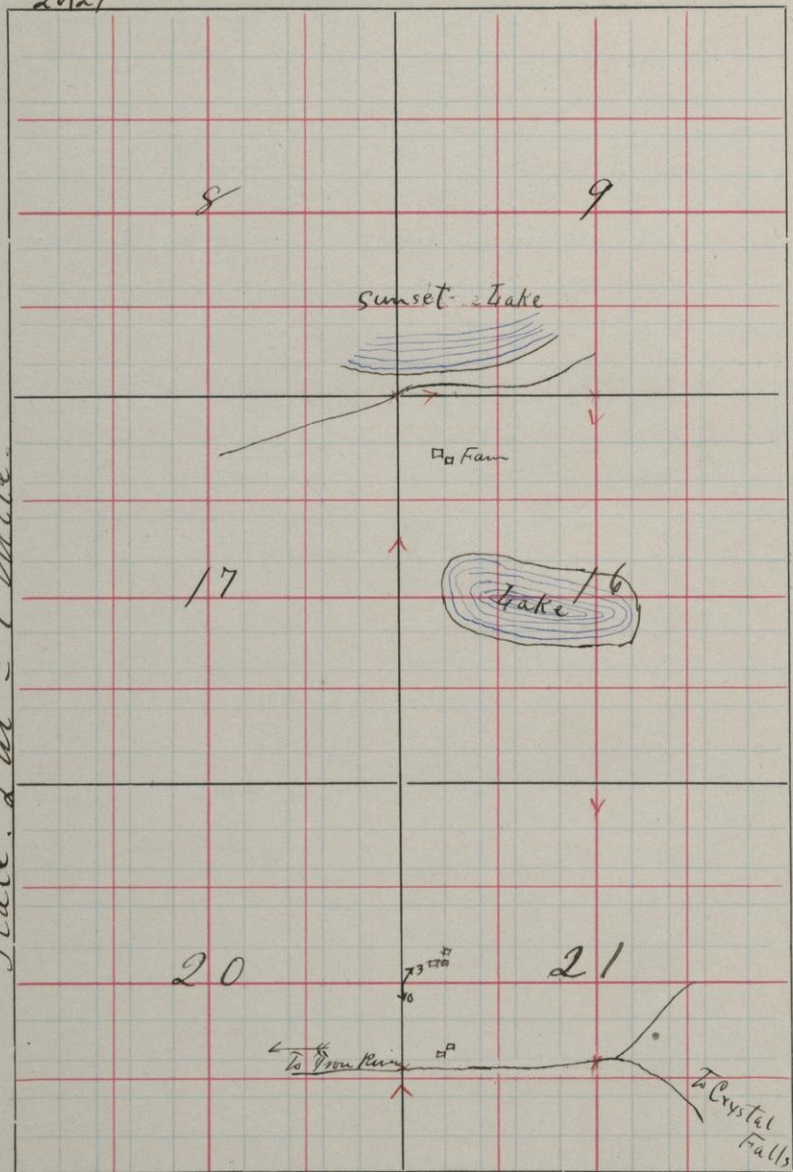
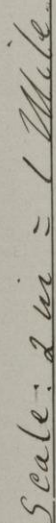
Scale: 2 in = 1 Mile



S. $\begin{array}{r|l} 8 & 9 \\ \hline 17 & 16 \\ \hline 20 & 21 \end{array}$

T. 43

R. 34

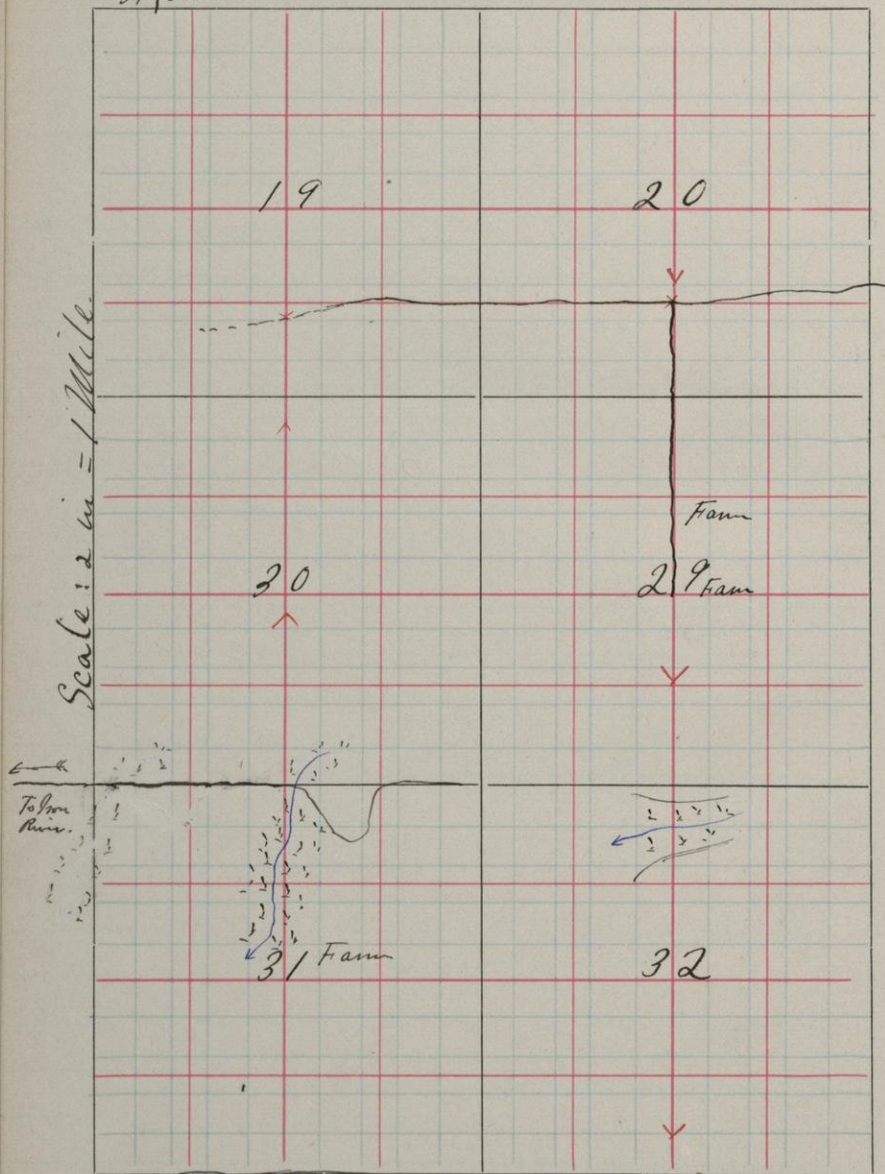


S. $\frac{19}{30} \frac{20}{29}$
 $\frac{31}{32}$

T. 43

R. 34

Scale: 2 in. = 1 Mile.



S. 6/5

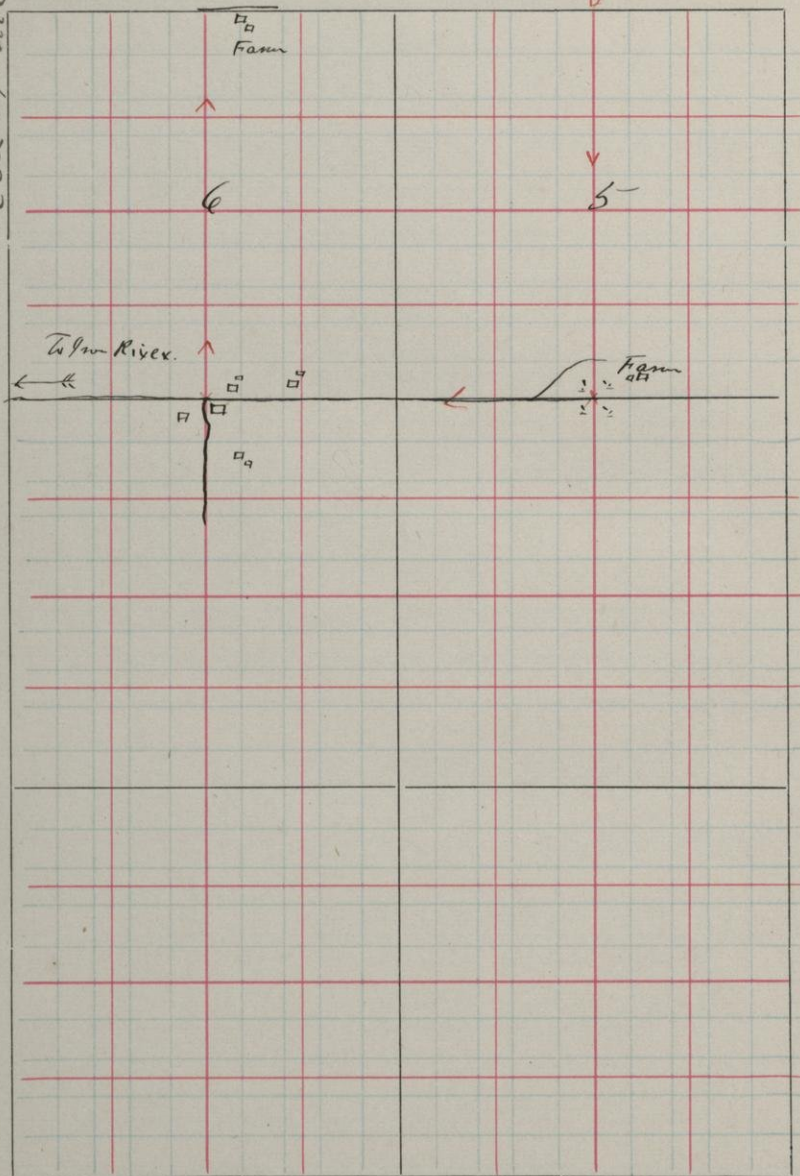
T.

42

R.

34

Scale: 2 in = 1 Mile

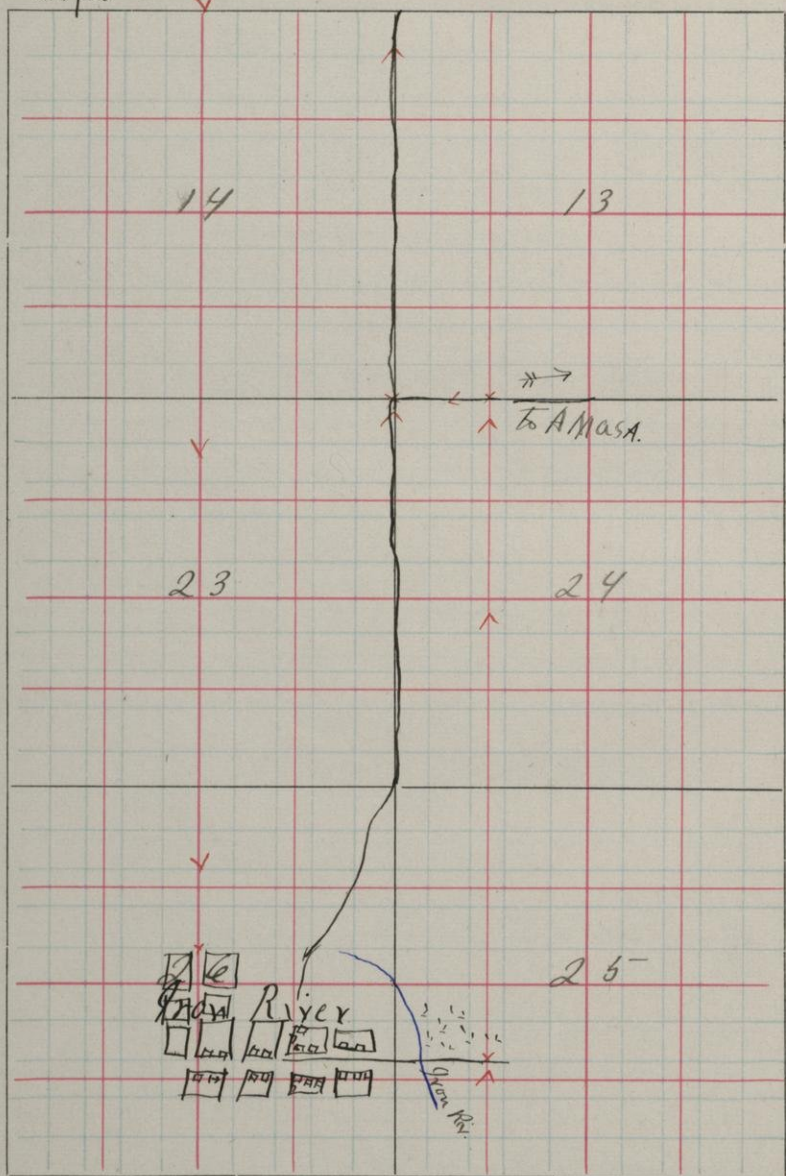


$\frac{14}{23} \frac{13}{24}$
 S. $\frac{26}{25}$

T.

43

R. 35



S. 11/12

T. 43

R. 35-

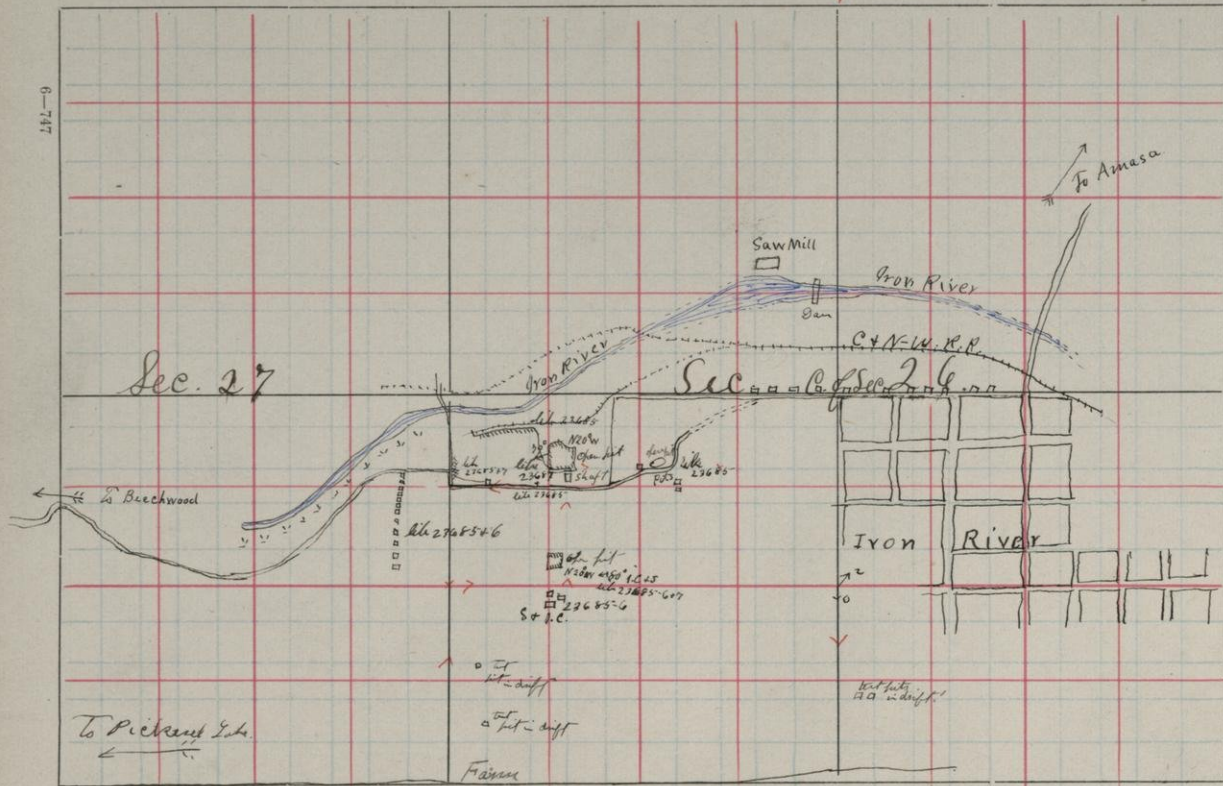
Scale: 2 in = 1 Mi.

11

12

Cor.

6-747



S. 27/26 T. 43

R. 35-

Cor.

23685-6 N480 W1750 SE Cor. Sec. 26-43-35-

Here are 2 deep shafts which have upon dumps a cherty iron ore 23685 and a black slate 23686. The slate weathers very readily and now breaks up easily into very small fragments. Some of it seems to be very rich in iron pyrites.

23687

N560 W1750 SE Cor. Sec. 26-43-35-

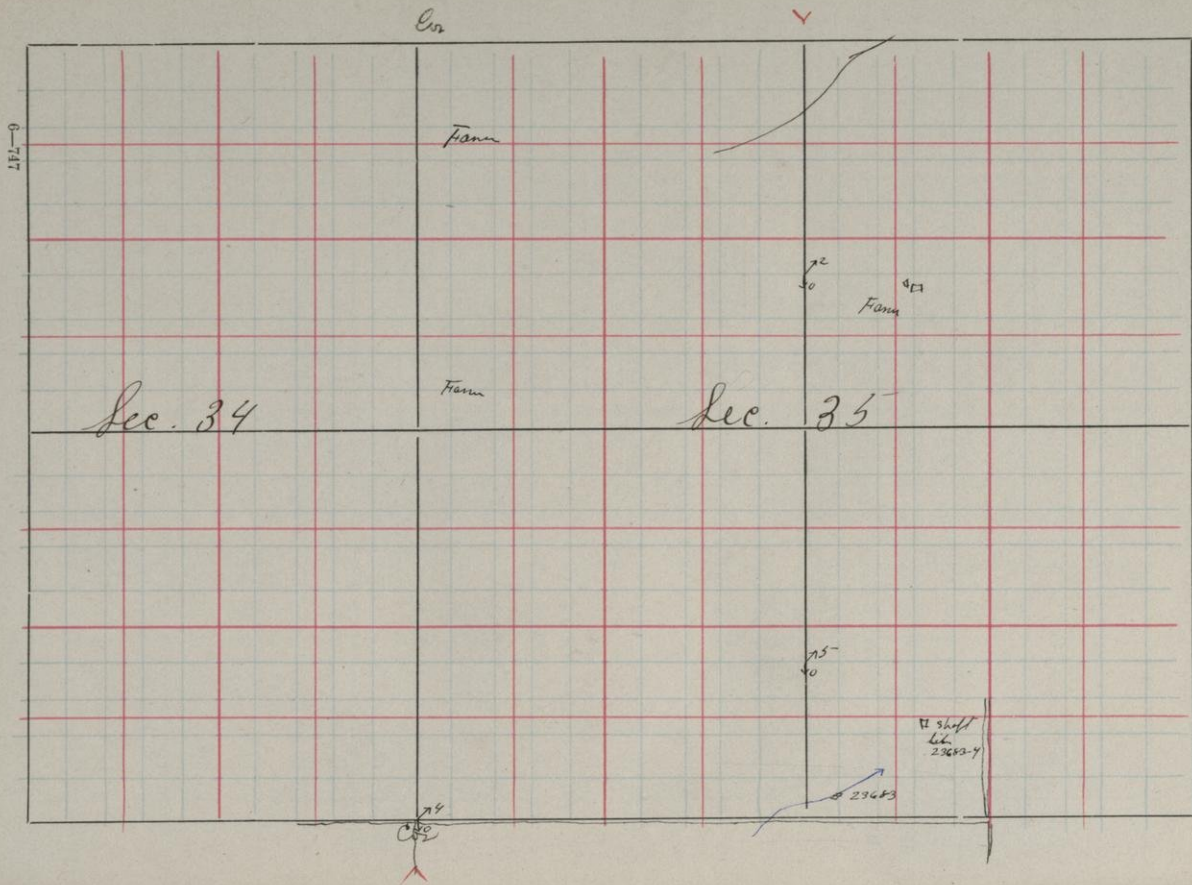
Large open pit in ore like 23685. Pit now full of H₂O. Along one side can be seen some crumpled bands. General strike of which is N20°W dip 80°W. On same wall are patches of dark slate, with which looks like 23686, with sulphate efflorescence upon it. Can not get to this slate but 23687 is a piece from the dump.

N550 W150 SE Cor. Sec. 27-43-35-

Row of twelve test pits in slate like 23686 (blacker gray) and floor ore like 23685.

S. 34/35- T. 43

R. 35-



23683

N60 W 900 SE Cor. Sec. 35-43-35-

Exposure in S bank of brook of Cherty iron ore,
23683. Can get neither strata nor dip.

A shaft has been sunk here and evidently
struck a black slate; it predominates
over the ore on the dump.

Cor. S. 3/2 T. 42 R. 35-

Cor.

23

V

S. 23420
11.1
12.1
13.1

100
100
100

100

100

100

Sec. 3

Sec. 2

Cor. 100
100
100



0-747

23684

N1995 W 1015 SE Co. Sec 2-42-35

Pits in cherty iron ore like 23683 and black slate 23684. The specimen shows very fully the folding of the slate and subsequent infiltration of quartz and consequent filling of the cavities at the summit of fold caused by stretching and imperfect readjustment of particles.

S. $\begin{array}{r|l} 8 & 9 \\ 17 & 16 \\ \hline 20 & 21 \end{array}$

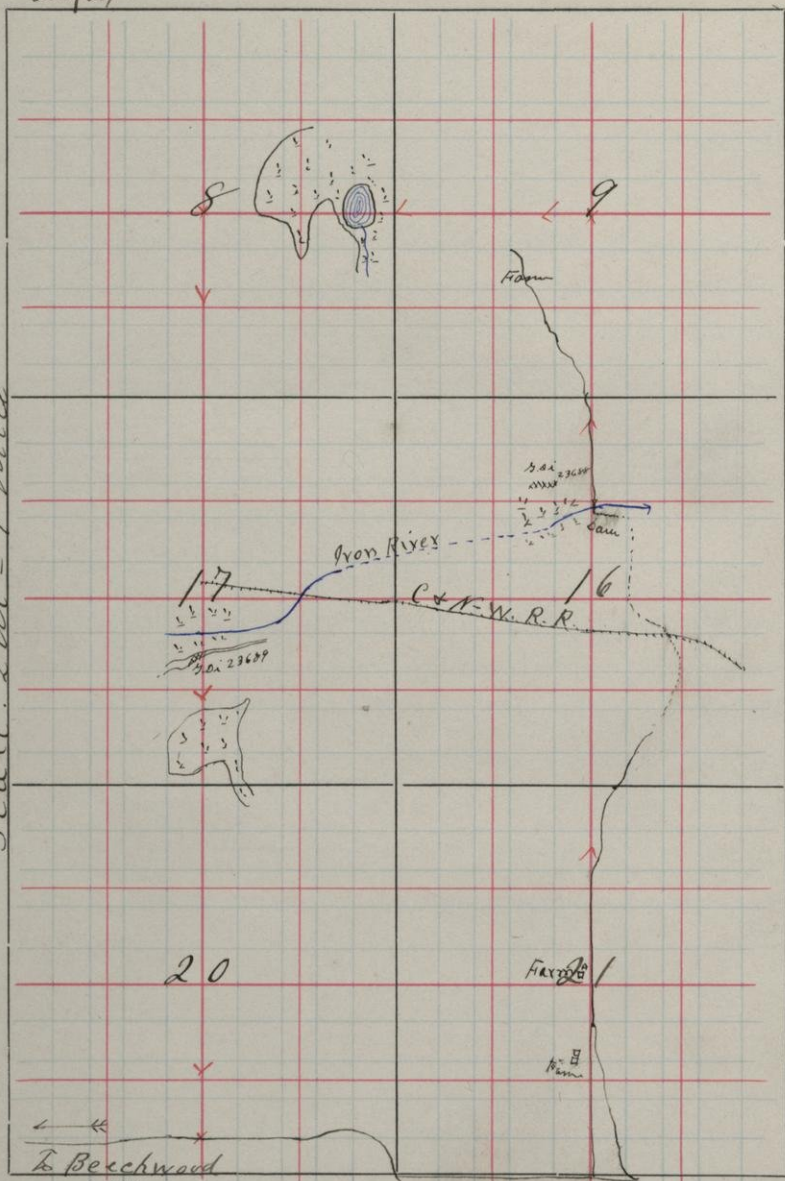
T.

43

R.

R. 35-

Scale: 2 in = 1 Mi



23688

N1600 W225 SE Cor. Sec. 16-43-35-

Exposure about 75 feet long S-W of dense
granite on N bank of Iowa River.

23689

N575-W1010 SE Cor. Sec. 17-43-35-

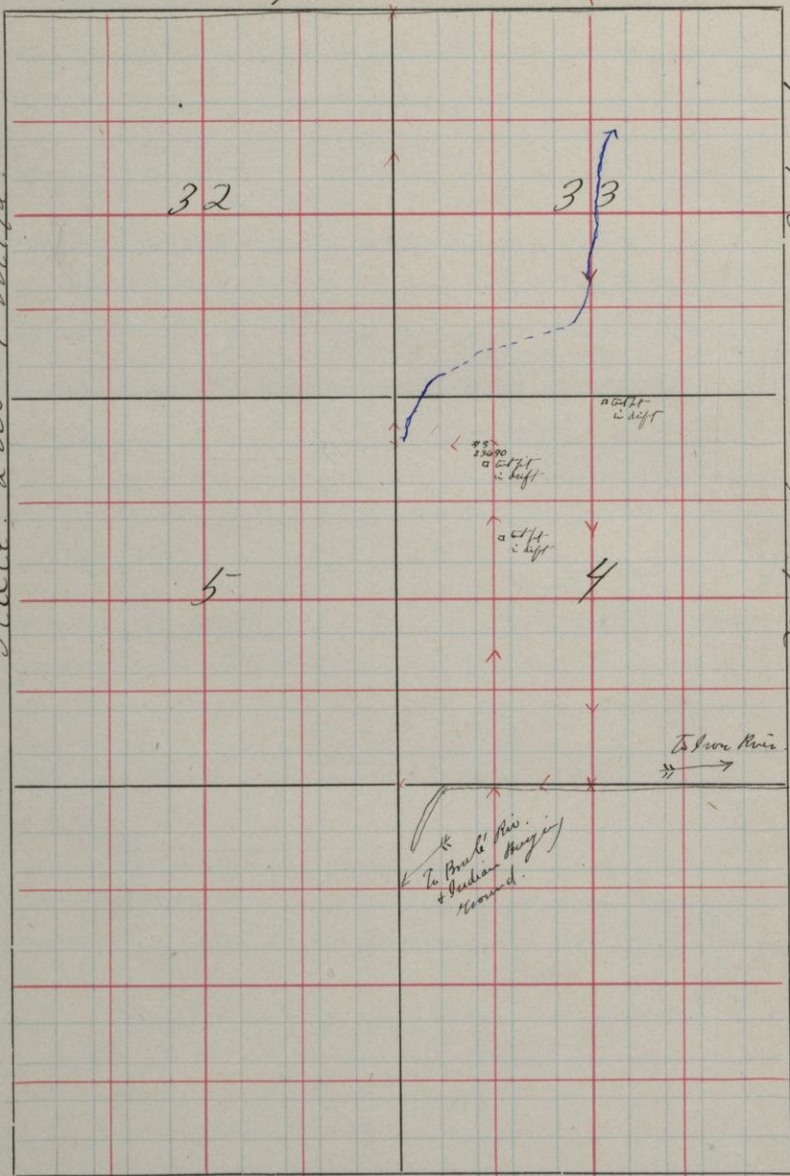
Outcrop of rather fine grained diabase
on N face of hill bordering swamp along
south bank of Iowa River.

S. $\frac{32}{5} / \frac{33}{4}$

T. 5 $\frac{43}{42}$

R. 35-

Scale: 2 in = 1 Mile.



6—747

R. 35-

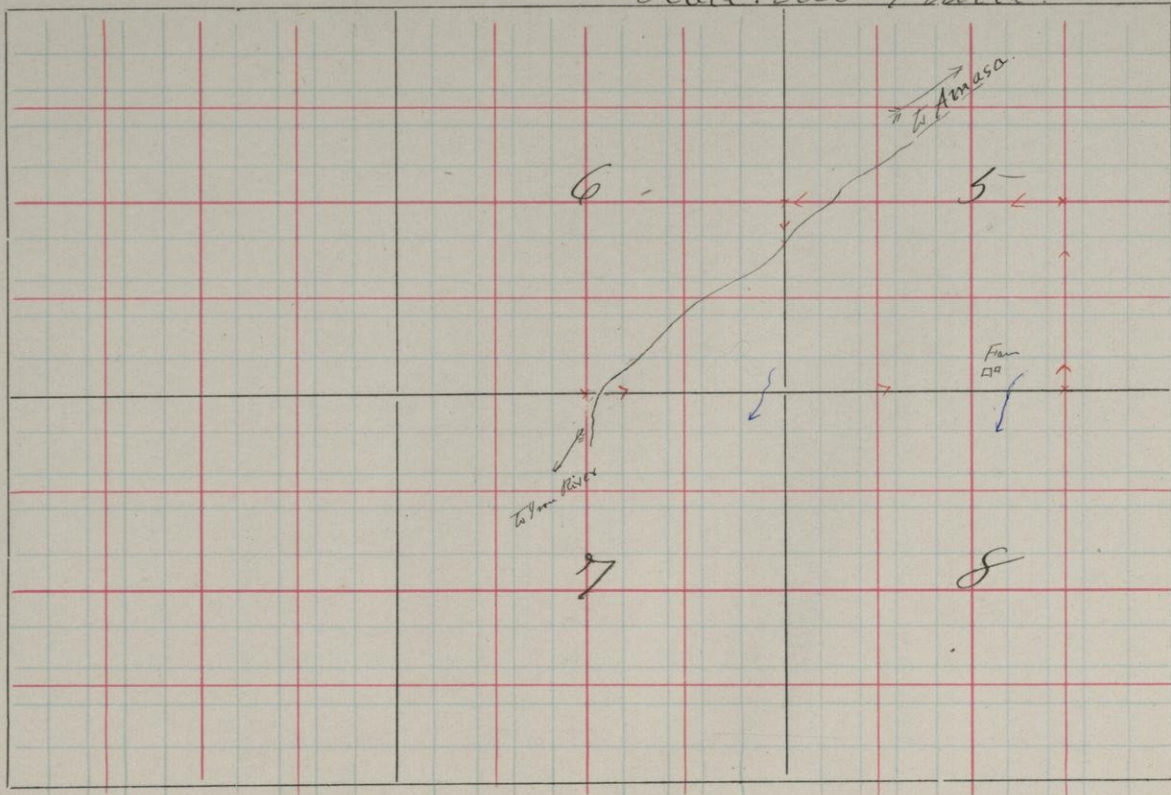
23690

N1800 W1600 SE Cor. Sec. 4-42-35-

Test pit with a rotten, black, slightly ferruginous
slate on dump. Found no ostracods near
here and needle shows no variation on the run.

S. $\begin{array}{r} 30 \overline{) 29} \\ 31 \overline{) 32} \\ 6 \overline{) 5} \end{array}$

Scale: 2 in = 1 Mile.



S. $\frac{6}{7}$ $\frac{5}{8}$

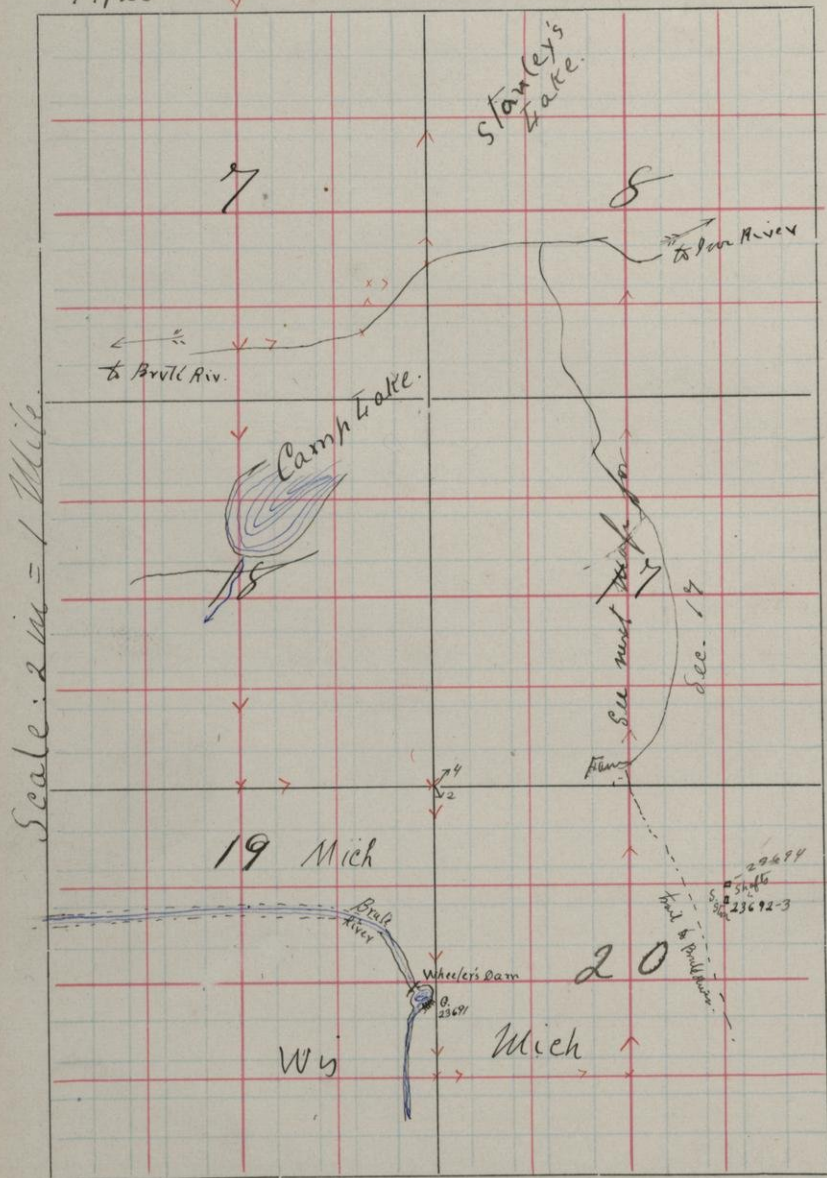
T. 43

R. 34

S. $\begin{array}{r} 7/8 \\ 18/17 \\ 19/20 \end{array}$

T. 42

R. 35 -



23691 N 900 W 30 SE Cor. Sec. 19-42-35-
Exposure in river bank just below dam of
spheroidally fractured amygdaloidal granitoid.

23692-3 N 1400 W 500 SE Cor. Sec. 20-42-35-
Brownish sandstone from shaft 114 ft deep.
Sandstone is said to have been underlain
by red soap rock ^{like 23698} and to have been
horizontal.
23693 is said to be below the soap rock.

23694 N 1500 W 500 SE Cor. Sec. 20-42-35-
Deep shaft with slate like specimen on dump.
Shaft is said to have passed through sandstone
like 23692 and then to have entered the
slate. The soap rock seems to be merely a
^{rather} ferruginous phase of this slate.

23695-6 N 1960 W 500 SE Cor. Sec. 20-42-35-
Near fine spring at this point are found innume-
rable large boulders of coarse sandstone like 23695 with
pebbles of chert, really a conglomerate. 23696 is such a
chert pebble.

Descending hill we pass over rock like
23697 in numerous exposures and boulders.

23697 N 75° W 525° SE Cor. Sec. 17-42-35-
cor.

S. 17 T. 42

T. 42

R. 35-

NW
Co.

NE
Co.

SW Con

SE C.

2
2 Wheelers Dam
on Brule River.

Farm

6—747

23697

N75 W 52 5 SE Cor. Sec. 17-42-35

Cliff of a ~~thrust~~ conglomerate, in places almost a red chert. quartzite. It extends for over $\frac{1}{4}$ mile to W. around N face of hill.

23698

N175 W 52 5 SE Cor. Sec. 17-42-35

Lower down at foot of hill on some pits which have the red slate (waspstone) 23698 on dumps.

23699

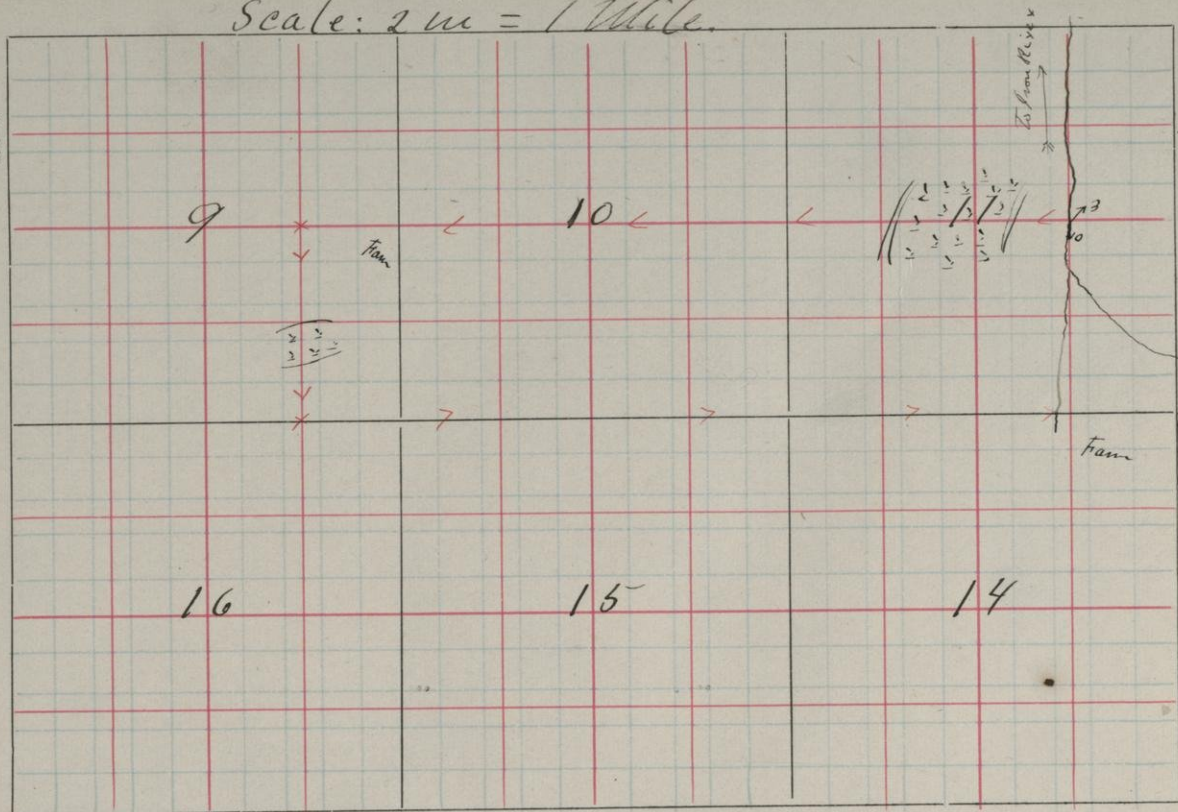
N300 W 1000 SE Cor. Sec. 17-42-35

Cliff of rock 23699. Here is found also the phase of 23697 which is fully as common as 23699.

It seems to me as though the succession of rocks here (according to the exposures found in Sec. 17 + 20-42-35) is as follows, in ascending order. The black quartzite 23693 overlaid by slate like 23694 in places ferruginous then like 23695. Over this lies next horizontally a sandstone 23692 which is in its turn ^{probably} overlaid by 23697+9. Highest number is the sandstone, in places conglomerate, 23698 with pebbles of 23696 in it. I think it very probable that this last sandstone is Potsdam if the others are not also. In no place could I get strike or dip.

Scale: 2 in = 1 Mile.

6-747



S. 9/10/11
10/13/14

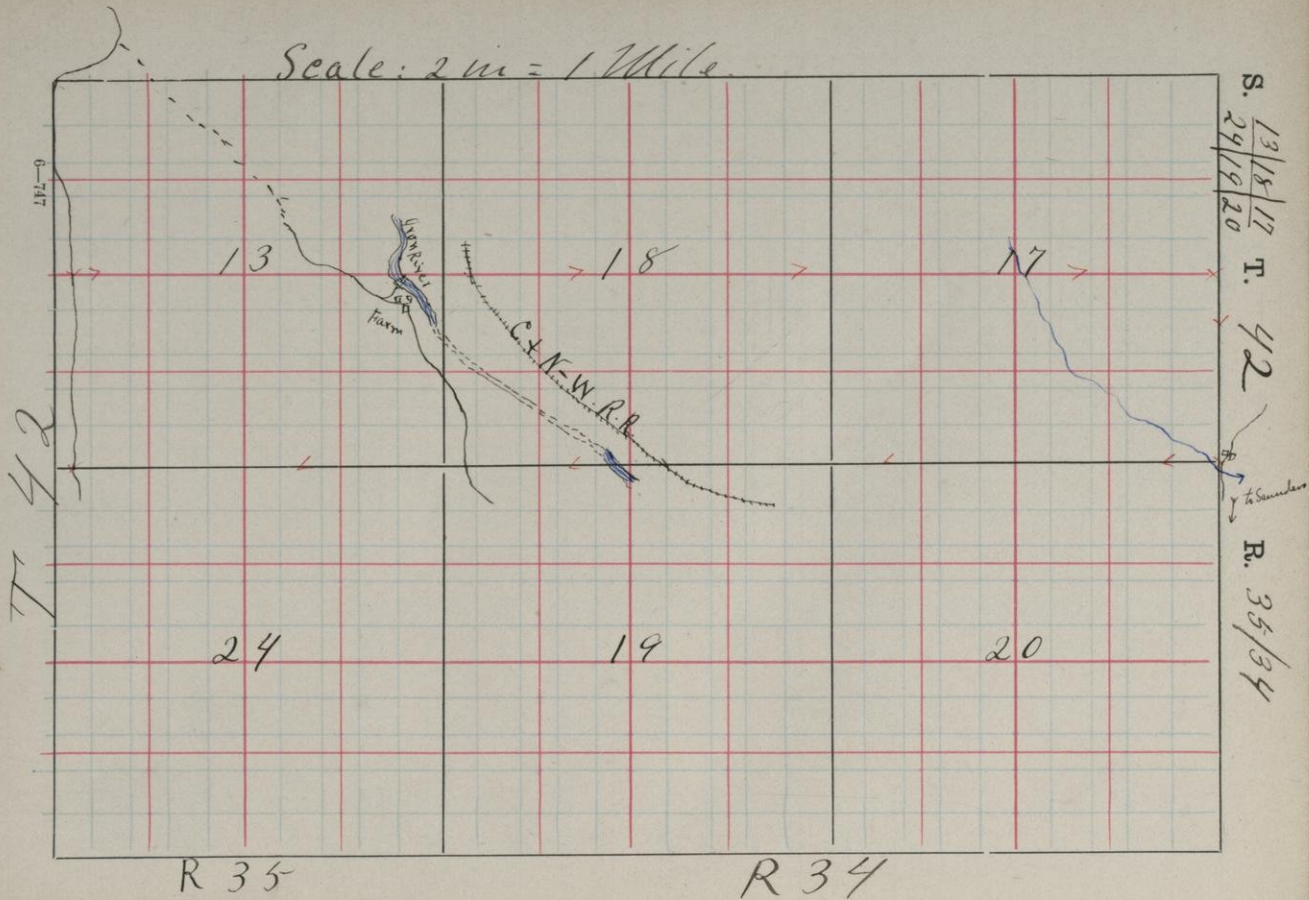
T.

42

R.

35-

Scale: 2 in = 1 Mile



S. $\frac{22}{27} \frac{23}{24}$

T. 42

R. 35-

Scale: 2 mi. = 1 in.

23762

G. 23700-1

22

23

27

26

Brule River

Fram
Ca

23700-1

N 47 1/2° W 1875 SE Cor. Sec. 22-42-35-

Ledge of dense granitoid. Spheroidal fracturing poorly but plainly developed. General direction of long axes of spheroids $W 20^{\circ} S$.

Immediately to the W. of above location and separated from 23700 by only a few feet - practically a continuous outcrop - occurs a schistose tuff 23701. Schistosity strikes $W 10^{\circ} S$ and dips about $80^{\circ} S W$.

23702

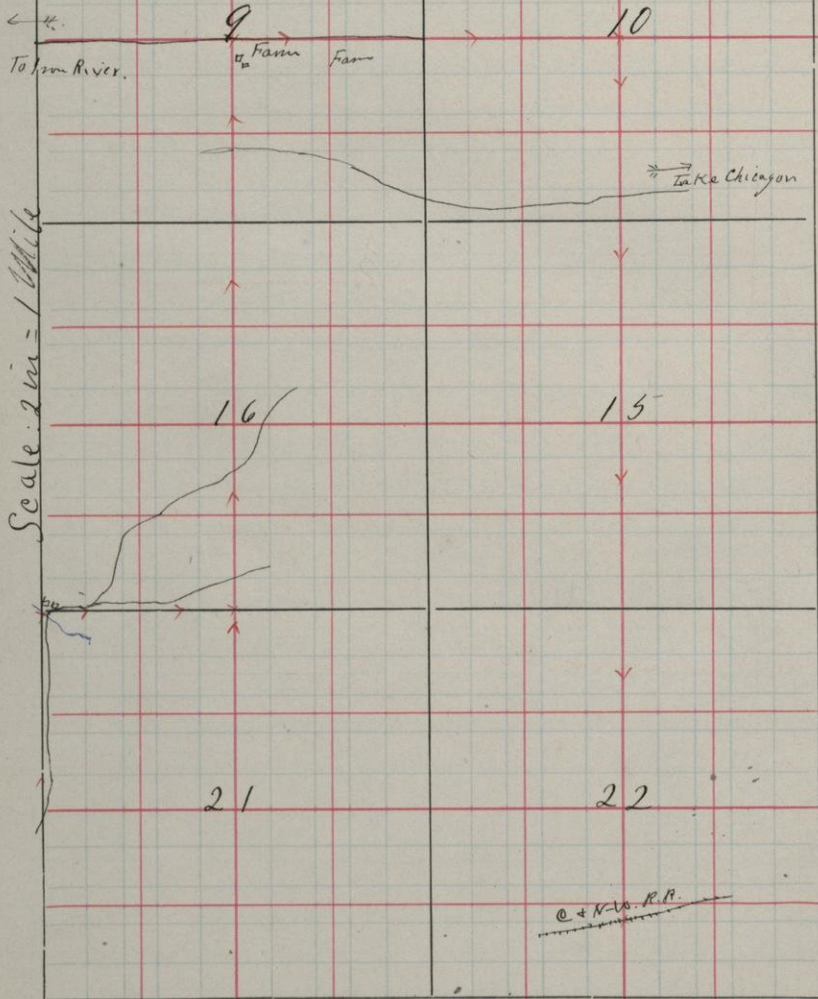
N 57 1/2° W 0 SE Cor. Sec. 21-42-35-

Continuing from last location above and on at least 250 paces west of this point is found a granitoid tuff like specimen. Fragments seem to be more predominant in this tuff than in 23701. Can not separate the outcrops in the field. Dip & strike of schistosity $W 10^{\circ} S$, dip $80^{\circ} S W$.

S. $\frac{9}{16} \frac{10}{15}$
21/22

T. 42

R. 34



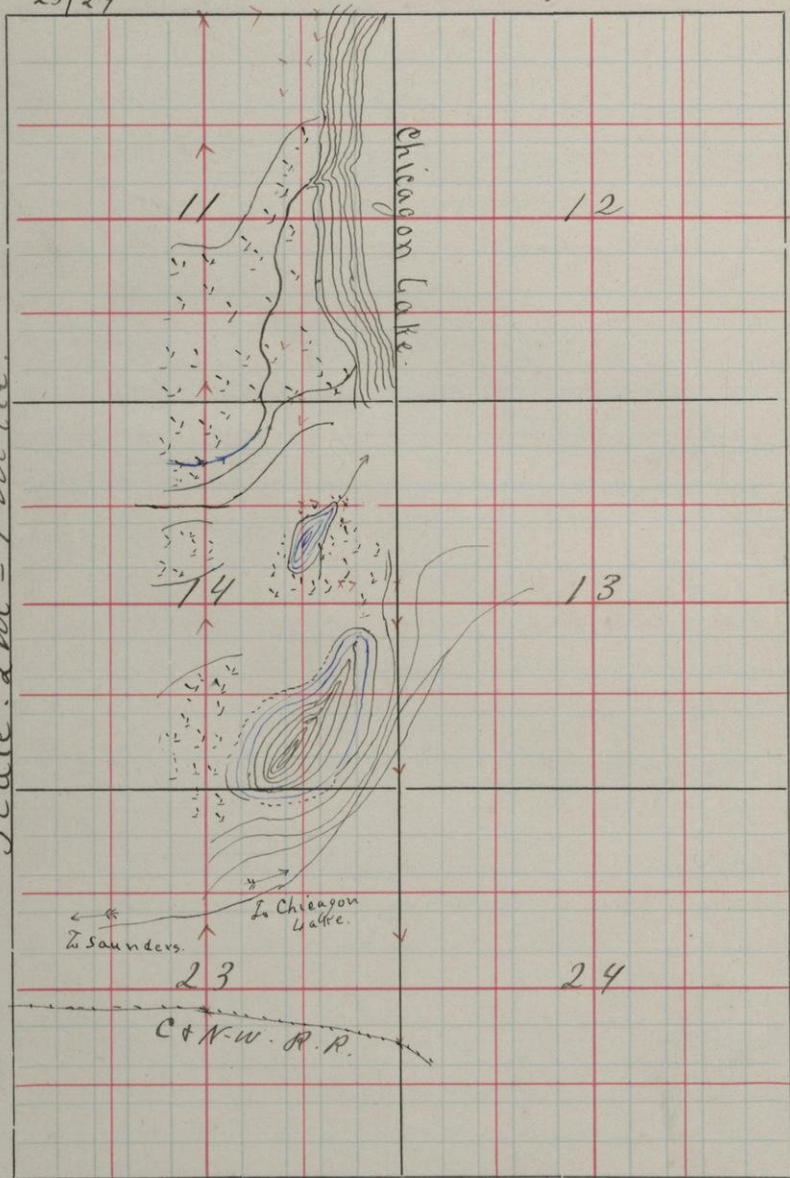
© + N. to R. R.

S. $\frac{11}{23} \frac{12}{24}$

T. 42

R. 34

Scale: 2 in. = 1 Mile.



S.

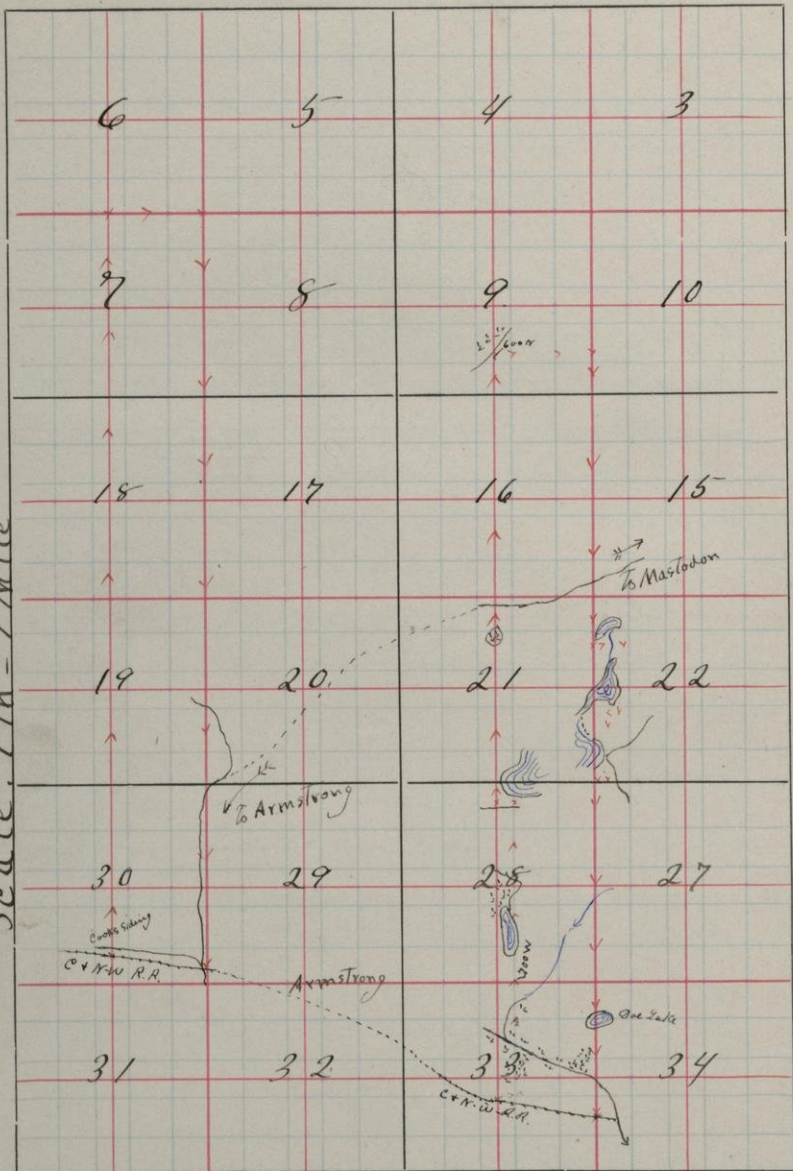
T.

42

R.

33

Scale: 1 in = 1 Mile



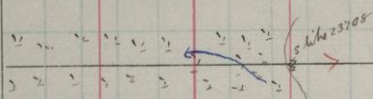
S. $\frac{8}{17}$

T. 42

R. 32

Sec. 8

Cor.



S. 23709

S. 23709

S. 23709

Cor.

S. 23709

S. 23709

S. 23709

Sec. 17

S. 23710

Cor.

6-747

Cor.

23709 N 0 W 495 SE Cor. Sec. 8-42-32

At this point and δ E are found
~~several~~ small outcrops of slate which
 are however so broken that it is
 impossible to determine the strike or dip.

like 23709 W 60 N 1800 SE Cor. Sec. 17-42-32

R.R. cut through slate like 23709. Strike seems to
 be slightly W of N with dip δ W.

23710 N 75° W 100 SE Cor. Sec. 17-42-32.

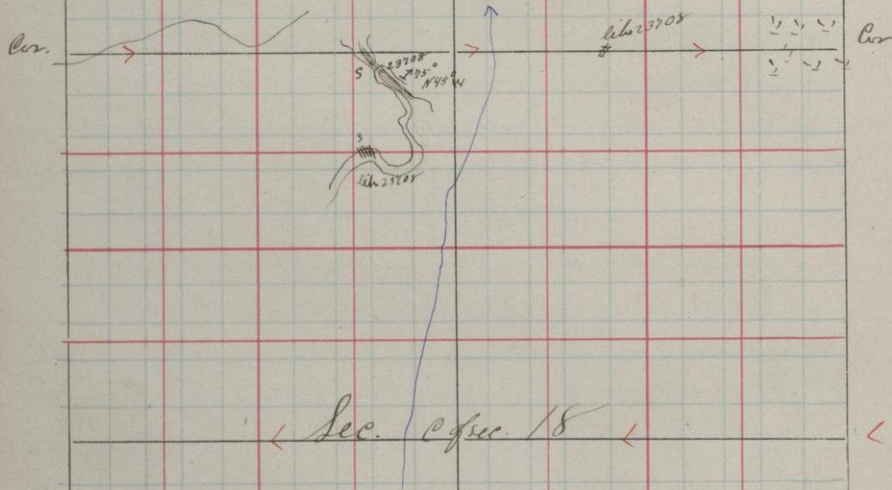
R.R. cut in black slightly ferruginous
 slate. Strike of schistosity, I should write
 cleavage, is N 10° W, dip 85° E. Dip is
 really about vertical, inclining here δ E
 and then δ W. I am doubtful about
 the cleavage agreeing with the bedding
 but can not satisfy myself about it.

S. $\frac{7}{18}$

T. 42

R. 32

Sec. 7



23708

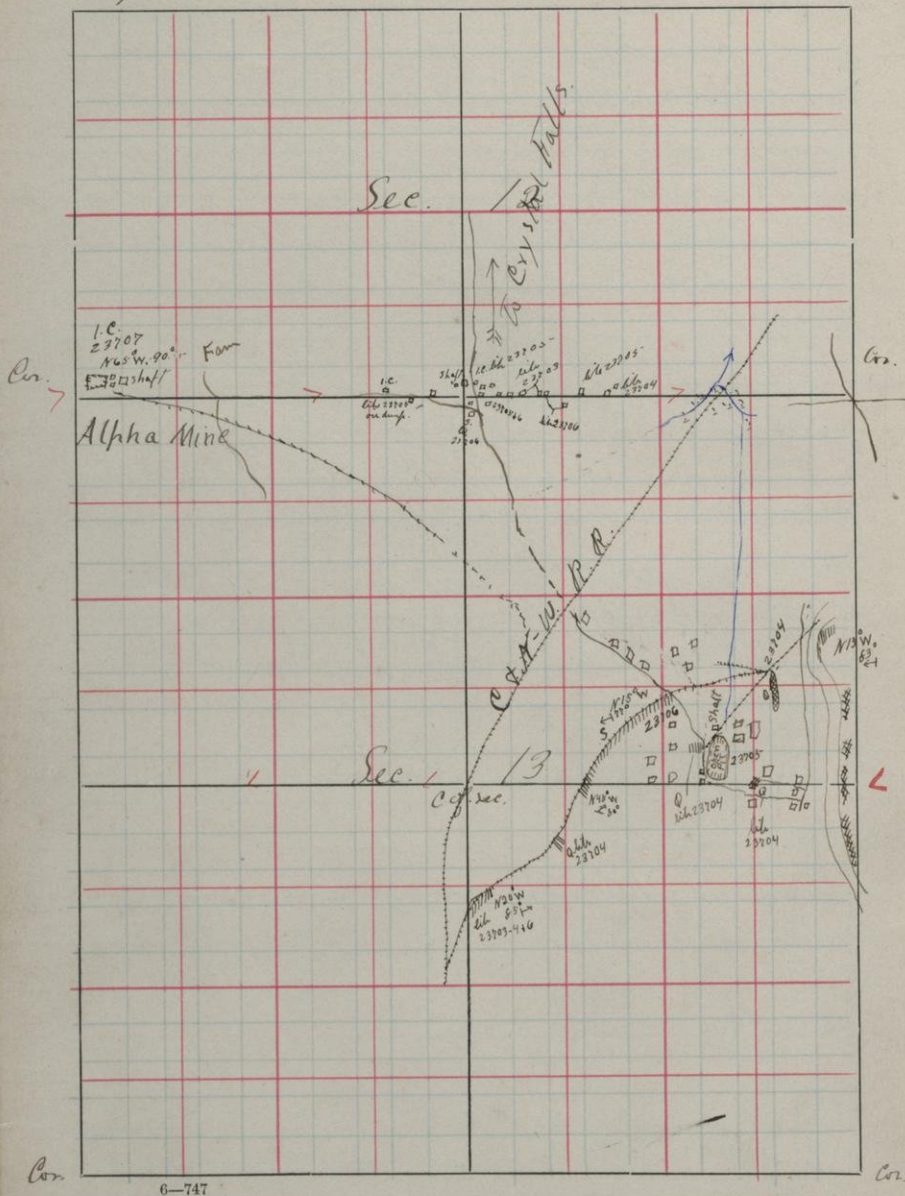
N 1985-W 1200 SE Cor. Sec 78-42-32

Exposure of ferruginous slate with
strike $N 45^{\circ} W$, dip $75^{\circ} NE$. Numerous very
small outcrops amounting really to a
large continuous outcrop occur to SE of
this point.

S. $\frac{12}{13}$

T. 42

R. 33



23703

N1000 W 45 SE Co. Sec. 13-42-33

Along face of hill to E of Mastodon mine outcrops a rotten ferruginous slate, in numerous small patches, so numerous as practically to be a continuous exposure almost. At N1375-W75 get dip 83° W, strike N15 W. This is of schistosity and apparently also of bedding.

23704

N1280 W 200 SE Co. Sec. 13-42-33

Knoll of thinly bedded almost slaty quartzite. Knoll covered with light soil through which the *Q.* appears at frequent intervals. Long direction of knoll is N-S. & believe it agrees closely with true strike of quartzite.

23705

N1030 W 360 SE Co. Sec. 13-42-33

Large open pit of Mastodon. Strike of gasper as ²³⁷⁰⁵ run in side of pit N22 E, dip 75° W. Bands are rose or brick crumpled. One occurs in pockets. Pocket here inclined to E. According to Captain of mine drill holes & drift to E + NE after leaving gasper went into graphite slate ^{note} 23706. To W drill went through gasper and then into same slate like 23706.

S. $\frac{11}{14}$

T. 42

R. 33

Sec. 11

Wm. 2370317
E.D.

Sec. 14

2 2 2 2 2
2 2 2 2 2

23706 N225°W1475 SE Cor. Sec. 13-42-33
 Exposure along R.R. of so-called graphite
 slates alternating with gaffer bands
 like 23704 and in places impregnated
 with iron. Strike N15°W, dip 77°W.
 Searched for fossils here especially,
 as there seemed to be a good chance
 among these slates, but found none.

23707 N110°W1980 SE Cor. Sec. 12-42-33.
 Gaffer from open pit of
^{not} abandoned Alpha Mine.
 Strike of gaffer bands, as seen in pit
 where not covered by H_2O , N65°W and
 dip 90°(?) . There are several test
 pits near here with rotten slate
 like 23703 and poor ore on dumps.

