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Menominee district: [specimens] 26477-26703. No. 193 1896

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], 1896

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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 ½ 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.

193

Menominee District,

also

Menominee River.

Vicinity of Foster City and Metropolitan

Summer 1896. Aug and Sept.

W S Bayley

W F Mullan

Chas Wey

Ira B. Wheeler

Specimens 26477-26600 p. 1-46
26691-26695 p. 46-49
26663 p. 52
26840-26841 p. 52
26728-26744 p. 53-54
26696-26703 p. 55-56

Specimen

26477-26600 p. 1-46
26663 p. 52
26691-26695 p. 46-49
26696-26703 p. 55-56
26728-26744 p. 53-54
26840-26841 p. 52.

SE cor

At 700 W. 250 N. of the pond Sec
 5. J. 39 R. 29 is another open
 pit, on the north side of which
 26477 is a rock resembling Soapstone, but
 on fresh fracture it is seen to
 be banded like the Dark Slates? On
 the south side of the pit are gray and
 red slates? The north side of the pit
 is topped with Potsdam sandstone.

On the East side of the larger Cyclops
 pit the iron bearing rocks are in
 a little anticline with very gentle
 dipping sides.

26478 from East side of pit

In the westernmost of the Norway
 pits? at the west end, is an un-
 conformity - between the Potsdam
 sandstone and the iron-bearing
 rocks beneath.

The iron bearing rocks are well
 exposed in the bottom and on the
 sides of the pits?

About 75 N. 20-75 E of No 5. Shaft
 are exposures of a rock that resen-

- 26479 Is a Paludum Sandstone - but which
 26480 Contains much limestone debris.
 It may possibly be a brecciated
 limestone.

The Eastern of the Cyclops pits is
 in two shales, very much distorted
 and shattered. On the North side
 of the pit these rocks strike about
 E.W. and dip S. 30° . On the South
 side the dip is much higher, about
 45° in same direction. On the East
 side there are two red quartz veins,
 traversing the beds obliquely.

N.W. 1/4 Sec 9. 39-29

The bluffs N. and E. of the Acague
mining are composed of limestone
whose contact with the iron bearing
rocks is at the old shaft of
the Briar Hill Mining.

At 400 E. 200 S. of N.W. cor Sec 9 are
the first exposures of the marble, forming
the south side of a high bluff.
The rocks are well exposed with a
strike of 40° N of E to 20° S of E, the
former in lot of lime, the latter at
base. The rock consists of alternating
layers of limestone, gray
slates and chert. The dip varies be-
tween 35° and 45° N. though small
folds are everywhere observed which
change both dip and strikes sud-
denly - especially in the shaly beds.
The calcareous beds are green with-
out evidence of outcrops when the
shaly beds are twisted severely.

Opposite the mine which termin-
ates the marble exposures to the south
is a little hill of quartzites, slates
etc, which belong to the upper series, if
any iron bearing rocks in this dis-

S. 9

T. 39

R. 29

N.W. Cor

N.E.

m. 26503

Aragon

Bing Hin

Curry Shast

sl. 26495-6-7

I.F.

Schmidt

tried. The rocks are

26481 light colored banded slates whose dip is 25° S and strike

26482 Above these is a 3 ft. band of quartzite, and above this

26483 shale containing laminae of limestone

Just north of the old Prior Hill shaft (see map) the iron shales are faulted in contact with limestone, a cliff of which forms the east side of the valley running.

The limestone on the side of the cliff, very near the iron shales, strikes about $E 90^{\circ} S$ and dips 65° S

26484 is a specimen of shale from near the shaft.

26485 } Specimens of shales, quartzite
 26486 } all collected from the talus of the
 26487 } hill west of the shaft.

S. 25
N 1/2

T. 40

R. 30

W 1/2

E 1/2

SW 1/4

SE 1/4

26488
264890

Dec. 25. T. 40 R. 30

26488 Limestone from pit 530 W. 325 S.

1/2 E 1/2 Dec 25 T. 40 R. 30

On the dump of the pit is some
sandstone, a small quantity of mar-
ble, but nothing else.

26489 At 75 S. 80 W of this pit is an
old shaft in which is a Potsdam
or conglomerate, a sandstone, and
in the dump of which are fragments
of a rock resembling ore.

26490 Slate from about 100 S. 300 E of
1/2 Dec 25.

S. E. $\frac{1}{4}$ H. T. 39

R. 29

Center

E $\frac{1}{4}$

1 Limestone
N 70° W
1/10

S.E. $\frac{1}{4}$, Sec 4. T39R.29

Made one run in Sec 4 to locate an exposure of limestone.

Found it at 400 W. 290 N. of S.E. Cor.

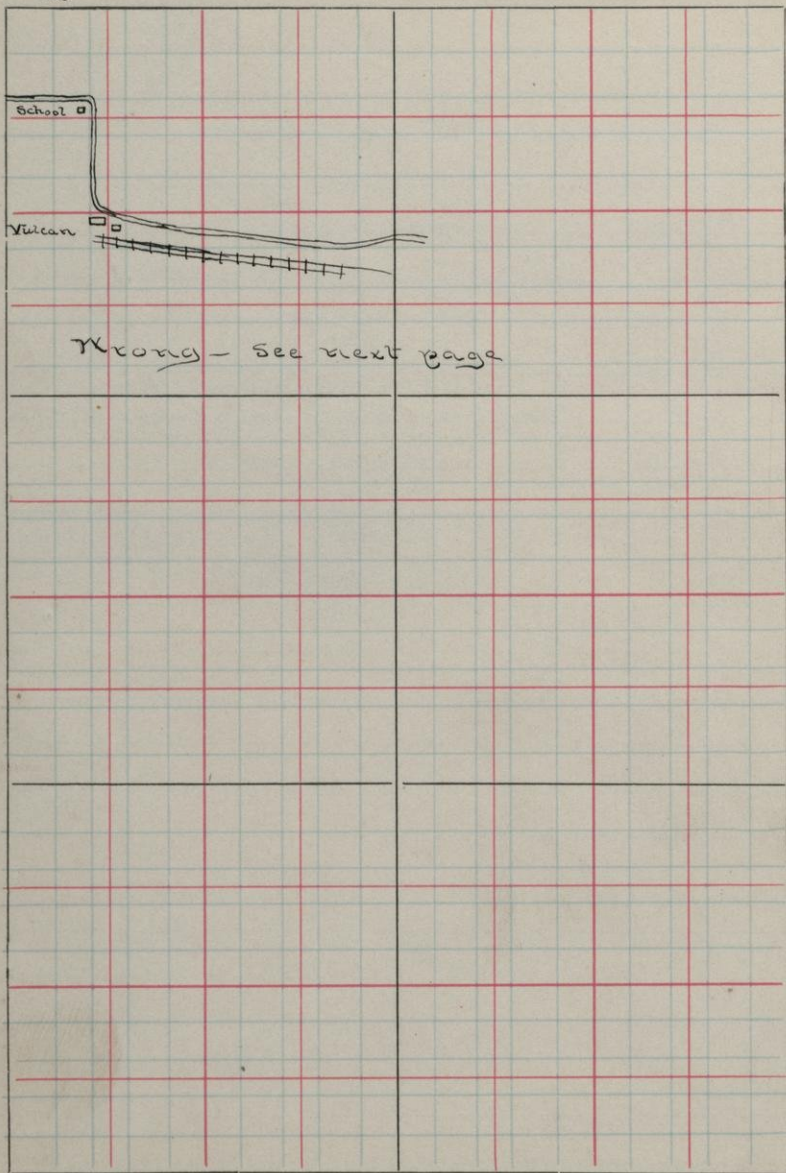
Sec 4. Extending 100 paces west of this point. Its strike is N. 70° W.

The limestone dips usually 40° S. but at the west end it dips to the N.W.

S. $\frac{10}{18}$

T. 39

R. 29



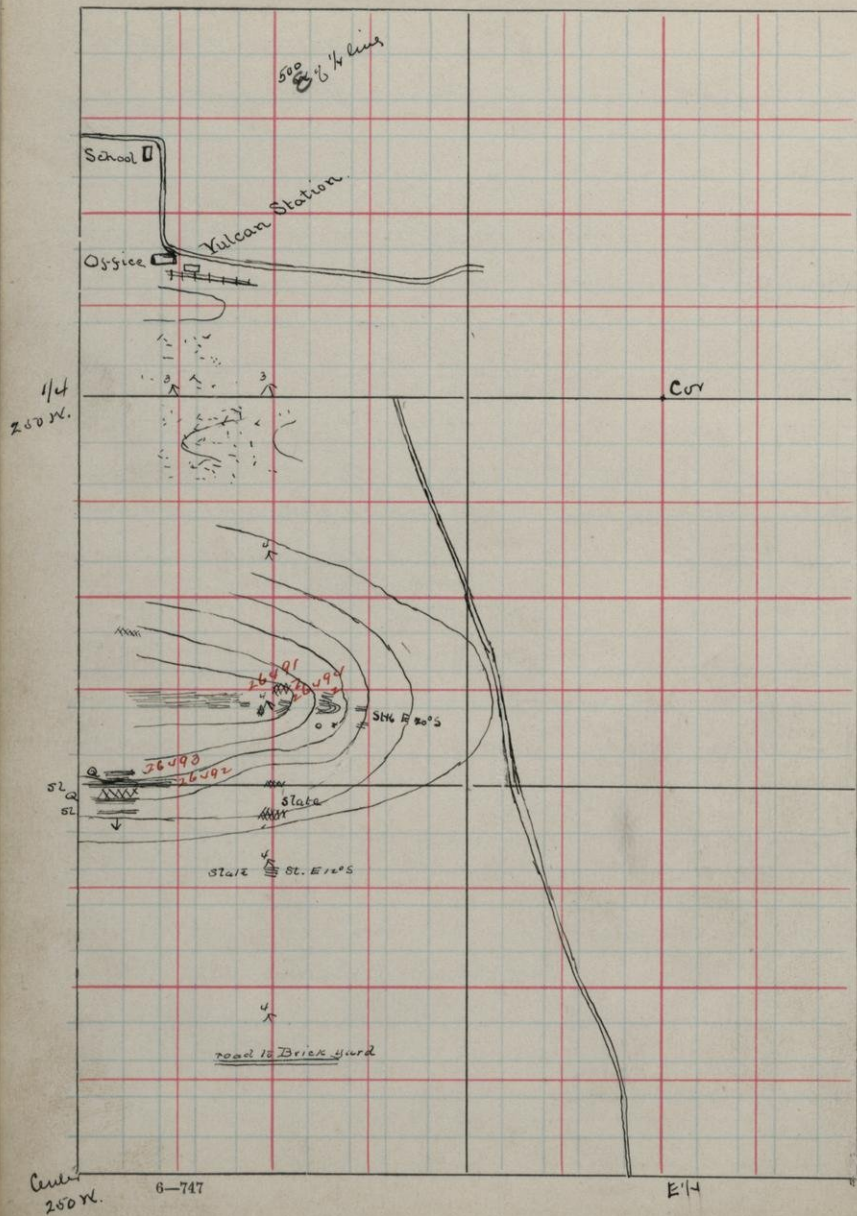
1/4

Cox

S. $\frac{10}{15}$

T. 39

R. 29



Ran through Secs 10, 15 and 22 T.
39 N. R. 29, on line 500 E of U.S.
1/4 line and back along East Sec.
town line.

No rocks were seen except in the
hill south of Lake Hamburg, where
easternmost and was crossed.

On this portion of the hill slates and
graywacke occur in alternating bands,
the slate being much more abundant
than the graywacke. The bedding of
the slates is not very distinct, but on
the south side of the hill 700 paces west
of the east line of the section ^{the} dip is seen
when south. These slates are contorted
and squeezed the schistosity, always
striking a triple N. of W. and cutting
the folds and consequently the bedding
at all angles, the schistosity being
practically vertical.

- 26491 Slate from north side of hill.
- 26492 Slate from south side of hill.
- 26493 Graywacke from south side of hill.

26494 At 500 W. 450 S. of U. S. C. Sec 15 are
two slate ledges very close together. In the

S. $\frac{15}{22}$

T. 39

R. 29

E 1/4

15

S 1/2

S 1/2

S 1/2

↓

S 1/2

Cor

1/4
250 AC.

H. Y. Farm.

22

In the Southernmost one the strike of the rocks is $W. 35^{\circ} S.$, and in the northern one $W. 8^{\circ} N.$, indicating presence of a fold. A little further East the fold is well seen. Here the rock is squeezed into a close fold pitching fairly steeply to the East and dipping South, indicating an anticline. In the top of the hill the folds are very close. The gneiss pitch almost vertically.

Other ledges are located on map.

S. 22

T. 39

R. 29

Center
250
ft

N. 5. Farer

1

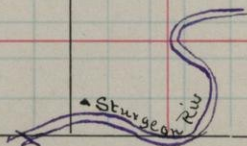
2

3

4

SW
250 ft.

6-747



SE Loc.

Continued work East of Brian Hill shaft.

On South side of the wagon road at 740 S. 645 E of N.W. Cor Sec 9 is an old shaft in the dump heap of which are rocks that are much more slaty than the rocks at the Aragon mine. They are however, essentially the same.

(26495) Banded Jasper and ore.

(26496) " " " " " Resembling more nearly the usual form.

(26497) Dense slaty rock.

The dump heap at the W. Curry shaft contains the same material as that represented by specimens 26495-97, the same slate is present.

26498 Black slate

(26499) Banded slate

26500 Evenly banded ore and slate from pit on side of hill, 845 E. 510 S of N.W. Cor Sec 9.

As we pass along East side of Swamp we find an Eastern cliff of marble in which the dip is generally Southern.

In the middle of the face of this cliff, at about where X is in map, the rock is brecciated to a great extent.

26501 Specimen of breccia

26502 North of this is a chert bed, which is very brittle and hence is much crushed and gashed. The chert is evidently a bed in the limestone series, but whether in its lower or upper portion cannot be told from this exposure.

At 100-130 S. of U. N. post Sec 9 is a little knob of limestone 100 paces long striking E. 20° S and dipping generally about 55° S. It is a light colored rock that in some places is weathered rough little lines of chert marking bedding. The rock beds are contorted in a minor way - the wider beds striking and dipping regularly but being flexed within themselves.

At 475 S of this U. N. begins the west side of a large ledge of white - Potsdam sandstone. The rock at the East End of the ledge

Contains many fragments of the iron formation.

26504 This white sandstone is apparently just below the normal red variety, and is especially common near the marble.

26505 From small marble ledge at N. 35 S. 175 E. of N. Sec 9.

26506 Shaft No 1 of the Curry mine is in a stripped piece of ground on whose north side are black slates and at the bottom of which are iron slates, i.e. fissile cherts and are interbedded. The dip of the iron formation steep is 41° on the N.W. side and 1.65° on the South and East sides of exposure.

26507 In the cut in the railroad north of the power house of the mine are genuine black slates in a ledge 129 paces long. Some of the slates are ripple-marked.

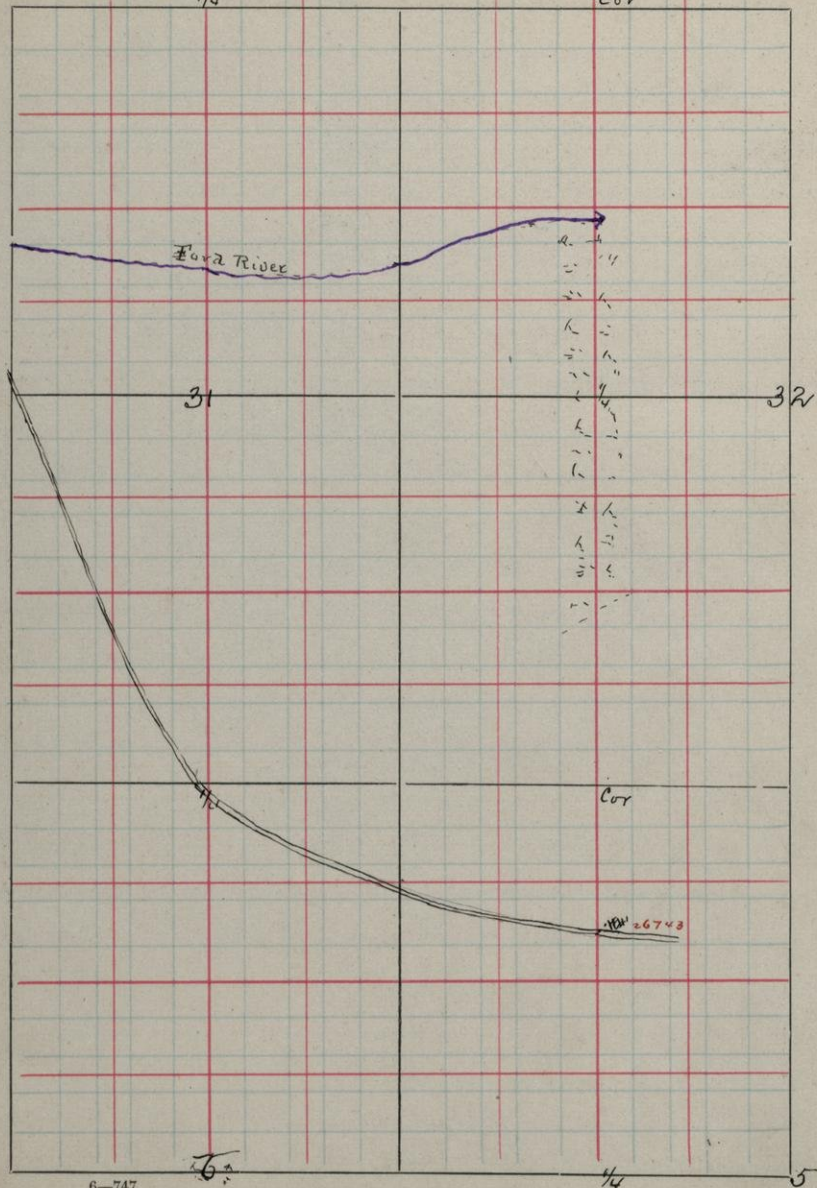
In the open pit just north of the railroad track are soft iron slates like those in the stripped ground. On the South side

S. $\frac{31}{6} \frac{32}{5}$

T. $\frac{43}{14} \frac{42}{21}$

R. 27

Cor



6-747

6

1/4

5

See pages 53 & 54.

for the pit the rocks are vertical, on the north side they dip 62° S.

26508 from side of narrow open pit at
670 S. 250 E of $\frac{1}{4}$ sec. Rec 9.

A very large open pit is situated at about 600 S. 370 E of same $\frac{1}{4}$ sec. on the East side of the pit are slates striking 38° E and on the west side is information material, the latter is a complicated fold apparently picking to the west. Could make little of it. There seems to be a slight unconformity between the slates and the information, but no good contact could be seen. In the N.W. corner of the pit the information immediately in the contact with the slates undoubtedly dips suddenly under the latter. It is possible that a steep fold exists here and that there is no real unconformity.

26509 } slates from East side of pit.
26510 }

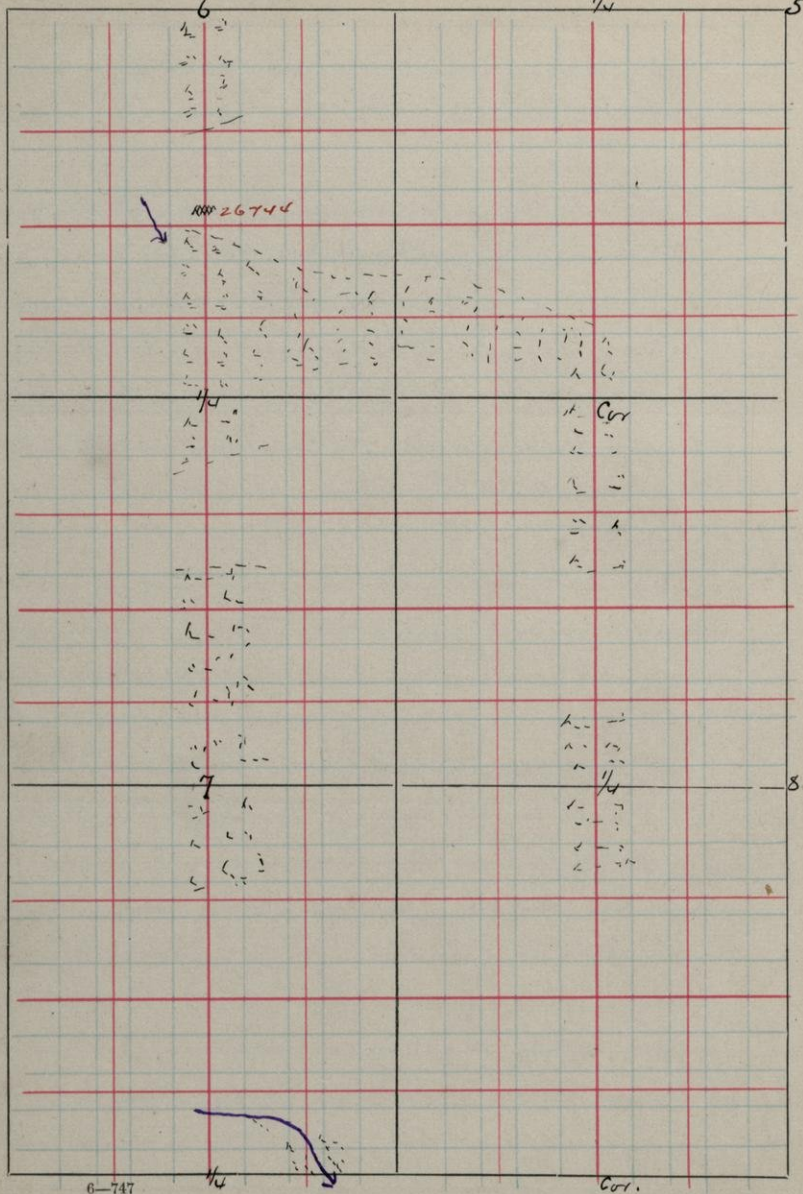
S. 6/5

T. 42

R. 27

1/4

5



0-747

1/4

Cor.

See pages 53-54

26511 In the railroad cut north of No 2 Vulcan shaft are red ferruginous slates² striking E 5° N. and dipping South.

On the top of the hill near the western of the two E. Vulcan shafts are several large pits in slates. On the north side of the Eastern one the dip of the rocks is very low (20-25°) to the South. On the South side is as high as 45° in some places.

26512 In the next pit west the same slates occur, dipping low to the South on the north side of the pit and high on the North side. A cross section of the two pits would show something like this



In the drift on the South side of the pit the dip is 25°-27°-35° as we pass from north to south a distance of 50 paces. In the next 25 paces the slates are first horizontal, then puckered into small folds, then dipping South. 50°

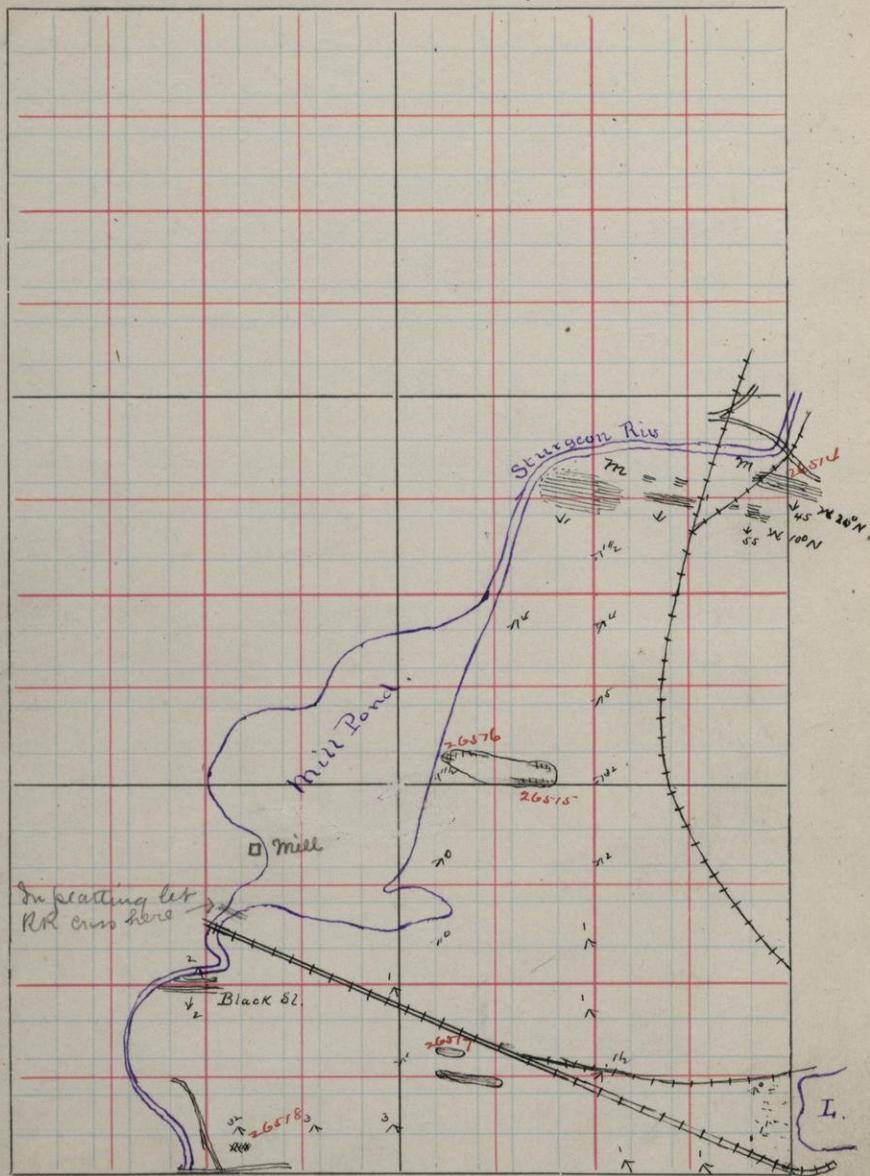
26573 On the north side of the pit the slates are full of ore. These ferruginous phases are unquestionably below the more nearly genuine slates to the south.

A large number of other slates and exposures of various rocks were met with in traversing this $\frac{1}{2}$ section and a number of pits were examined. The latter show little of special interest. Everything seen is plotted on the map (page).

S. 13

T. 39

R. 29



Made a run through East Half Sec 13, running run to that portion of the Sec East of the Morgan River.

26514 At 150 - 300 S. and as far west as two paces are ledges of limestone striking in general $E 20^{\circ} S$ to $E 10^{\circ} S$. Within the layers the rocks are much contorted into many minor folds. Near the center of the section is a little hill of black shale whose cleavage is vertical, but whose bedding is so obscure that it could not be made out.

26515 from South side of hill 1000 ft. 700 to of S.E. corner.

26516 from North side of hill.

At 310 - 240 ft. 750 - 875 to of S.E. corner Sec 13, are two ledges of black shale like 26516. The orientation in both strikes $E N$ and is nearly vertical, but the bedding of the northern ledge in particular is much contorted, forming little folds with axes pitching at an 50° to the East.

26517

- 26518 At 1400 W. 75° N. JSE cor Sec 13 is a small ledge of greenstone.

Sec 11. T. 39 R. 29

Ran north w. line about 1500 E of W. line Sec 11. T. 39 R. 29 through Sec 2 and into Sec 35. T. 40 N. R. 29 and returned w. line 500 E of west line of section.

The run took us through the property of the East Vulcan mines.

- 26519 At about 300 E. 230 N. of SW cor Sec 11 is a pit in the side of the hill in which are red slates belonging to the new formation.

On top of the hill is a shaft house of E. Vulcan mines. In dump here are the rocks represented by specimens.

- 26520 Cherty ore.

- 26521 Compact hard ore.

At eastern shaft the rocks are much the same.

- 26522 Iron dump heap.

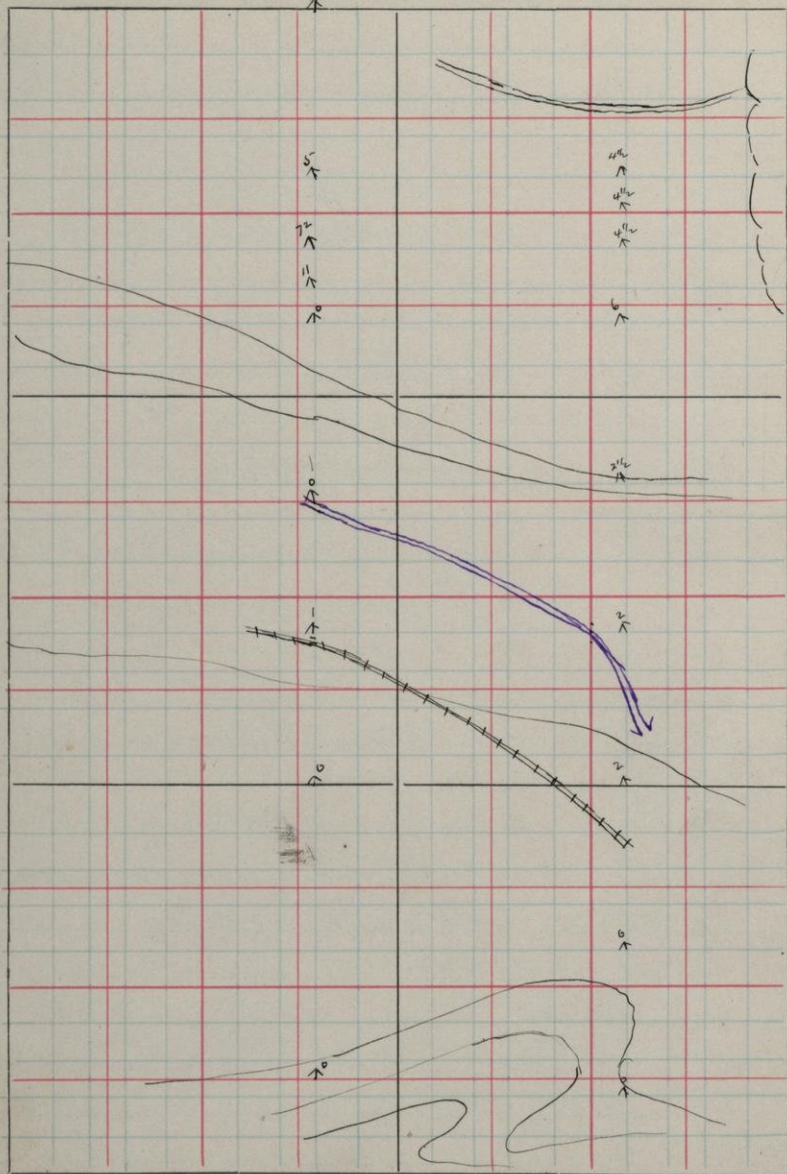
S. 21

T. 39

R. 29

1/4

Cor.



Exposures are not numerous in the vicinity. At the western shaft, however, there are several ledges of iron slates in which the rocks strike N. 20° E.

26523 No other rocks were seen until reached Sec 35. Here are knolls of granite the southernmost of which is at loc N. 250 E of S.W. cor Sec. 35.

Granite and quartzite knobs were located in this section as indicated by map. No other rocks were seen until reached brow of hill near the road.

26524 Here again is a shaft with pits and exposures of iron slates from 30 paces east of the shaft.

The little pit to the west of the shaft is in ferruginous slates dipping vertically and striking W. 30° E.

In another little pit just west of this one the one formation is capped with Potsdam sandstone.

On the west side of the pit two little one foot pits are seen. The predominant

S. $\frac{35}{2}$

T. 40
39

R. 29

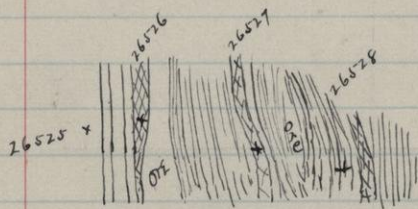
Coe.



1/4

6-747

- 26525 rock in the pit is the cherty one and
slate? This near the one body is
26526 replaced by a white slate with a talcose
feel. Then comes the ore in a place
where the strata seem to be swollen
out - and more or less crushed.
This one body is separated from a
second one pocket by a bed of what
26527 looks like the same white rock as
26526. Immediately in contact with
26528 this one are cherts, beyond it again
a layer of white rock and beyond this
evenly banded cherts.



It looks very much as though the white
rock were the impervious layer in
which the ore was formed and deposited.

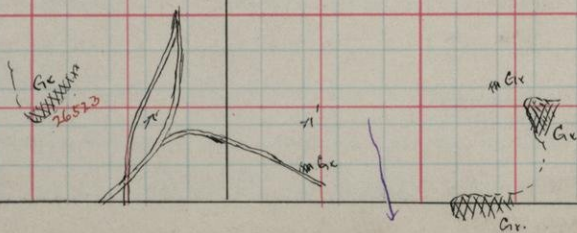
- 26529 From cut in railroad. Strike $E 90^{\circ} S$. Dip
almost vertical in western portion of cut
and $85^{\circ} S$ at its Eastern End. On top of the
ledge the rock becomes very slaty, although

S. 35

T. 40

R. 29

114



6-747

it is essentially like the specimen.

Run north along line 800 E of west line of Sec 12. T. 39 R. 29 W. as far as the granite then east and south along line 800 W. of E line of the section.

The only rocks seen in the run were granite, quartzites and limestones. 26530 On the north side of the hill at 400 N. 850 E of S.W. cor Sec 12. is a small ledge of graywacke or calcareous sandstone

At 550 N. 900 E is the west end of a series of limestone hills. On the south side of the westernmost hills the rocks strike W. 25° N. and dip 52° S.

The series of rocks exposed in a N-S section, beginning at the South Campgrounds

- 26531 Calcareous sandstones interlaminated with thin bands of shale. 15 ft.
 26532 Limestone interlaminated with shale

in thin bands. 12 ft.

26533

Coarse calcareous sandstone interlam-
inated with limestone. 7 ft

Limestone and shale striking W 30° N.
25 ft.

Sandstone. 10 ft.

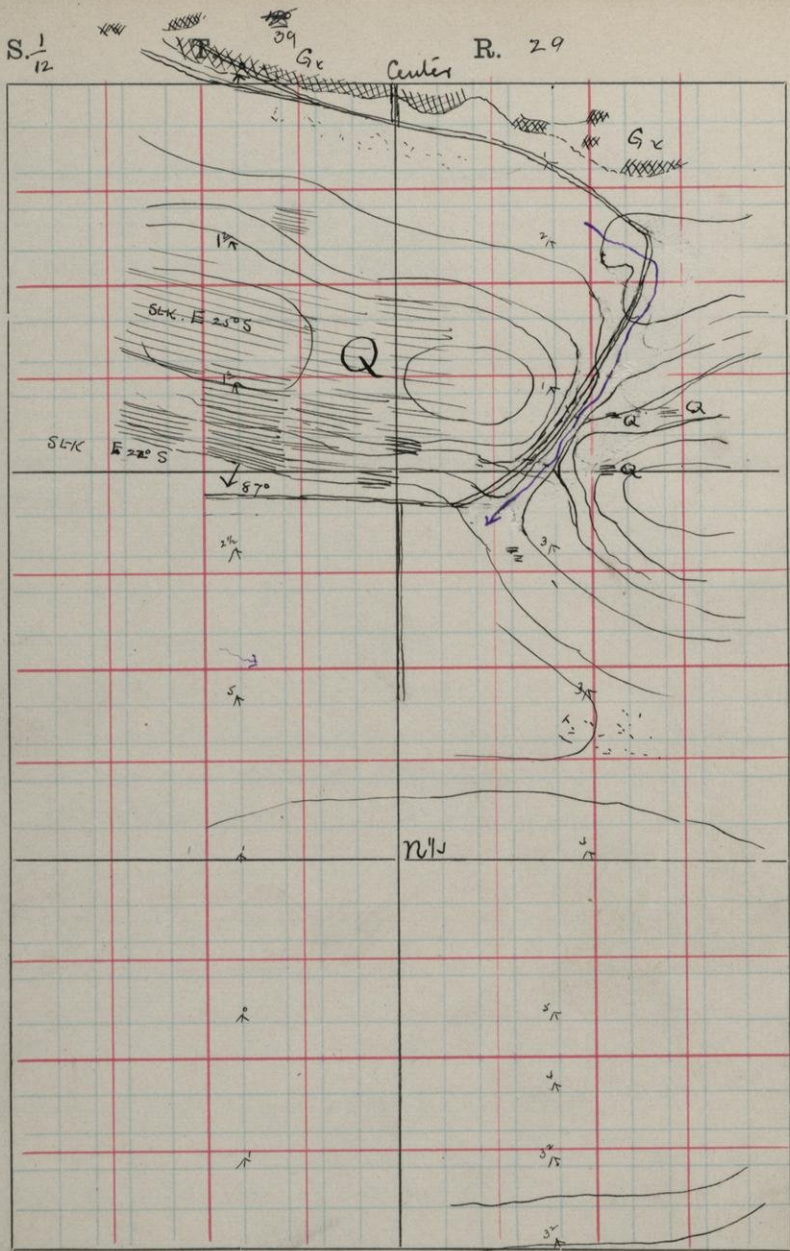
Limestone. 10 ft.

The large hill to the north of these hills
consists of interlaminated limestone with thin beds of shale.
As a rule the rocks strike as in the
ledges to the south (see map) but their
dip varies from 50° S. to almost hori-
zontal. The highest dips are on the north
and the south sides of the hill, the flat
lies in the center and on top. On the
quarter line of the section the layers
are greatly folded near the top of the
hill. The folds are sharp, pitching
very steep both to the east and the
west - the westernmost ones west
and the easternmost ones east.

In the little hill still further north
the rock is limestone more thickly
bedded than before. Its strike is W 19° N.

S. 1
12

R. 29



and dip 45°

In the very large hill near the railroad the limestone is so massive that it is difficult to get strike and dip. The crest of the hill trends $W. 70^{\circ} N.$ On north side, at about $900 E$ of West Sec line the dip appears to be about vertical. This is assumed to be near the crest of an anticline.

The hill in Sec. 1. is composed of quartzite in massive layers well marked by bedding lines. Strike of layers is between 20° and $25^{\circ} S$ of $E.$ and the dip is vertical near the top of the hill, and $87^{\circ} S$ on its south side.

The very handsome ripple-marking show plainly that the northernmost layers were deposited before the more southerly ones.

Worked on N. and West side of
Sturgeon River examining contact
between quartzite and granite,
passing through Loreto property in
they way.

The pits and shafts of the Loreto
mine are all in Sec 4. T. 39 R. 28,
situated as follows:

Main shaft.	900 N.	1825 W.	J. E. Cor
Discovery "	925 N.	1825 "	" " " "
New "	985 N.	1860 "	" " " "
Pits old	970 N.	1570 "	" " " "
" "	1500 N.	1600 "	" " " "
" "	1650 N.	1600 "	" " " "

Specimens were collected by Mr.
Murray and sent to Waterbury

26534 were taken from dump of old
26535 pit at 970 N. 1570 W. of J. E. Cor Sec 4.

26536 Granite was first found at about
380 N. 500 E of J. W. Cor Sec 6.

At about 250 N of 1/2 Sec 6 Black
creek falls in a little cascade over
granite and conglomerate. The

26537 Conglomerate resembles strongly a granite. Round and angular fragments of gneiss are shown thickly through a matrix of the same composition as the gneiss.

The granite, or more properly granitic gneiss, associated with the conglomerate is a banded rock whose strike is 35° N of W. and dip. about vertical.

26538 on the south side of Sec 6. Near the 1/2 post great knobs of gabbro or of some other basic rock cut through conglomerate and quartzite. In the west end of the northern knob of the basic rock is a little patch of conglomerate.

26539 The rock continues as a ridge of knobs southward, showing in its flanks occasional quartzite exposures. The country changes its character slightly as indicated by the specimens.

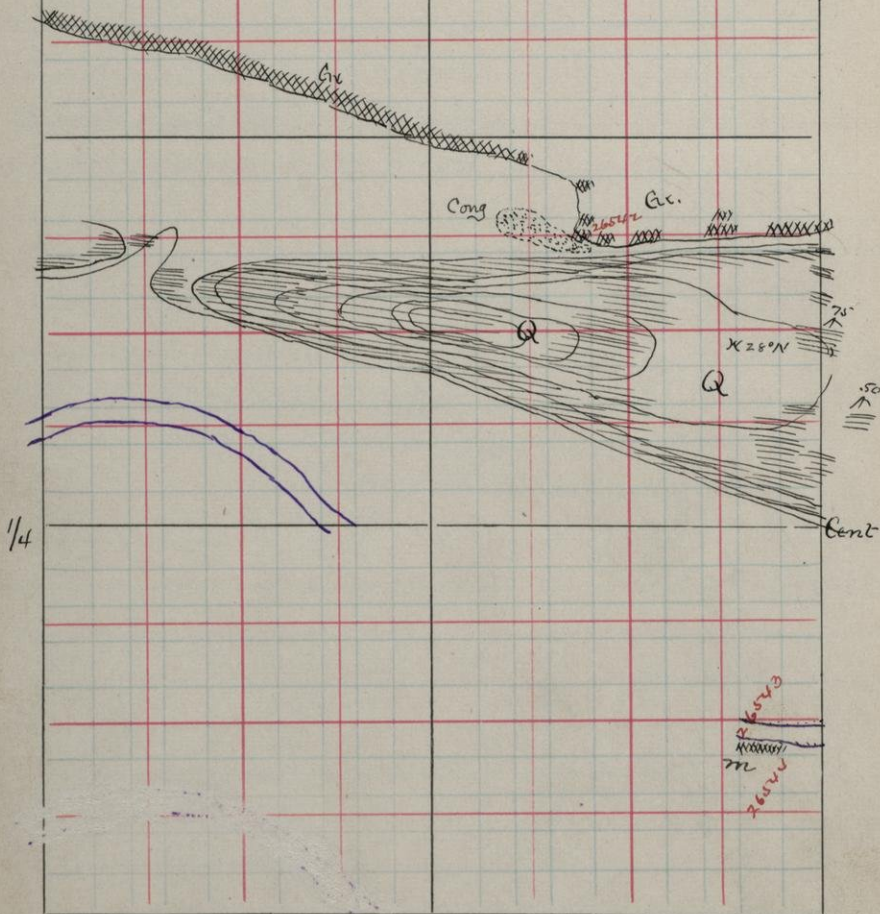
The quartzite strikes W. 35° N and dip. about vertical, perhaps inclining a degree to the north.

NW 1/4 S. 8

T. 39

R. 28

Cov



- 26540 From west end of great knob in
N.W. 1/4 Sec 7. Looks like granite? Am
not sure but may be recrystallized
rock.
- 26541 Further north the rock is full of lenses
of hornblende-schist. 26540 may be
granite?

In the northern portion of this 1/4 Sec.
are great bluffs of white quartzite.
There are no contacts here with the
granite so relations of the two rocks
cannot be determined. At the East
end of one of the principal knobs, the
quartzite shows evidence of a fault
the strikes of the beds on opposite
sides of the line being divergent as
indicated on map.

The ledge of quartzite and the granite continuing east being separated by a topographic break just reach point near the center of NE 1/4 Sec 8 - where there is a little knob of conglomerate.

26512 is a specimen of what take the granite immediately west of conglomerate bluff and almost in contact with it.

On south side of the knob is great pile of rounded quartzite?

On the south bank of the Sturgeon at about 250 S. and 50-100 W. of center of Sec. 8. under overhanging foliage and soil are low ledges of loose rock which I take to be weathered marble.

26513 The west of the rock looks like decomposed calcareous quartzite.

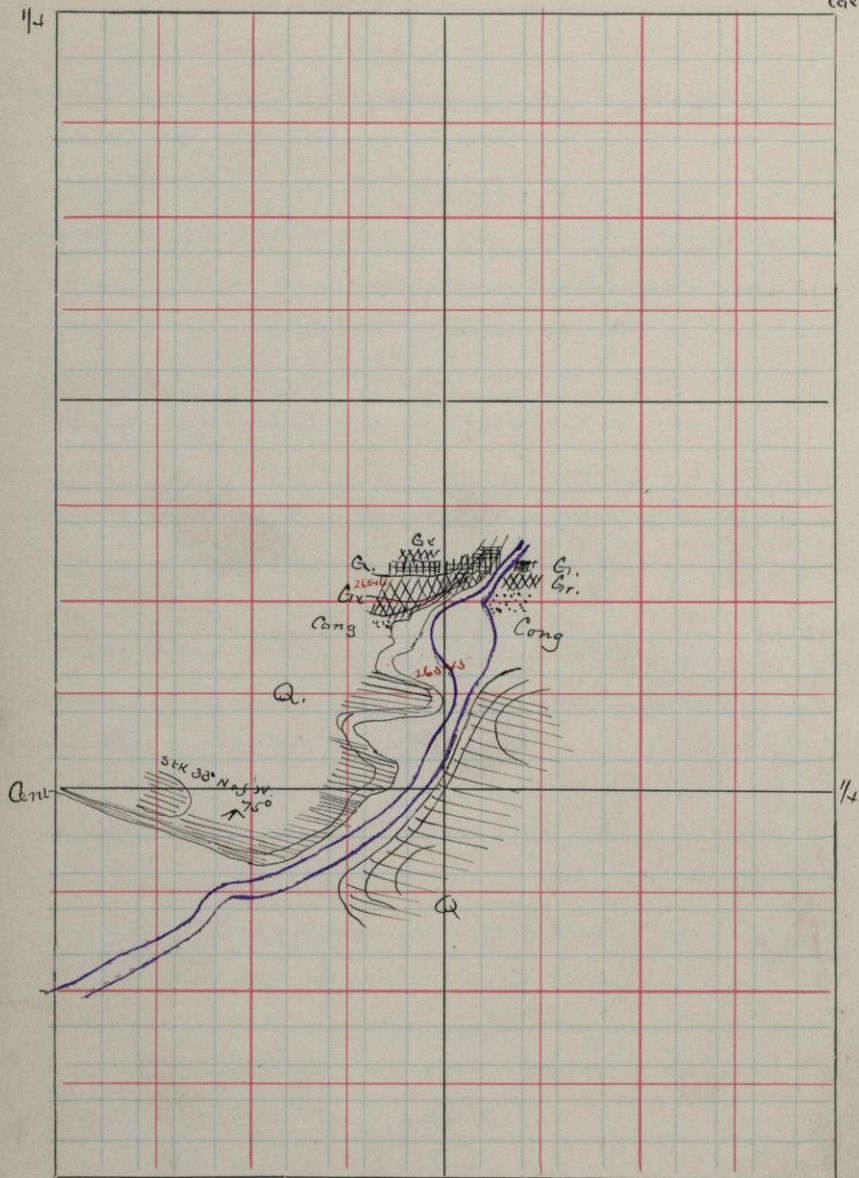
26514 At the west end of the ledge the rock is a little fresher and more massive. Though even here it is very rotten.

NE $\frac{1}{4}$ S. 8

T. 39

R. 29

Civ.



Traced the granite and quartzite ledges to the falls of the Sturgeon river where found the conglomerate so many times described in the literature of the region.

The map on opposite page shows clearly the relations of the different rock masses.

The quartzite strikes 30° N of W and dips 80° - 83° N. Its thickness of 300 paces. This great knob continues east across the river, which has cut through it making a great gorge.

26545 On the north side of the quartzite ridge, the rock is schistose and seems as though near a slipping plane. Across the valley which separates the quartzite from the granite, is a small patch of conglomerate at base of granite knob.

26546 Then turning about this a cliff of red granite, banded and dipping approximately at 60° S. and north.

Basic
gneiss.

26547 This a great ridge of greenstone which evidently is intruding in the granite.

S. 24/19

T. 39

R. 29/28

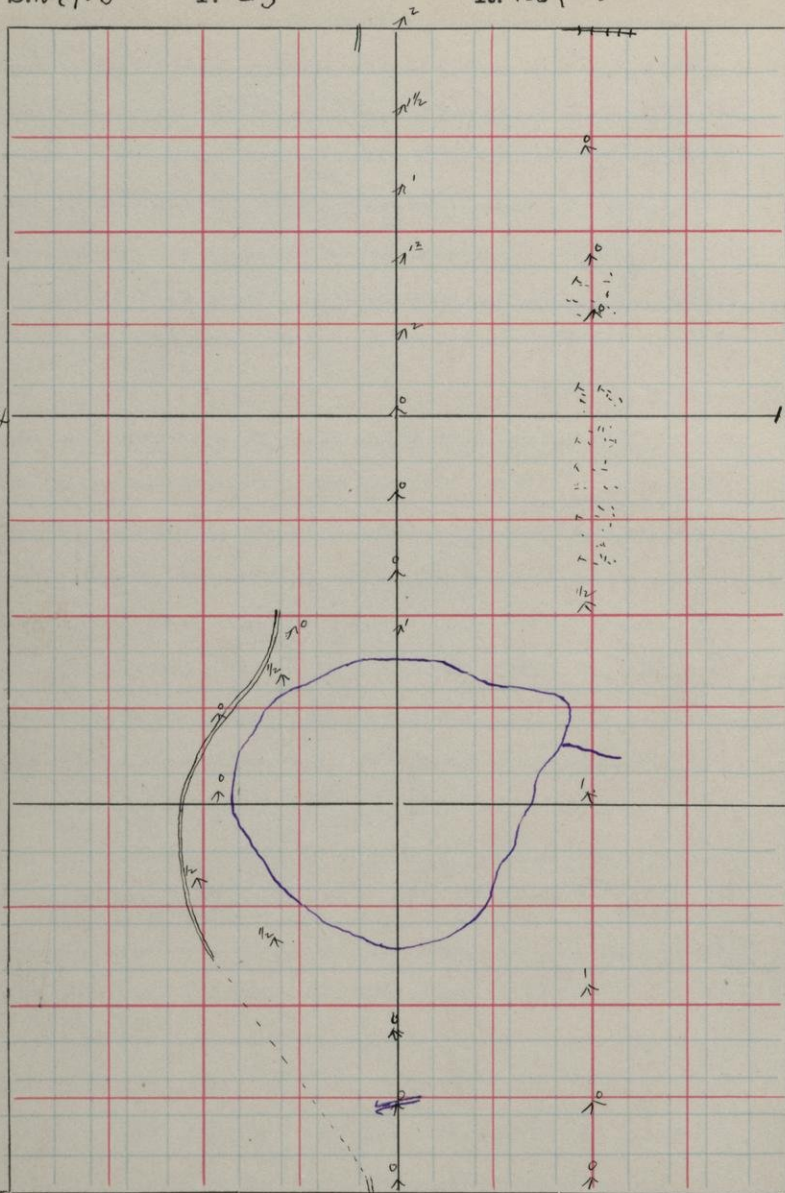
24

19

25

6-747

30



From N.E. Cor. Sec 24 T. 39 R. 29
ran south three miles then East
500 paces and north.

No rocks of any kind were seen
until reached south line line, where
met with greenstone-schist² in
Knobs.

26548 From Knob. 100 ft. S.E. of S.W. Cor
Sec 31. T. 39 R. 28

26549 More Diabasic phase from Knob
near corner.

S. 25/30

T. 39

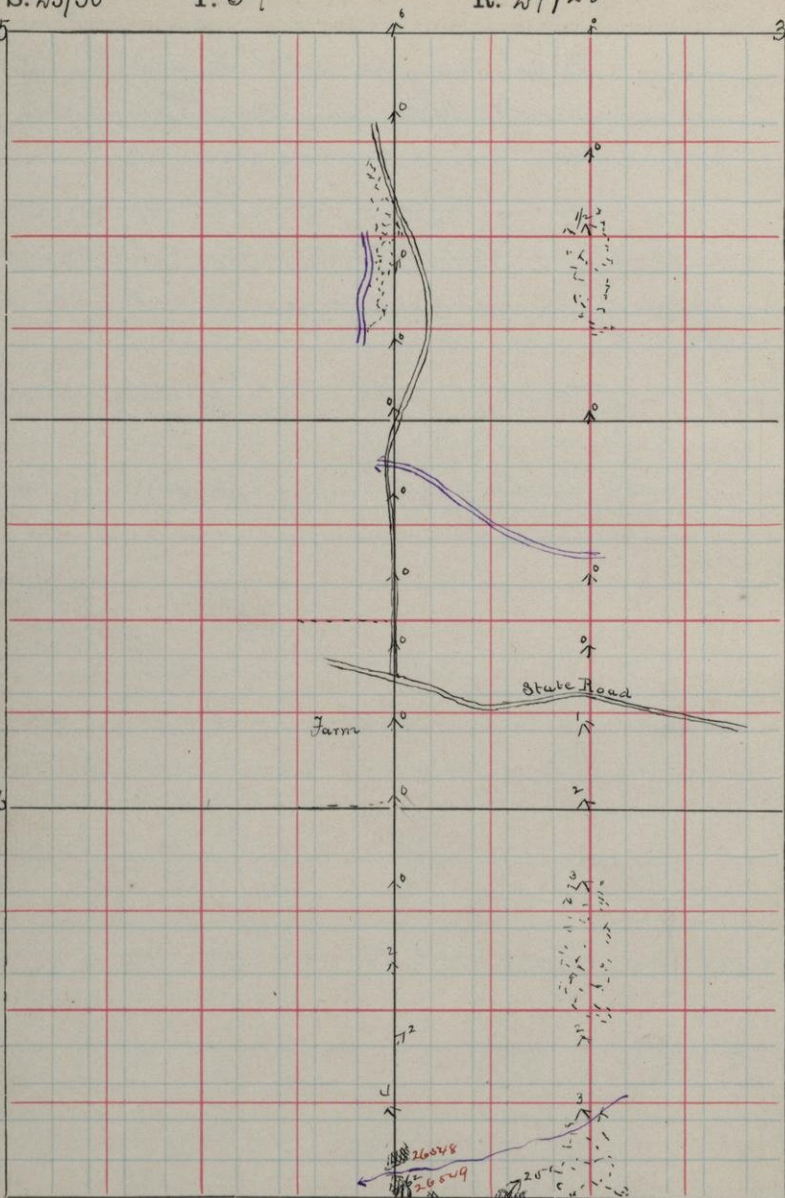
R. 29/28

25

30

36

31



Ran north through sections 22, 15,
and 10 T. 39 R. 28 on line 500 E
of west line of sections.

on side of R.R. at 1430 N. 1645 W of E.
Cor. Sec 22. is a pit on top of bank &
cut. From its dump heap were taken

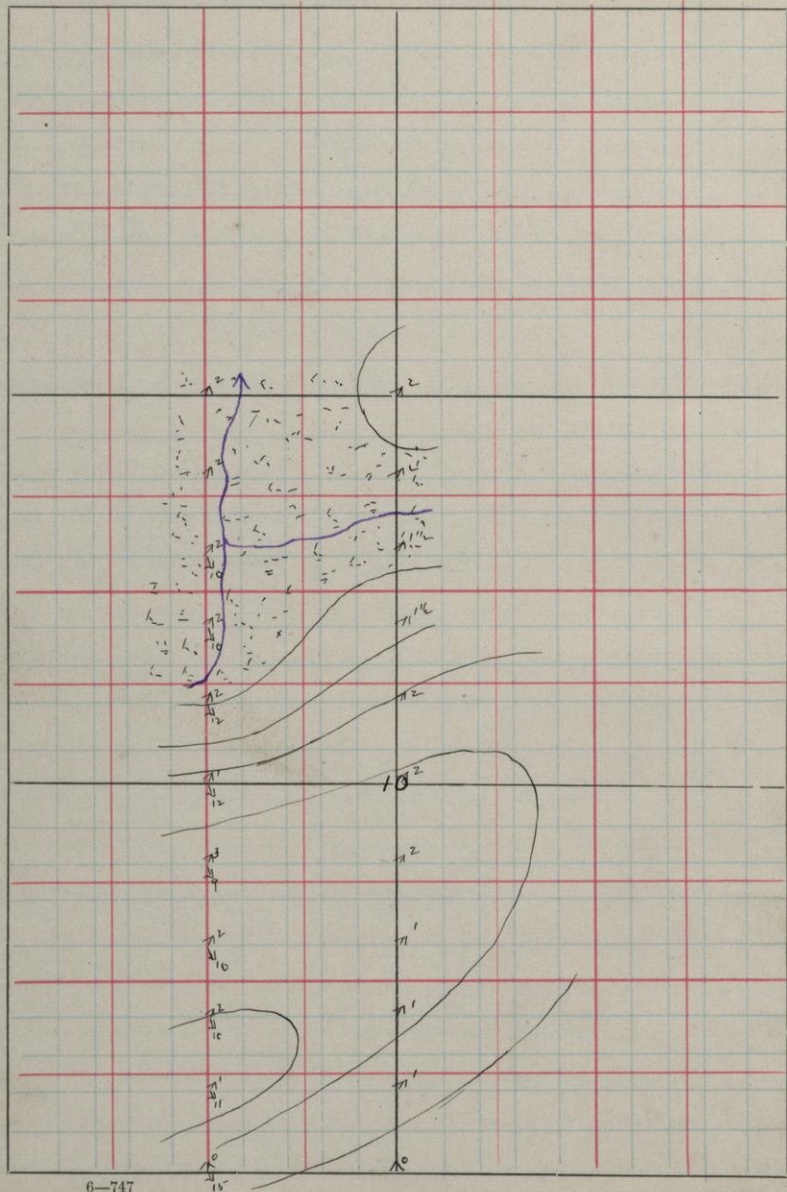
26550 black ferruginous shale

26551 chert.

26552 Siliceous limestone from north side of
hill near the top. 650 N. 1500 W of S.E.
Cor. Sec 15. The top of this hill is grad-
ually covered with Potsdam sandstone
so that relations of limestones to shales
cannot be determined.

No other rocks were seen until
returned to the railroad, where tra-
versed the property of the Brew Union.
At about 1900 N. 1045 W of S.E. Cor Sec
22 are several pits in a little hill.

26553 From these obtained a peculiar red
sandy shale resembling somewhat a
fine grained Potsdam sandstone, but
which is probably a red slate belong-
ing with the iron formation, as further



west it appears to be associated with
26554 chert.

Just south of this pit is another one
26555 in which the ore formation rocks are
plainly seen

on the south side of the hill on which
the pits are situated is a cliff of very
rough, hard chert and ferruginous
bed. It extends in broken craggy ledges
for about 100 paces. (Specimens 26560-1)

26556 chert, ferruginous slate

26557 black, ferruginous slate

26558 more slaty phase

all from pits east of the former pits
26556 + 26557 are from pits situated
at 115 E. 125 S. of N.W. post Sec 22

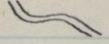
26558 from pit at 100 E. 180 S. from
N.W. post.

In the western pit of the Breckenridge
black ferruginous slates are well ex-
posed striking about $N 10^{\circ} S.$ and
dipping $40^{\circ} S.$ The north side of the
pit is capped by Potosi sandstone.
Under this are black slates and

26559 under this again gray slates.

On the south side of the pit the black slates

become very cherty or quartzitic.

The dip of the slates is not uniform throughout, as in the East side gobs but the usual & common is the found , dips however being always to the south.

The rock in the cliff on the hill looks like a chert in which there has been replacement by ore. The strike where obtained is W. 22° S. Dip about 55° S.

26560 Chert and ore thin bedded

26561 Mottled chert and ferruginous quartzitic

On the dump heap of the little pit at 214 S. of the post Dec 22. are black ferruginous slates and the gray rock 26559.

At 210 S. 75 E of this post is an old shaft in the bow of hill.

26562 One from dump heap of this shaft.

Looks like same porous one that is usually found in the cherts.

At the westernmost pit of the Emmet mine near the rail road track the rocks are

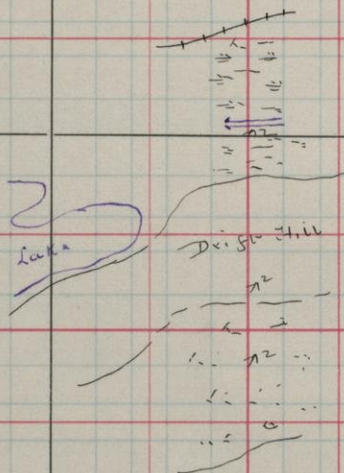
$\frac{20}{29} \frac{21}{28}$

T. 39

R. 28

20

21



29

6-747

28

interbedded slates, cherts and one, striking
 5° N of W. dip 60° S. At the north side
 of the pit are the same gray slates, or
 graywackes noted in the other pits?
 They are conformable beneath black
 ferruginous slates.

26560 Red one from same one of the pits near
 the $1/4$ post; brecciated.

S. 29/28
32/33

T. 39

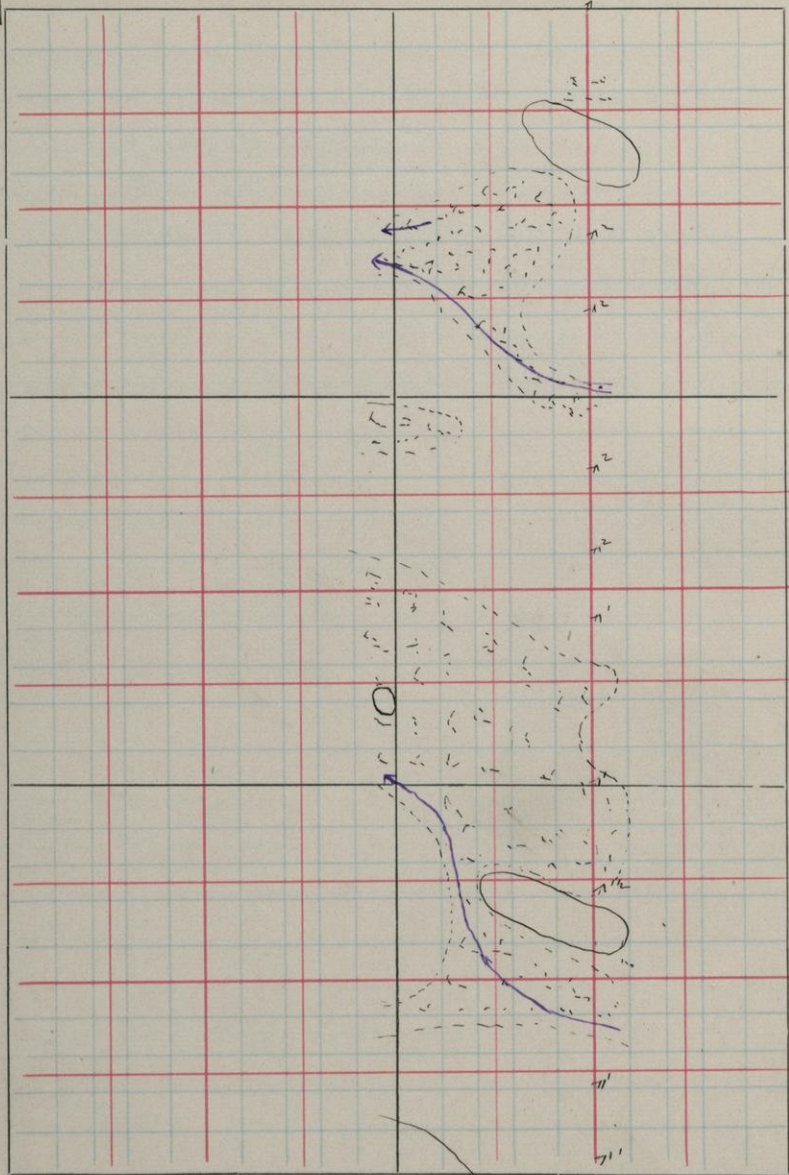
R. 28

29

28

32

33



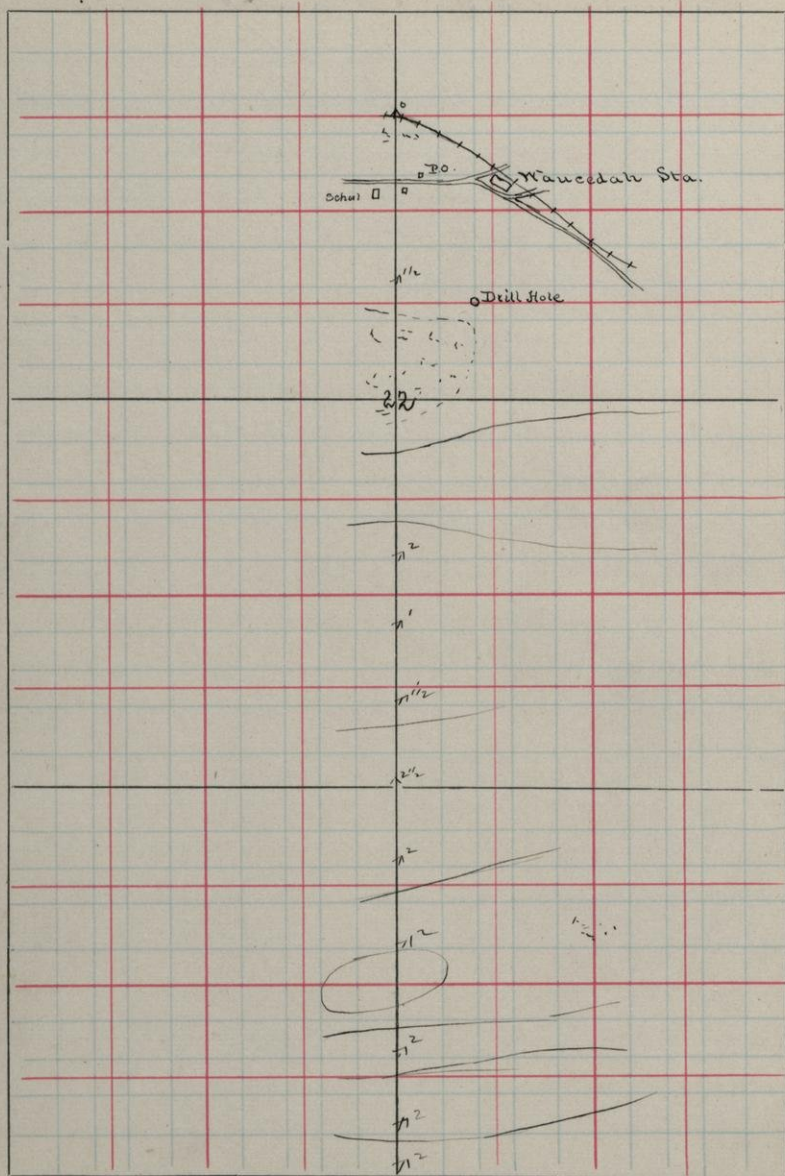
Ran south two miles and a half
to south line of T. 39 R. 28 along
section lines between Secs 28 and 29,
E13 - and back 500 paces East.

No rocks.

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

T. 39

R. 28



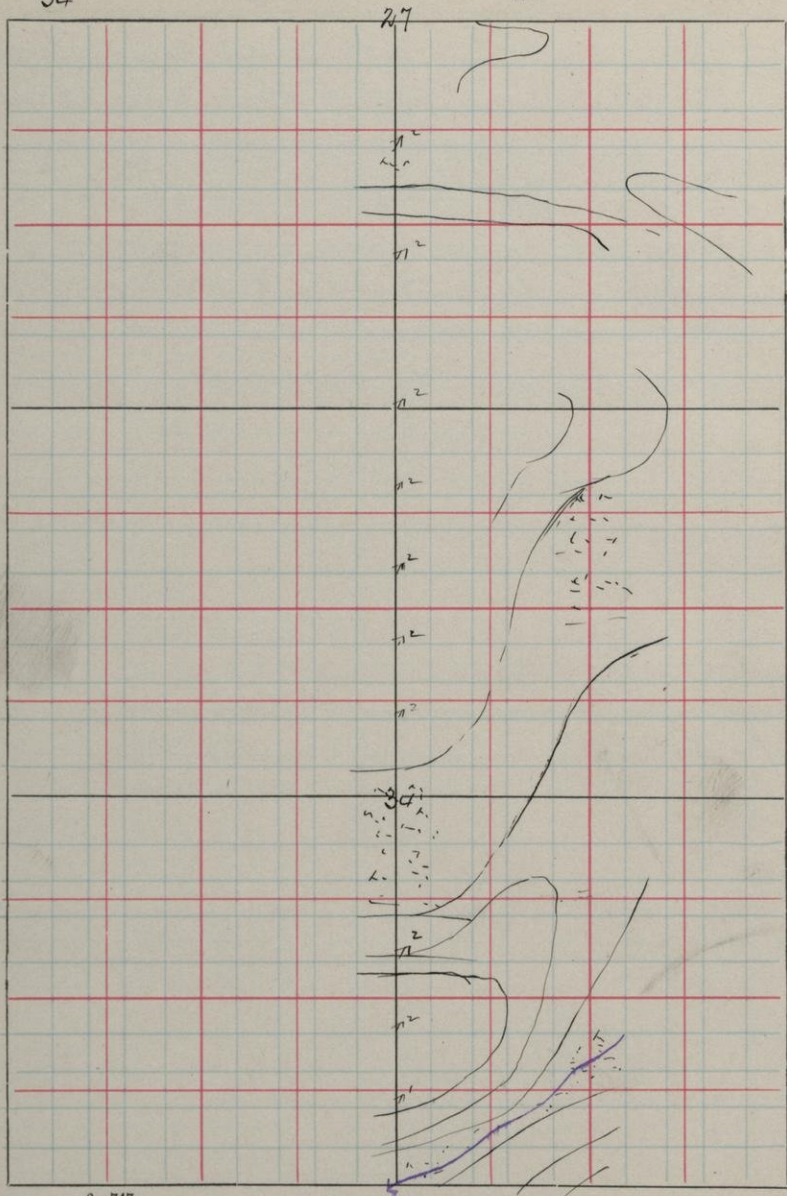
Ran out on N T Center line 7 Secs
22, as far as South turn line then
East 500 paces and back
No rocks.

A Drie hole is going down just South
of Wauwedah Station, but it had not
gone through the drift when we left.

S. $\frac{27}{34}$

T. 39

R. 28



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

T. 39

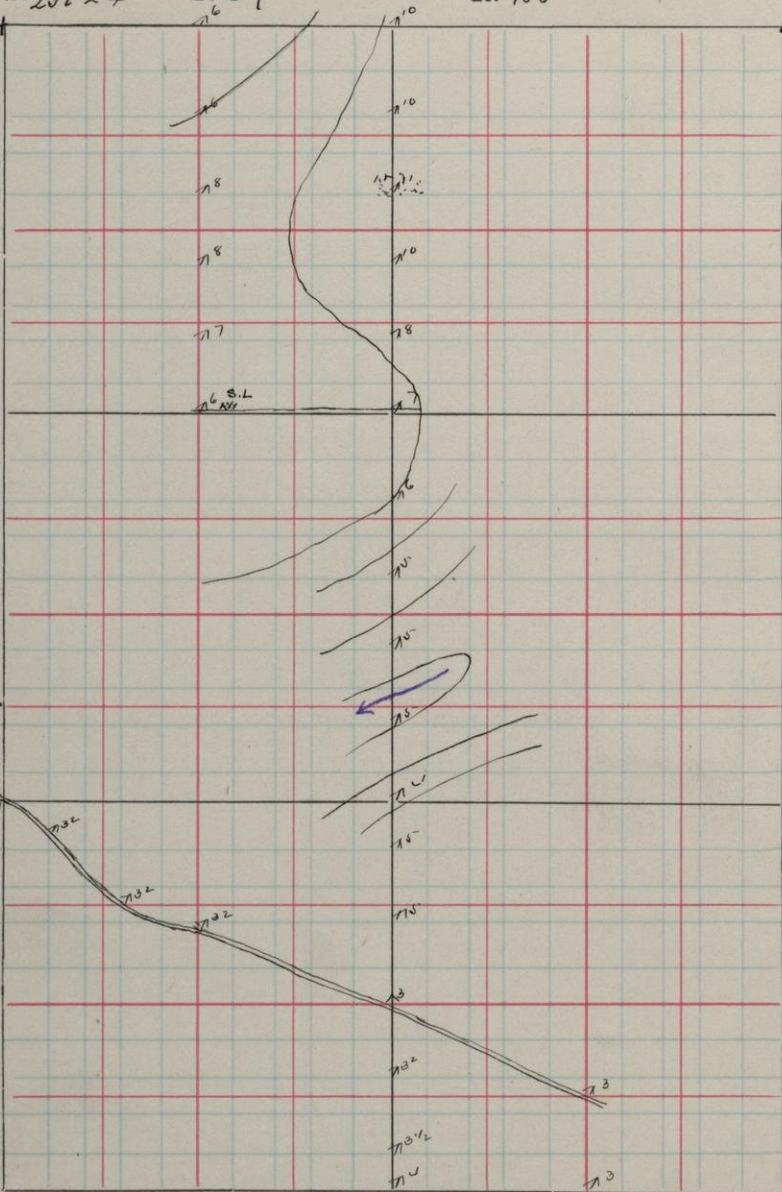
R. 28

14

23

23

24



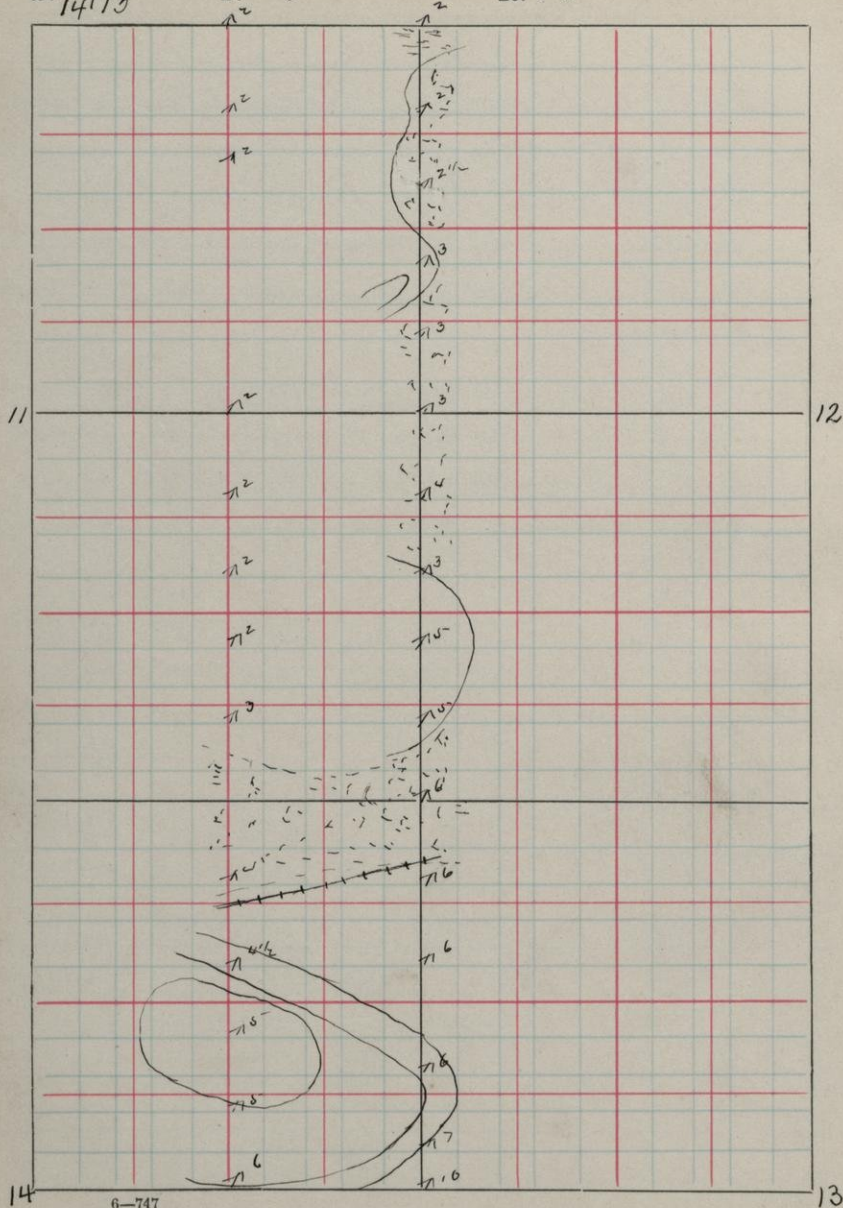
From Waucesha - Hermannsville
road saw North in line between
Secs 23 & 24. T. 39 R. 28 as far as
North corner between Secs 11 and
12, then west 500 paces and south
to road

Saw rock outcrop in side of road at
top of hill, about 400 paces west
of N.E. cor Sec 23. The ledge is of
flat lying Silurian limestone.

S. $\frac{11}{14} / \frac{12}{13}$

T. 39

R. 28



2656✓

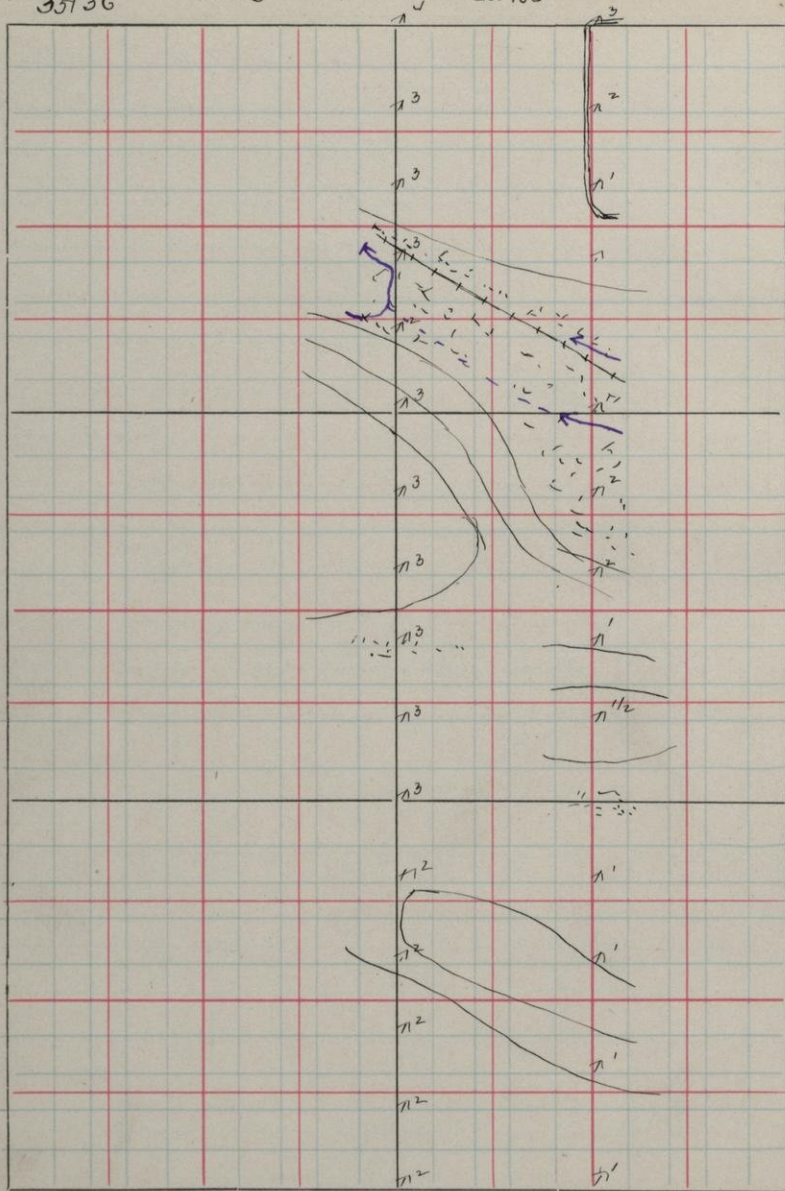
S. $\frac{26}{35} \frac{25}{36}$

T. 39

R. 28

26

25



Trail road between Wancedah and
Hermannsville ran South in
Sec. line between Secs. 23 and 24
in town 39 R. 28 as far as town
line then 500 paces East and North
again.

No rocks of any kind were seen
on the run.

S. 35/36

T. 39

R. 28

35

36

While travelling around the mine discussing the relations of the ore bodies to the associated rocks the following specimens were obtained

26565 Iron mass in ore body. 10th level
W. Vulcan.

26566. Near the top of the ore in the W. Vulcan
are concretions of ore material, similar
to concretions in slate? The con-
cretions are found near contact of
ore with slate?

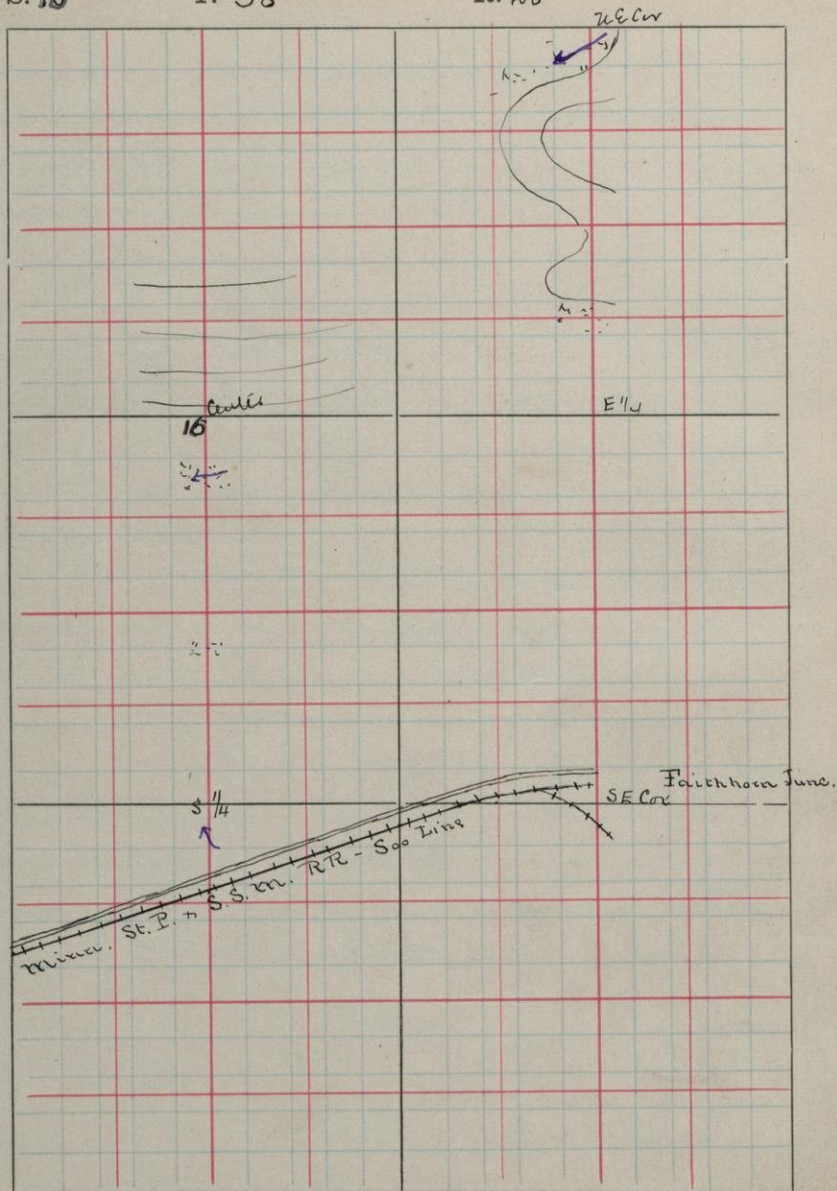
Near the top of the ore bodies, more
particularly along the west side of
of the mine, at what is known as
the water course, the ore contains
nodules of calcite crystals, etc. The
one here is shattered and a breccia
is common, composed of fragments
of ore or of slate cemented by calcite
or by quartz.

The upper contact of the ore formation

S. 15

T. 38

R. 28

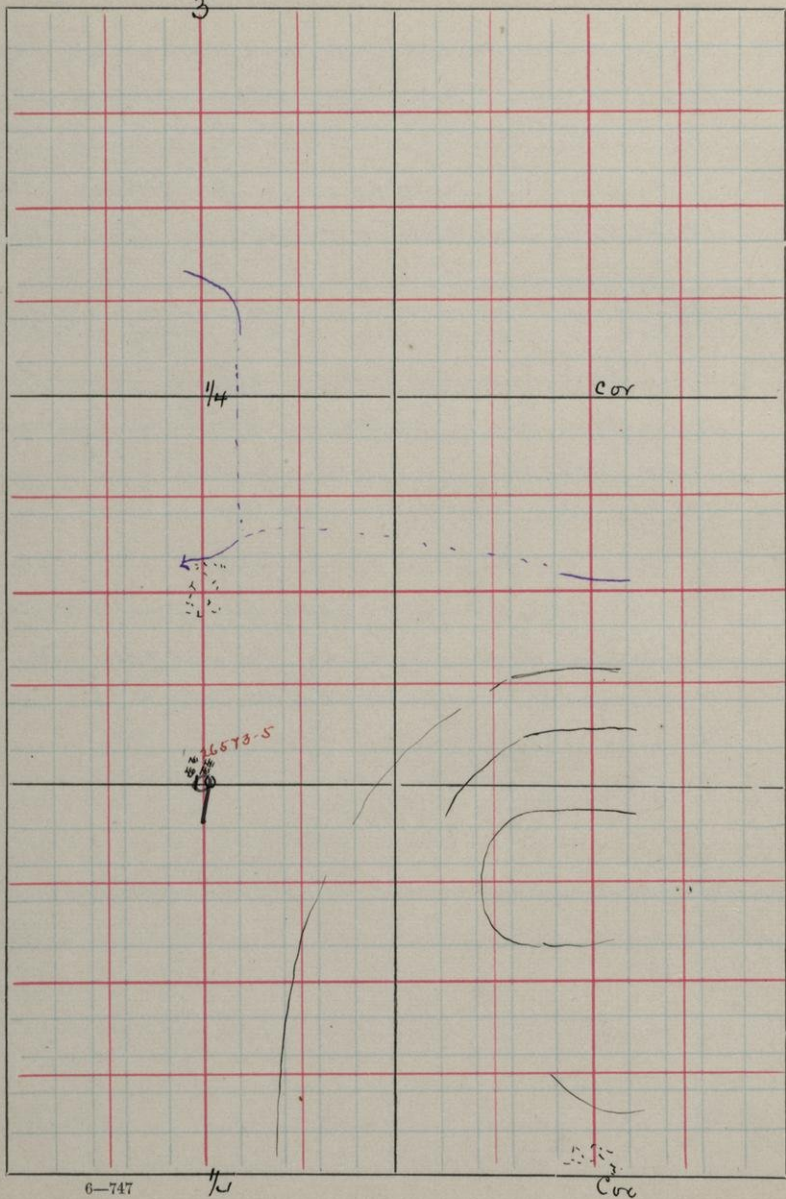


- 26567 is with a 'black slate', thought by
 Geo. Kelly to be Hanbury slate, being
 near the Contact (three or four feet
 26568 from) the slates are slickensided,
 called "graphitic slate" by the miners.
- 26569 These slates seem to be very thick as
 they are found also in deep drill
 hole in W. Vulcan, before getting
 into which the hole passed through
 26570 poor ore.
- 26571 In the one, especially around calcite
 crystals are pockets, or nests of a
 kaoline-like substance, also more
 frequently near the top of the one than
 elsewhere.
- 26572 Small faults in slates are common

S. 24
9

T. 38
3

R. 28



From 0 1/2 past Sec 16. T. 38 R. 28,
 ran North 3 miles, then East 1/2 mile
 and South again. W.S.E. cor Sec 16.

26543 At 1030 N. 1025-W of S.E. cor Sec 9 find
 a few small flat ledges of greenstone
 in top of low drift hill. The rock is
 crushed, gashed and seamed evidently
 by being one of the pre-Herminian
 green - schists.

26544 At 1045 N. the coarse greenstone is
 associated with a fine grained
 banded schist, into which it seems
 to intrude.

26545 Fine grained dyke in same.

These were the only rocks seen
 on the run.

Dr Clements and myself, made a rapid trip down the Menominee River to determine, if possible whether or not a tongue of Huronian crosses the stream, ~~or not~~. The rocks collected were not located accurately as we had no maps. The conclusion arrived at is to the effect that all the rocks in the river below the New York farm are either Valcanies or they are Cambrian and Silurian. Rain all the time.

The specimens are numbered in order beginning with that.

- 26576 Before reaching Limer Falls
 26577 Located in trap belonging to Limer in Madison.
- 26578 Both these specimens were taken
 26579 from the side of the stream at the upper end of the pond dammed back by the large dam at Limer Falls.

S.

T.

R.

There are duplicates of

26580 & 26581.

26580 Red slate from Lorenzo Mining
26581 Blue slate

Called Soapstone by Gen. Murray
of the Mining.

At Lurver Falls is an immense
Dam built in greenstone schists of
various kinds. Did not have time
to examine carefully, although it
would well repay me to study the
rocks here very thoroughly.

26580 Iron end of passage on Wisconsin
side

26581 Associated with 26580.

These rocks seem to be amygdaloids
or variolites. They are beautifully
marked with large and small
concretionary bodies.

26582 Iron about midway between Lurver
26583 Falls and Pemine Falls.

26584 Little further down stream

26585 Porphyry? Iron about 2 miles
above head of Pemine Falls.

26586 About one mile above Pemine Falls,
Michigan side.

26587 from head of Penmine Rapids

26588 Predominant

26589 Rocks

26590 at

26591 the

26592 Penmine

26593 Falls.

26594 Amygdaloidal dyke.

Evidently we have here a series of
volcanics, both acid and basic

These rocks are all quite massive,
below the falls the rocks are largely
schists.

26595 Sericite = Schist } Between Holmes's

26596 Greenstone-schist } Landing and rapids

26597 Head of rapids below Holmes's land-
ing.

26598 Along rapids a mile below Holmes's
landing. Rock originally porphyritic,
lithophysal or concretinary. This
is the predominant rock here

26599 Fragments or inclusions in rock.

Below as far as the White-rapids
containing the greenstones and the
cogranules, sometimes massing,
glen schistose. The variety great,
but all alike in being volcanic.

26600

Red rock from an island 2 miles
above White-rapids. Similar rock
found frequently below.

At White-rapids the rock is Silur-
ian limestone or Potsdam sandstone,
or both.

26691

From below the White-Rapids

26692

From some distance above Pike
Farm. Greenstone

Could not find any Algonkian
fragments as far as went, but
cannot declare that none ever
was below. From conversation
with river men learned that
no ledges some distance down
stream.

Pike Farm is in Wisconsin side
about 4 or 5 miles from

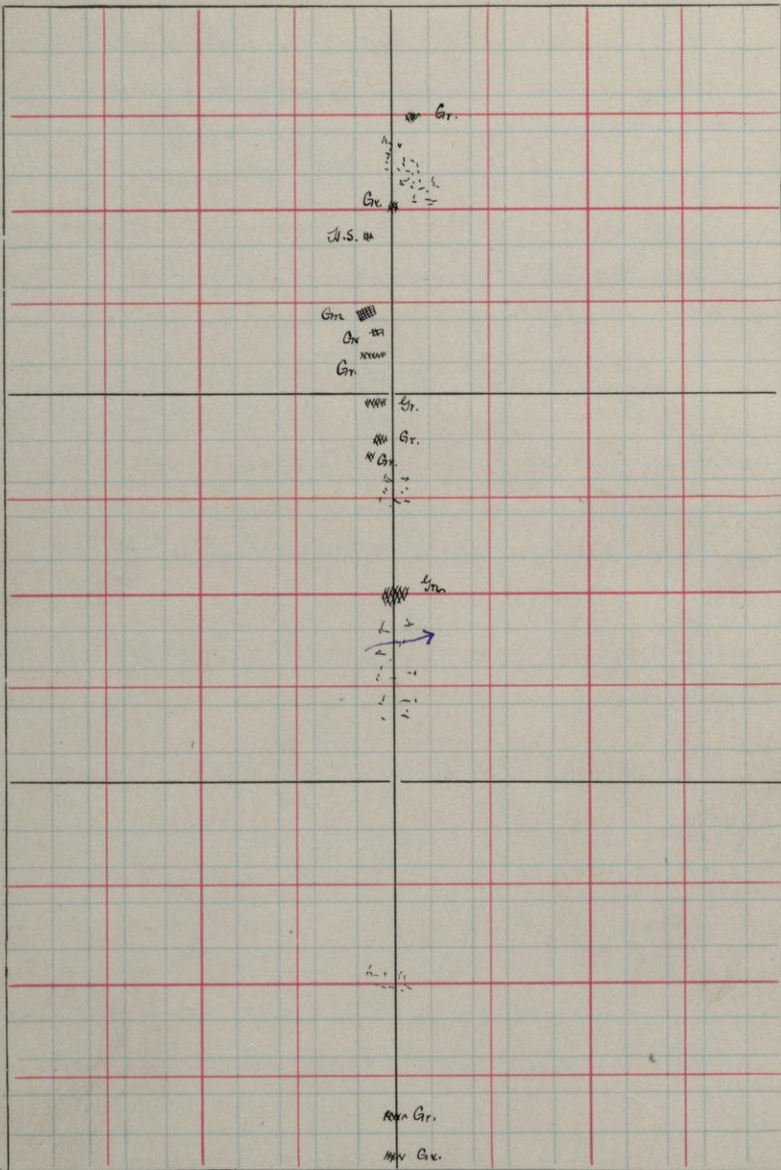
S. $\frac{21}{28} \mid \frac{22}{27}$

T. 40

R. 28

21

22



28

6—747

27

Ran south from N.W. cor Sec 15. T. 40 R. 28 W. four miles to south side of town line in search of exposures of rocks other than granites, with a view to determining whether or not any folds of the Algonkian are caught in the Granite?

Nothing was found in this run but granite and hornblende-schist.

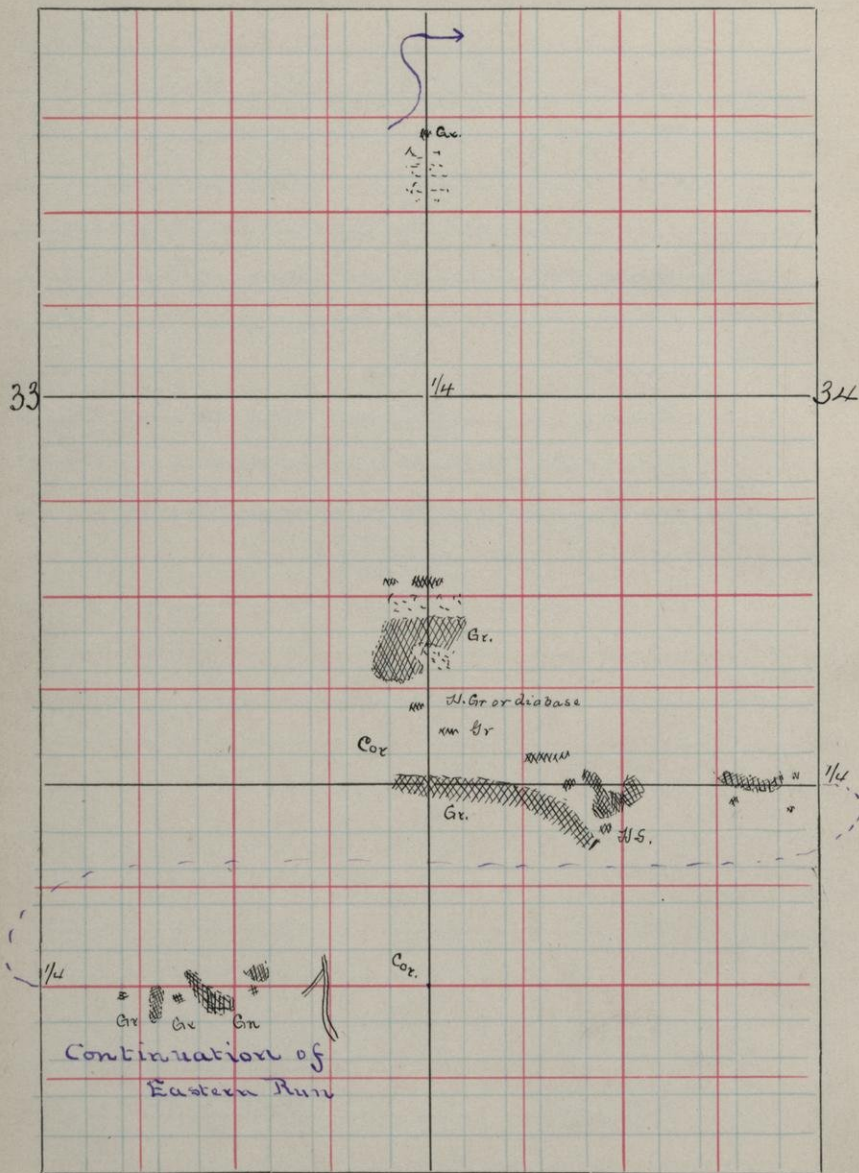
26693 From Sec line between Secs 15 & 16.

26694 From S.E. cor Sec 23.

S. 33/34

T. 40

R. 28

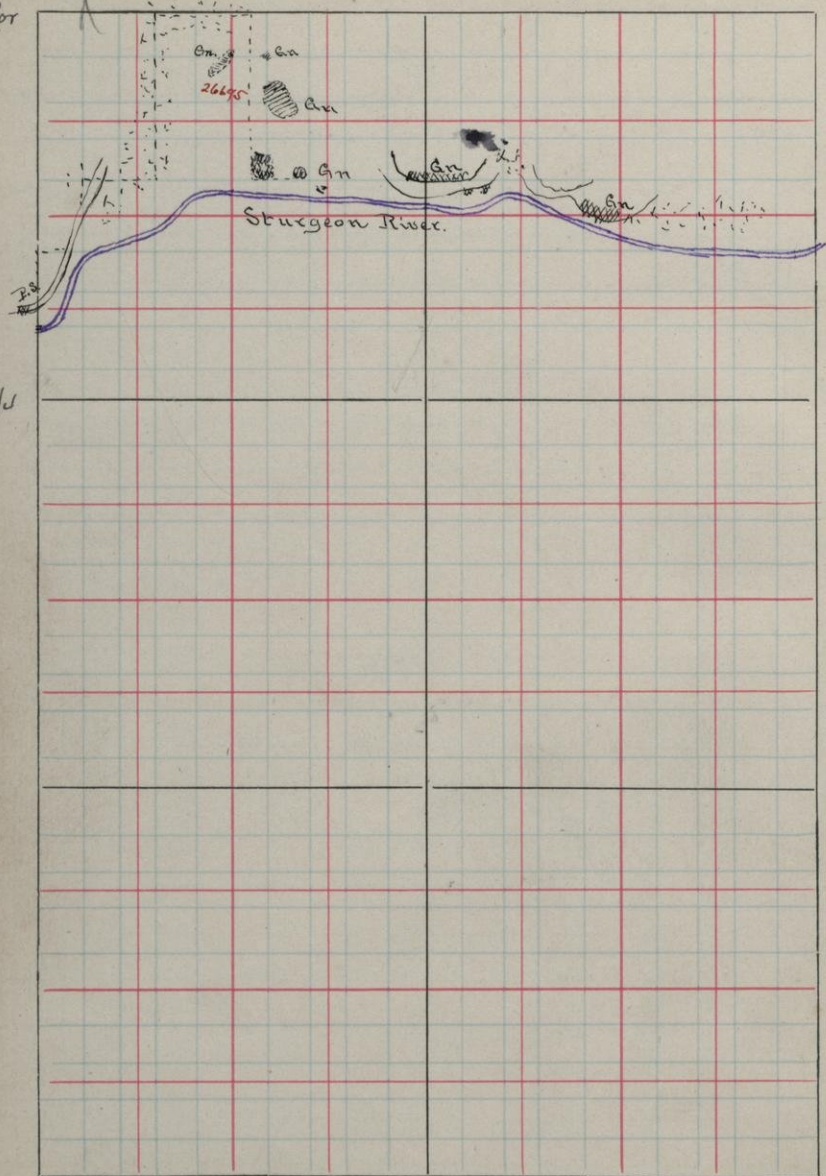


S. 76

T. 41

R. 27

Cor



Made a run along the Sturgeon river
in Sec. 8 T. 40. R. 27 W.

North of Foster City?

At 260 ft. 20 W of S $4\frac{1}{4}$ f sec. is a ledge
of Potsdam sandstone forming cliff on
side of stream.

26695 on North side of river, as indicated
on the map is a series of ledges of
gneiss - very schistose, black and
white streaked - resembling biotite?
granite?

This is well laminated with bands of a
fine grained light colored - almost
white rock whose schistosity is parallel
to the banding in the gneisses.

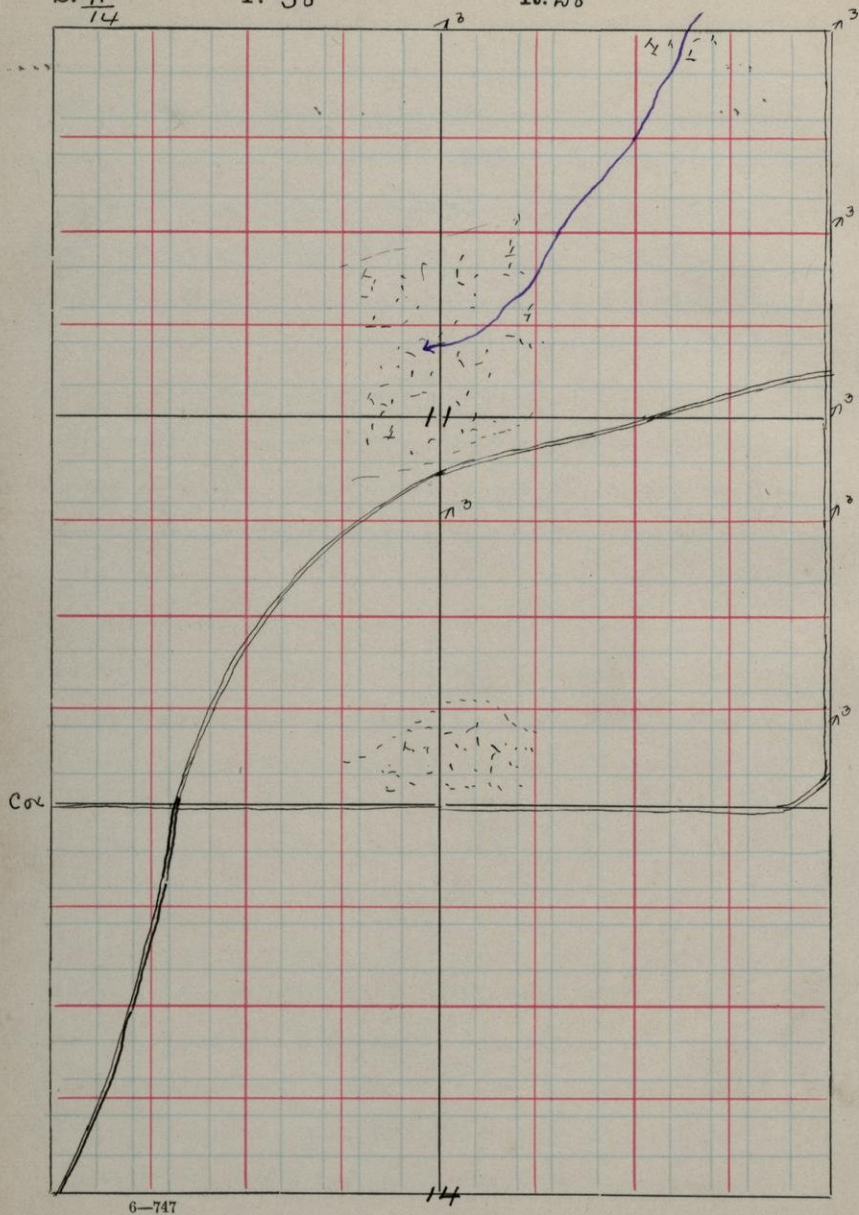
The schistosity of the ledges on the
N.E. of the NW $\frac{1}{4}$ of the section, strikes
S.E. and dips N at 50°.

The ledges in the N.E. quarter line
are more evenly banded than the others
and are of a darker color, with
bands of chlorite? schist and resembling
schist interlaminated with gneiss.

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

T. 38

R. 28



Followed the river up as far as dam
but saw no other rocks.

Oley and Weller made several
runs in country for simple geological
geological features and collected a
few specimens.

They ran north in N. T. 14 line of
Sec 14 T. 38 R. 28 and back in
East line of section. Run extended as
far north as the turn line.

No rocks.

S. 21

T. 38

R. 28

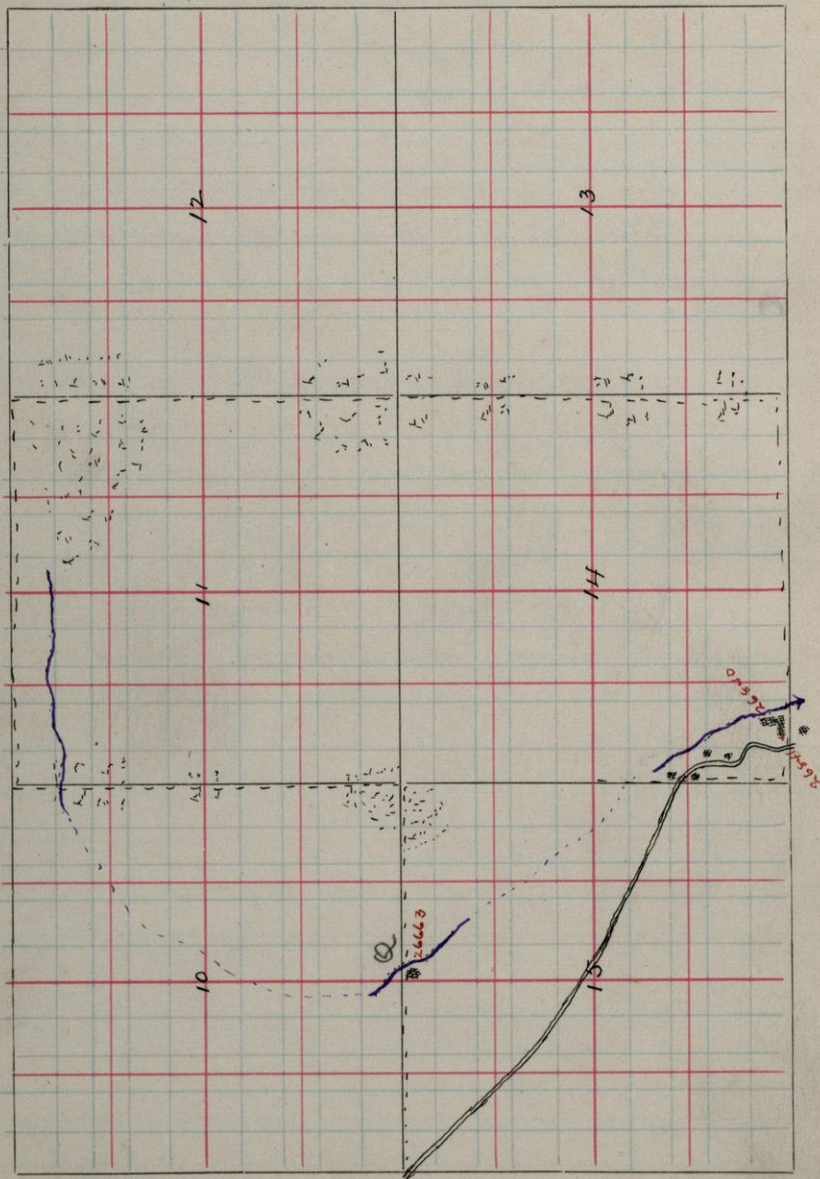
Cov

Cov

S.

T. 40

R. 28



From N. W. Cr. Dec 15. J. 40 R. 28
 Oley and Weller ran East one mile,
 North 1 mile, East 1 mile, South
 2 miles, West 1 mile and North
 to Sturgeon river.

The only rocks seen were

26663 Quartzite - 900 W. 1980 N of D.E. Cr
 Dec 15. J. 40 R. 28.

26840 Granite or gneiss - 1600 W. 20 N.
 D.E. Cr Dec 15

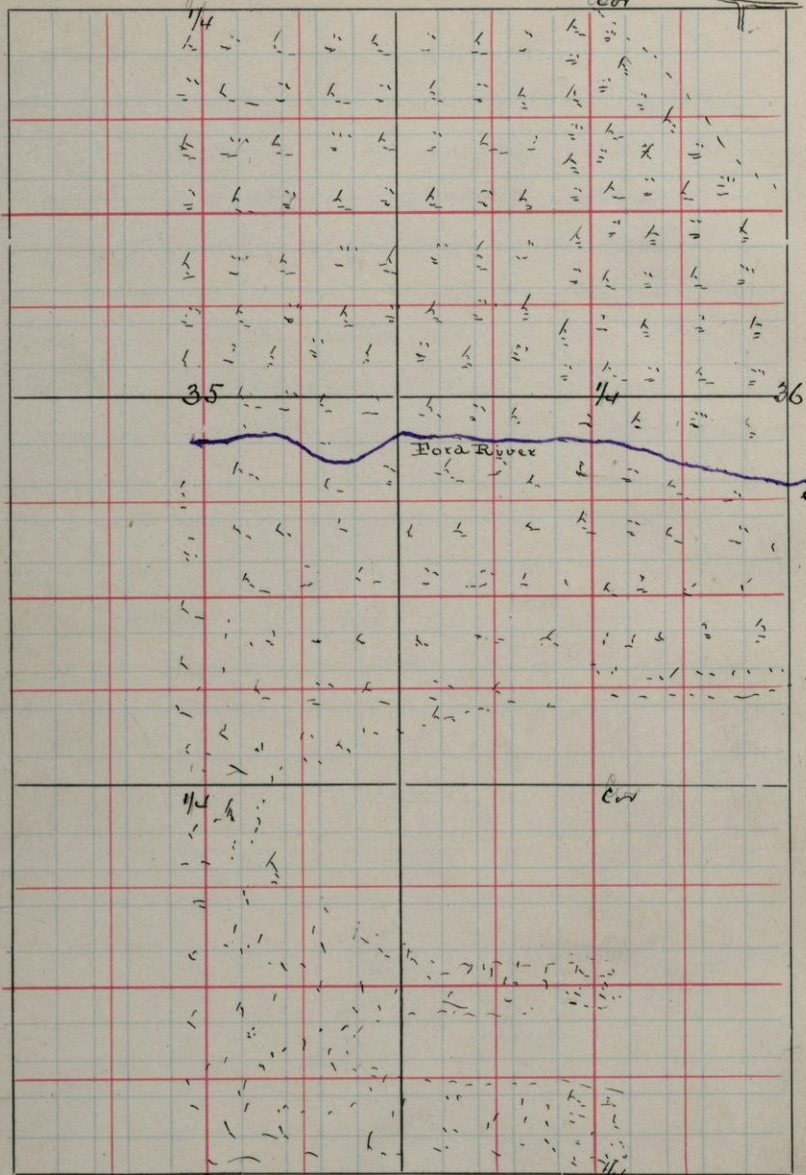
26841 Granite - 1725 W. 10 N Dec 15
 Dec 15.

S. $\frac{35}{2} \frac{36}{1}$

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

R. 28

0064



From U.E. cr Dec 35 J. 43 R. 28

Olney & Weller ran south three miles west 500 paces and back - finding several ledges en route.

26728 Greenstone 760 U. 1450 W. JSE cr
Dec 36 J. 43 R. 28.

✓ 26729 Quartzite 1400 U. 1950 W. JSE cr
Dec 12. J. 42. R. 28.

✓ 26730 1450 U. 1925 W. JSE.
Cr. Dec 12. J. 42 R. 28.

26731 230 W J O.G. cr Dec
11. J. 42. R. 28

Same rock at 400 W. JSE cr Dec
11. and again at 730 W.

26732 900 W J J.E. cr Dec 11
J. 42. R. 28.

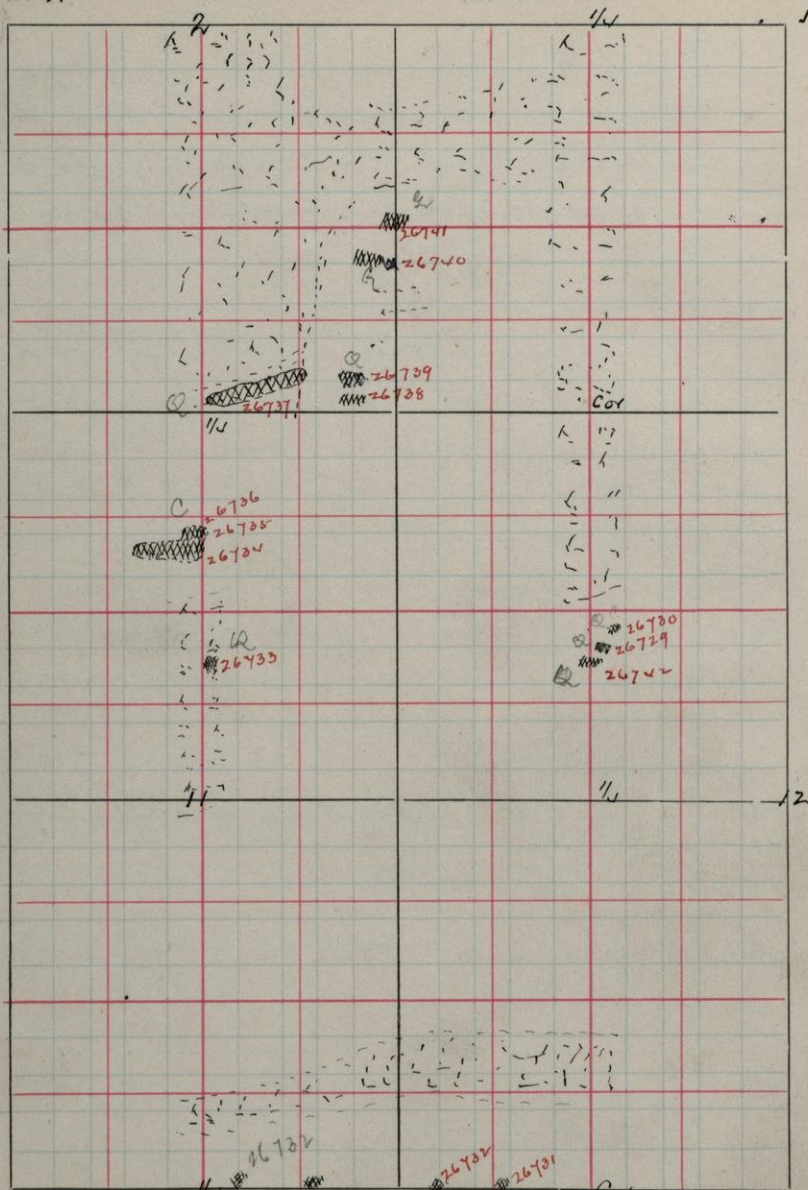
✓ 26733

Quartzite 1385 U. 1000 W. O.E cr Dec 11.

S. $\frac{2}{11}$

T. 42

R. 28



- 26736 1650 N. 1000 W. of S.E. Cor
Sec. 11. T. 42. R. 28.
- ✓ 26735 1660 N. 1000 W. of S.E. Cor
Sec. 11. T. 42. R. 28
- 26736 1700 N. 1000 W. of S.E. Cor
Sec. 11. T. 42 R. 28.
- ✓ 26737 110 N. 960 W. of S.E. Cor
Sec 2. T. 42 R. 28
- ✓ 26738 110 N. 575 W. of S.E. Cor
Sec 2. T. 42 R. 28
- 26739 60 N. 575 W. of S.E. Cor
Sec 2. T. 42. R. 28
- ✓ 26740 400 N. 500 W. of S.E. Cor
Sec 2. T. 42. R. 28.
- ✓ 26741 Granite? 190 N. 500 W. of S.E. Cor
Sec 2. T. 42. R. 28
- ✓ 26742 Q 1370 N. of S.E. Cor Sec
11. T. 42 R. 28.
White E. & W.
- 26743 Limestone, 1980 W. 1700 N. of S.E. Cor
Sec 5. T. 42 R. 27.
- 26744 Granite? 550 N. 1000 W. of S.E. Cor. Sec
6. T. 42. R. 27.

Maps for T. 42 R. 24 m. p. 14015.

In conversation with Mr. Brewster of the Plumbago mine learned a good deal about the occurrence of the ores and their nature. Also obtained some specimens.

is tale or serpentine from within the ore at the Chapin mine.

Brewster says that the quantity of this material increases with the depth of the ore as if it were infiltrated from above. The upper ore is more porous than the lower, the pores of which are filled with this material. The ore also increases in percent of Mg & Al as depth increases.

Crystals of hematite in calcite from within the ore at the Chapin mine.

26696 Feldspar from ore in Chapin mine.

26697 From ore at Chapin mine.

26698 Soapstone or talc-slate from wall of Aragon mine

26699 Limestone from foot-wall of Aragon mine

The following few specimens were collected near or on the Horse race. on Wenamunee River south of Iron Mountain.

26700 Porphyritic granite³, on R. R. track - $3\frac{1}{2}$ mile S. of Wenamunee River.

26701 Diabase - Porphyritic³ from side of R. R. track near Horse Race.

26702 Horn blende - Schist from R. R. track a little south of Horse Race crossing.

26703 Talc or Soapstone from mass in one at W. Norway "thing" (W. Vulcan)

2670.

Addresses of Men Interested in
Marquette and Menominee Geology

Marquette Range

C. E. Hendrick, C. E. Lake Superior Univ
Sokpenning, Mich.

C. H. Hall, Agent L. S. Iron Co.
Sokpenning, Mich.

Addresses of men interested in Mesozoic Geology

L. B. Suttus, M.E. Iron Mountain, Mich.

E. F. Brown, Supr. Pewabic Min., Iron Mt.

Robt. Murray, M.E. Loretto, Mich.
Iron River, Mich.
Crystal Falls.

Wm. Kelly, Supr. Vulcan, Mich.

J. A. Jansson, M.E. Norway, Mich.

Per Larsson, Supr. Norway, Mich.

John Jones, Supr. Iron Mountain, Mich.

Dr. H. P. Kuest.

L. M. Sandenburgh, Iron Mt.

V. S. Kelley, " "

C. E. Brewster, " "

William Hyde, " "

F. L. Connelly, " "

W. L. Woodworth, Iron River, Mich.

C. E. Lawrence, Amasa, Mich.

Jas W. Houghton, Iron Mt.

Supn. Chapin King

E. E. Brewster

Chemist " "

G. Kelberg

Norway, Wash.

O C Dainow, Florence, Wis

Amos Shepard, Freeport, Me

LI General map

LII Special map.

