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Penokee-Gogebic Region, Michigan: [specimens] 12501-12665. No. 59 June, 1887

Van Hise, Charles Richard, 1857-1918

[s.l.]: [s.n.], June, 1887

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 59.
June, 1887.

Pemokee - Gogebic.

C. R. Van Nise.

12501-12665

Survey of the Pre-Cambrian Rocks of the N. W. States.

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 figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. In all cases where there is the least doubt about the true bedding directions, 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 line as 100 paces, and twenty of these spaces as 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.

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.

3. The ruling of the left hand page is also arranged so that a smaller scale can be used. Each one of the black lines may represent a section line and the red lines quarter sections and "forties." The scale of the maps may thus be reduced, if desirable, to two inches to the mile (the ordinary town plat scale.)

4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with a note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples, trimmed to a uniform size of $2 \times 2 \frac{1}{2} \times \frac{1}{2}$ 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 $\frac{1}{2}$ §, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. All specimens are to have numbers painted on them, in white on a black background, in the field.

5. 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., etc.

6. Forward this note book, as soon as filled, as registered mail matter, to R. D. IRVING, U. S. Geologist, Madison, Wis.

Colby Mine.

Monday, June 16, '87

The workings at the Colby Mine are in the N. E. $\frac{1}{4}$ Sec 16 T 47 R 46 near the south line of the quarter. The workings are in two parallel pits some 300 feet apart. The southern workings are much the larger and from there about two thirds of the ore raised by the mine has come. At present most of the mining is under ground although ore is still being taken from the large open pit at the south. Both northern and southern pits have a northeast and west direction and are nearly parallel, but in these pits are many irregularities. The northern pit has gone no deeper because the ore is cut off by rock, and the southern open pit also promises soon to pinch out. As shown by the detailed plans of the engineer

T.

R.

Bolby

A. S. 1/4 Sec. 16, T. 4, R. 46
Bolby.

Open cut
Open cut

the deposits in both north and south deposits at each level are most irregular in outline being not solid clean ore but reticulating masses of ore - when viewed in section through which is an equal or greater quantity of lean ore or barren rock.

The north deposit as now followed instead of dipping to the north as at the surface is now trending to the south almost perpendicular to the true dip of the rocks, and it is quite possible that both deposits will be found to be continuous reticulating masses which at the surface changed to contain between them an unusually thick mass of lean ore and barren rock.

Running along the hanging wall of the north deposit is a belt some fifty feet in thickness of a soft grey rock which is called soapstone but which appears to be a

highly altered eruptive. If this
conjecture is true, the silica
for the "jasperization" and
"silexification" may have come
from this source in this lo-
cality. Upon the maps of the
mine this dyke is called a
diorite dyke, although quite
unlike what miners call di-
orite ordinarily. This material
is quite similar to material
previously found in sec X3
T47 R 45 West of Black River
and there proven by thin
section to be a much altered
eruptive. Here however the
alteration has extended even
farther than at Black River.

Beginning at the south the
cross section is as follows.

- 12501 Coarse fragmental ferruginous
quartzite. North of this
is the rich soft ore of the pit
and then follows (2) and (3)
12502 the hanging wall of the south
12503 pit the first is lean slaty
ore and the second is lean

banded Jasper.

12504 Ferruginous Banded Flints hanging
wall of north vein

12505 Peculiar phase of hanging wall
of north deposit having a
conglomeratic appearance, the
pebbles appearing to be Jasper

12506 Slaty ore of north side of north
pit and

12507 Soapstone - "Greenstone dyke" upon
north side of north pit. This
dyke follows along below the
ore for some distance, then cuts
off the ore entirely and ore is
then found by going down
beyond the dyke and then drifting
south.

12508 Flinty - siderite From pit
175 W. of E line of Sec 16 and 125 W.
of E & W. $\frac{1}{4}$ line (estimated by
Cobby Surveyor)

About $\frac{1}{4}$ mile east of main
 workings are other rich deposits -
from which shipments have not
been made, but which are said

by the mining captain and super-
Intendant to have the same gran-
ite as a foot wall which is found
at the Cobby workings in N.E. 1/4. 16.

Palms mine

NW 1/4 of Sec 14 T20N R7E Range 46 W
 showing prospect for Hapt and location of 30 1887

old camp
 casing

Missouri L.G. & N.R.R.

Sheldon Creek

No. 4

No. 8

No. 1

No. 2

Engineering office
 Ship's tent
 Beam
 Parking
 Flowers
 Canteen

Small Branch

Scale 1 inch = 400 feet

Miss. Central R.R.

6

Tuesday, June 28, 1887.

Palms Mine

The Palms Mine is in the N. W. $\frac{1}{4}$ Sec 14, T44 R46.

Mining is going on in three shafts in line E + W magnetic but which corresponds to about W 10° S. These shafts are 800 feet apart and the center one is 50 feet east of the center of the property. The order of succession of the strata here is from north to south granite, slate, quartzite, paint rock, ore, ~~lean ore and Jasper~~, and slates bearing carbonate of iron, and ferruginous flint

12509 Siliceous slate south side of R. R. Cut spur N. E. S. + W. 75° E + 10° S, magnetic from each shaft

12510 Quartzite north side of same cut 75° E + 55° magnetic from each shaft.

- 12571 Slaty Carbonate of Iron. From
4 p.m. 100 x of west shaft
- 12572 Ferruginous Flint, R. R. Cut,
M. E. S + W. 200 x of west shaft.
- 12573 "Pain's Rock". Found in mining
between the granite and
rich ore - According to the
Captain is from 2nd to 12' in
thickness. Where it disappears,
it simply is rich enough in
iron to be an ore.

✓ The granite is 500 to 600 feet
south of shafts.
Ore belt 70' across and ore
hanging - "not all clean ore."

T.

R.

Anvil Mine

A. S. 4 Sec. 14, T. 47, R. 46

Shaft not being used.

Location of working
shaft

175 N. 940 W.

Now working.

4-1548 N. 36 W.

8

Anvil Mine

The Anvil Mine, situated a short distance east of the Palms has a succession of layers precisely like that at the Palms. The situation of the workings is shown by accompanying diagram.

In R. R. Cut, N. E. S. & W. the section is well exposed 20 specimens are here taken instead of at shaft.

12574 Quartzite 690 feet east of west line of anvil.

12575 Lean Ore just north of and in contact with 14

12576 Slate 300 feet north of shaft 365
10 feet east of ^{west} line of property.

12577 Lean Ore and Slate from pit

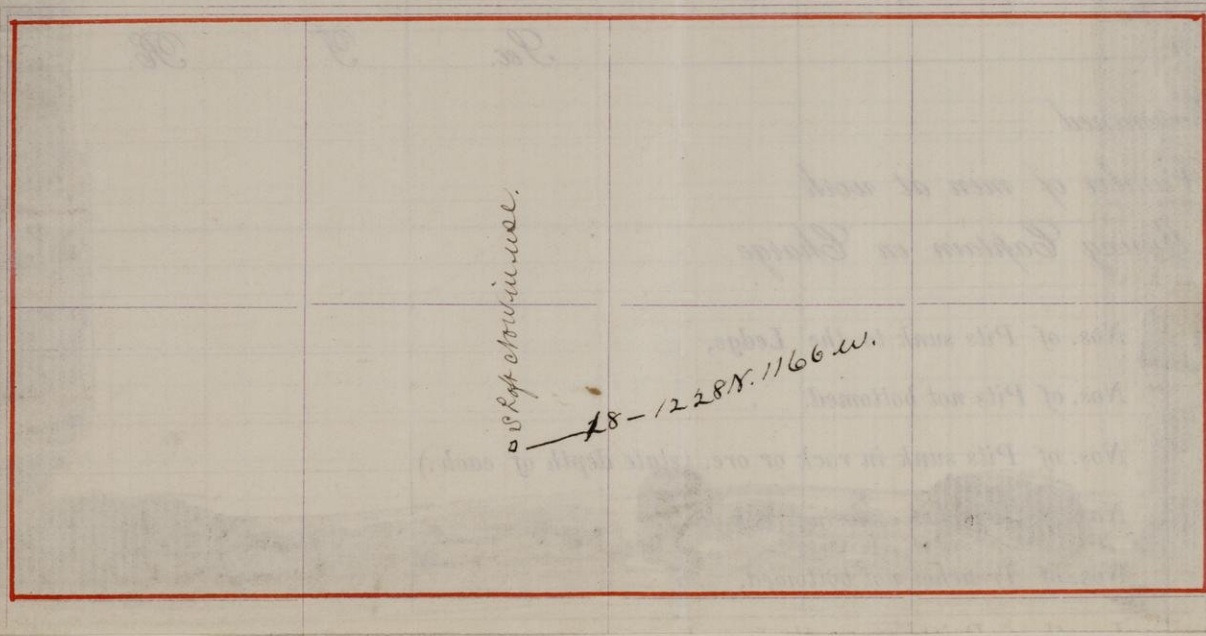
12578 500 to 600 feet north of same shaft

12579 Lean Banded Rock. From pit about
150 E + 50 to 75 S of 17 + 18

Diagram of work on Option of Tilden Mine

on N²

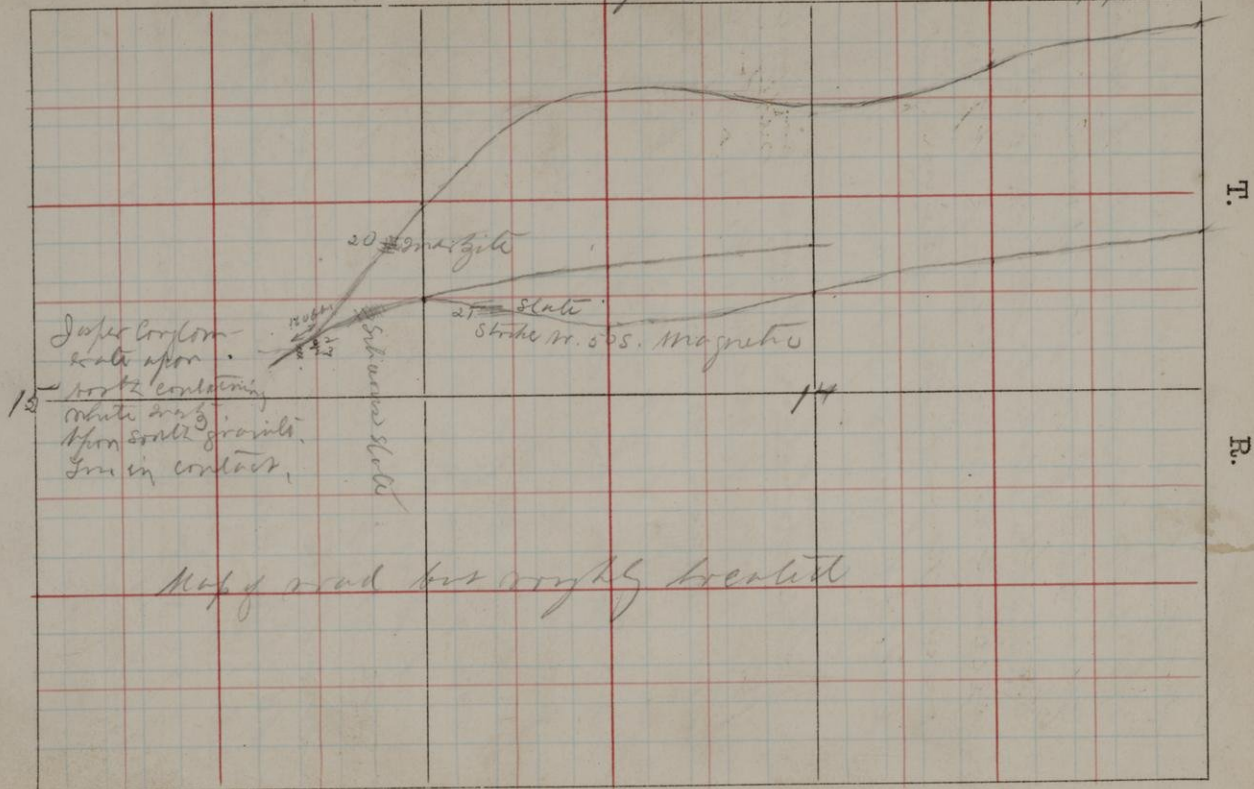
Sec. 15, T. 47, R. 46.



The cross cut in the chief shaft of the Anvil runs for 115 feet across ore, which ~~then~~ separated from the seams of "sand rock" which it contains is said to run beyond 60% metallic iron. Beyond this the ore gradually becomes poorer.

The Filden Mine includes the N $\frac{1}{2}$ of sec 15, T 47, R 46. The main workings are from a single shaft the position of which is shown by the accompanying diagram. Here the section so far as exposed is the same as at the Palm and Anvil. Just south of the shaft, a P.R. cut shows 12524 Magnetite which continues for 50 steps south of which there is an interval in the cutting of 50 steps and then the characteristic variegated slates appear.

N. 20. S. & Western Spurs. Sec 14 & 15, 47, 46.



Map of road but roughly treated

- 12520 Quartzite
12521 Slate
12522 Conglomerate containing white-
quartz and Jasper pebbles and
12523 granite. The position of these
specimens are shown upon
accompanying diagram of N.
E.S. & Muslim Road.

The granite has a thin facing
of the conglomerate upon ^{near} the
road road cuts and the slate
and quartzites are farther
north.

Valley Mine

$S\frac{1}{2}$ NW $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, N $\frac{1}{2}$ SE $\frac{1}{4}$, Sec 16, T47, R4

(S)

9-1088 N. 1360 w.
 5-1066 N. 1262 w.
 7-1055 N. 1249 w.
 8-1040 N. 1228 w.
 6-1035 N. 1249 w.
 1035 N. 1230 w.

now working

old shaft
 now abandoned
 not working

The Valley Mine

This mine so called, was not visited. At present there are no chipping pits, although in the past a few thousand tons have been chipped. The fragmental quartzite to the south has not been found according to Mr. Paddock. The material taken from the pits is said to be the usual lean ore and flint. The location of these pits is shown upon the accompanying diagram.

T.

R.

Fontaine Mine (S)

E 1/2, S. 2, 1/4

Sec 17, T47 R46

3 — 626 N. 44 W.
 0 — 2 — 620 N. 49 W. 12 W.
 4
 15 N.

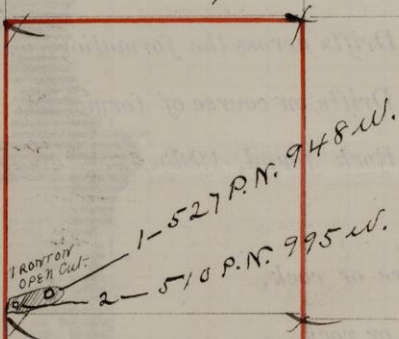
The Fontaine Mine

The Fontaine property like the Valley is not shipping, nor have they as yet shown up any large clean deposit. The material taken from the shafts is the usual lean banded ore and flint containing bands and cherts of ore. The rock is found upon their dump heaps which can be taken for fragmental quartzite.

T.

R.

Fronton Mine
N $\frac{1}{2}$ S. E. $\frac{1}{4}$
Sec. 17 T. 47 R. 46.



The Doonton mine.

This property is shipping quite largely and is said to be steadily improving as developed. It has one large open pit several hundred feet long, but the mass of the ore is now being taken from underground. The section is here just as found elsewhere - fragmented vitreous quartzite, flinty rock, or, lean flint containing boulders and chert ore. N $\frac{1}{2}$ of the S.E. $\frac{1}{4}$ sec 17, 47, 48 Diagram accompanying.

As shown by accompanying diagram the main workings are upon the west part of the 80. Shaft upon east part, near Toubin has lean ore.

T.

R.

Puritan Mine,
S. W. $\frac{1}{4}$ Sec 17.
T. 47. R. 46

Open Cut
~~500 ft~~
500 ft
1000 ft

14

The Paritan Mine

A spur of the N. L. S. & W. Co.
runs just south of the ship-
ping shaft. Upon the south
side of this track are the

12525 typical variegated slates
and upon the north side of
this same cut are found

12526 Vitreous Marbles. South
of this quartzite occurs the
rich ore and mingled with
or overlying the ore is

12527 Flint containing shots and
balls of ore.

12528 Lean Banded Ore. From R.R.

12529 cut on branch N. L. S. & W. Co.
north west of Paritan workings.

12530 Slate from shaft upon E & W.
1/4 line of Sec 17 and between
center of section and 500 west
of center.

T.

R.

Blue Jacket Mine
 S $\frac{1}{2}$ S.E. $\frac{1}{4}$, Sec. 18,
 T. 47, R. 46,

4-112 N. 549 W.
 3-12 N. 509 W.
 2-120 N. 476 W.
 1-120 N. 462 W.

Blue Jacket Mine

This property is not shipping and as yet has no developments which show the presence of any considerable body of ore. The material taken from the shafts is the ordinary ore, flint &c., and mingled with it one found no quartzite which could be from the fragmental belt.

Lean ore is found in a pit located at the S $\frac{1}{4}$ post of Sec 18, T. 47 R. 46

Variegated fragmental slate just south of south line of Sec 18, 100 steps east of S $\frac{1}{4}$ post.

Wednesday, June 29,
 A short distance N.E. from
 Bersemer is found a contact
 between quartzite like that
 found in Black River near
 the "Trop Range" and the
 greenstone of the trop. The
 actual contact is shown
 in a pit.

12531 Trop - south side of range
 1289 N. 592 W of S. E. 10
 47. 46.

12532 Quartzite in contact with
 this trop.

12533 Sandstone in pits south of
 12534 the above 1205 N. 627 W. of S. E. 10

12535 } Conglomerate
 12536 }
 v

12537 Slate from material from
 same test pit - 1160 N. 627 W.
 of S. E. of Sec 10.

As this quartzite and sand-
 stone is closely resembled

sandstone in Black River close to the trap and quartzite west of the Montreal River in the same relative position to the trap, the thought is strongly suggested that this peculiar red sandstone and quartzite belong to the Keweenaw series rather than to the Huronian - following along as it does approximately conformable to the trap range. If this is true, and the trap and quartzite belong together in the Keweenaw, it becomes probable that the test pit just south of here showing both conglomerate and slate represents the junction between the two series. The conglomerate being the base of the newer.

J. Parke Channing who made the above locations for me also says that quartzite like that near Bessemer is found 1004 ft and about 1500

West of S. E. Sec 17, T47 R 45
 also near center of S.E. 1/4 of
 N.E. 1/4 Sec 9, T 47 R 46,
 the contact of the trap and
 quartzite is again seen

Nikado Option S. 1/2 of N.
 W. 1/4 Sec 18, T47 R. 45 - 28

Rhinelanders Option W 1/2 of N.
 W 1/4 Sec 18, T47 R 45.

~~Alvord A. E. 1/4 of A. W. 1/4 Sec 18~~
~~and A. W. 1/4 of N. E. 1/4 Sec 18~~

Pilgrimage S.W. 1/4 of N.E. 1/4 and
 E 1/2 of N.E. 1/4 Sec 18

Speedwell W 1/2 of N. W. Sec 17

Star E 1/2 " N. W. Sec 17

Florence W 1/2 of N. E. Sec 17

Lowland E 1/2 of N. E. Sec 17

12538 Bear Ore and Jasper "Nikado"

12539 800 feet S. and 50 feet W. of N. 1/4
 post Sec 18

12540 Greenstone pit 20 steps N of
 38 and 39

12543 Iron Carbonate 600 N. 75 W.

of the center of sec 18. 47, 45

Lean Ore in shaft 562 N. of center of sec 18. Ore formation said to run at least 12 steps farther south to 550 N. of center of section.

12541 Altered Greenstone 500 N. 50 W.

12542 of center of sec 18. From shaft. This greenstone varies from quite fresh to much altered so much altered as to approach the grey altered material shown as a probable altered greenstone at the Colby. Material precisely like that found at the Colby is also shown upon the Wells option just S. of Sunday Lake Outlet.

✓ Same or fresher greenstone in shaft 883 N. of center of section. Greenstone is also shown in at least two intermediate shafts and is

probably continued from
383 ft & 530 ft of the center of
Sec 18. or least.

Lean flint & on 1560 feet
south and 400 feet east of
the N. E. corner of Sec 18,
"Pilgrim" (about) from shaft
of which this is the close approx-
imate location.

✓ On "Oxfordwell" option, according
to statement of Captain diamond
drill core shows "iron forma-
tion" in holes 1360^{feet} and 1560 feet
south and 400 feet east of N. W
Sec 17.

✓ On "Flound" option diamond
drill according to Captain
shows "iron formation" 1395
feet south, 1460 feet south
and 1690 feet south of the
N. W. post of Sec 17
12544 From last hole

The great thickness of the

iron bearing belt west of Sunday Lake is due to two causes (1) a flattening of the dip and (2) to the presence of thick masses of interbedded greenstones. Besides the ~~many~~^{ones} noted, other exposures in this area are mentioned in the note books of previous years.

About 200 steps east and a short distance S. of the N. 1/4 part of Sec 15, T47 R45 in a test trench is exposed the contact between the lower green schist and the lower quartzite of the Huronian. The schist are finely foliated and contain white quartz veins. The strike of the fibre of the schist does not correspond to that of the Huronian at this place. They abut against them ~~quartzite~~ or rather at sharp angles; as far as can be determined from

the small area of the rock here
band.

12545 Specimens of the green schist
12546 above described.

12547 Quartzite, two feet north of
green schist. This quartzite
continued for several feet,
then after an interval of 10
or 15 paces is found variegated
slates and flint conglomerate
in that pit which was
located and sampled two
years ago. By reference to
previous note book, exact
location of this pit and there-
fore of the contact may be
obtained.

12548 Green Schist, from ledge
close to Wakefield depot.

T.

R.

on First National Mine,
 A. Pr 1/4 Sec 19, T47, R 46, S 20

Location of Vein as
 shown by S & L Co.

First National July 10
 All the ore shafts - those in number upon the west side of the property contain in their debris fragmental quartzite. The row of pits near the quartzite and others some distance north upon the east half of the property contain mostly Jasper and lean ore

Friday July 1, 1887.

12549 Slate Shaft 20 ft. 17 1/4
post sec 24, T 47 R 47

12550 Ferruginous Slate 50 ft. 20
W. of S. E. Corner sec 13, 47 R 47
Shaft.

First National Mine.

All the pits and shafts upon
this property were not exam-
ined, but a section at an
open pit upon the property
and near there was as fol-
low.

12551 Variegated slate - founda-
tion of Boiler and Engine house
perhaps 50 steps south of the
line of workings of the prop-
erty.

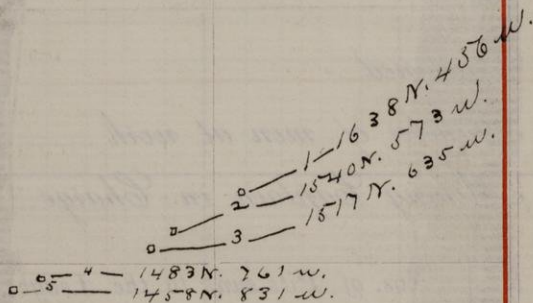
The following specimens
were taken from an open pit
the 4 centers being not more
than ten feet apart and the
order being from North to
South.

T.

R.

Bonnie Mine

A. 2, 4, Sec. 24, T. 47, R. 47



Bonny Mine Sunday July 10

At main shaft of Bonny near R.R.,
 Spar - the lower one is found in the
 material thrown out a little
 frequent al quartzite, and also in
 the first ~~shaft~~ pit west of this point.

12552 Fragmental quartzite

12553 Ferruginous fragmental quartzite

12554 "Pains Rock"

12555 Flint with shots and bands of lean ore.

The fragmental quartzite here simply becomes so ferruginous as in the space of a few inches to change into a loosely cemented ferruginous sandstone, and upon this is a few inches of the pains rock, and above this the ore which was taken out and upon the north wall appears the flint.

12556 Ferruginous Jasper from 8 ft. about 200 West along workings from pen pit.

✓ The Bonney Mine, like the Flint Railroad at present is not shipping and apparently there is no large body of ore shown up. Hollowed row of test pits entirely across property and they all showed

T.

R.

on

CRW 1/2 Sec 24, 47, 47
 Iron King Mine.

Open cut A02

5882n 1405n
 1780w 1698w

Main A05
 1415n + 1393W

South Vein
 1300n + 1565w
 in file

essentially the same material -
 flint containing bands, and
 spots of ore, and occasionally
 with this a little Jasper.
 Nowhere was any of the
 fragmental quartzite thrown
 out.

The Iron King

Shipping is at present going
 on from two open pits upon
 the west part of the property,
 and from shafts which run
 from these pits, but ap-
 parently, by the large stock-
 pile of pure ore, and the
 immense pocket for load-
 ing cars the chief deposit
 developed in a shaft consid-
 erably south and some dis-
 tance east of these open pits.
 The material taken from
 this shaft shows large
 quantities of
 12557 Vitreous fragmental quartzite.
 In the open pits none of

T.

R.

Robst Mine

S $\frac{1}{2}$ A. E. $\frac{1}{4}$

Sec 23, T 47 R 47.

13-00

3-64 N. 298 W.
 2-87 N. 125
 1-49 N. 125.
 597
 1-00

Vanghu Mine

N $\frac{1}{2}$ S. E. $\frac{1}{4}$

Sec 23, T 47 R 47

4-800 N. 800 W.
 3-790 N. 920 W.
 3-

1038	236	far east of north line
	577	" south of north line
4 shaft	508	" east of north line
	449	" south of north line
5 shaft	658	" east of north line
	427	" south of north line
6 shaft	915	" east of north line
	329	" south of north line (Parker)

12558 this quartzite is shown and
flint containing bands
and shots of iron in the wall
rock.

The Pobst Mine

The workings of the Pobst
are wholly underground. How-
ever in the material taken
from the southernmost
shaft was found

12559 Vitreous Fragmented Quartzite
The remainder of the material
was the same as before found
in the other mines again and
again - flint containing
bands and shots of iron.

✓

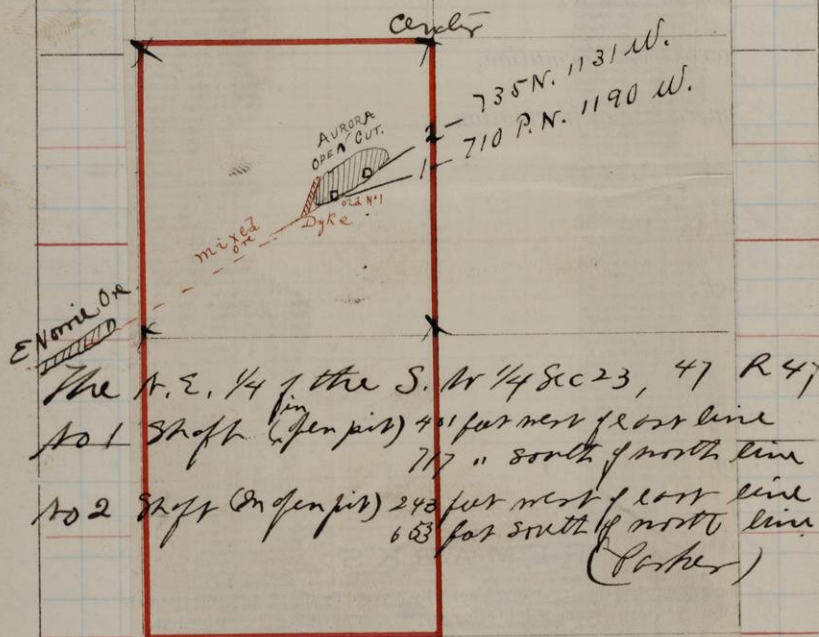
The Varenghen Mine

like the Pobst is working
underground chiefly and from
in the material from the
shafts appears the vitreous
fragmented quartzite.

T.

R.

Aurora Mine
 $E\frac{1}{2}$ S. $W\frac{1}{4}$
 Sec 23, T47, R47,



111
27

The Aurora Mine

The Aurora gives an usually good opportunity to obtain a full section from the Granite which is exposed upon a hill a short distance to the southward and considerably higher than the mine openings to the flint north of the ore. The order of rocks is followed

12560 Granite 220 south of east part of large open pit

12561 Slate. From pit 120 S of ore pit. This slate changed from green to Brown variegated 25 steps north of it and become

12562 slaty Quartzite 60 S of pit

12563 Quartzite upon south foot wall of open pit near its west end. This quartzite becomes more and more arenaceous as the ore is reached, and grades into a

T.

R.

fully covered by the above form; state whether digging is wet or dry. Des-
 operty, or anything else of interest. If Ore has been found give

RKS

Horrie Mine
 S $\frac{1}{2}$ S. E. $\frac{1}{4}$ sec 22
 T. 47, R. 47.

4-200 N. 5/5 ul
 5-285 N. 45 ul.
 3-186 P. N. 630 ul.

T.

R.

Care or East Horrie
Mine

N $\frac{1}{2}$ S. W $\frac{1}{4}$ Sec 23

T47 R47

OPEN CUT.

575 N + 1575 W.

3 — 186 P.M.

very ferruginous sandstone,
which is so friable as to be
readily crumbled between
the fingers. Upon this self-
eff of sand and ironoxide
and panir rock occurs the
ore and north of the ore is
the typical rock of the region
as an accompaniment.

12564 Flint with spots and banding
are, Little or no Jasper
is here seen.

Care & Horrie Mines

At the workings upon both
of these properties, there is
found in the shaft ma-
terial the typical vitreous
fragmental quartzite which
is the standard foot wall
of the ore deposits in the
region. No material shown
is precisely like that already
obtained many times (speci-
mens were not taken).

T.

R.

Ashland Mine
 $S\frac{1}{2}$, S. W. $\frac{1}{4}$ Sec 22
 $N\frac{1}{2}$ N. W. $\frac{1}{4}$ Sec 27
 T47. R 47.

Sec 27.

0-3-75 N. 1672 W.
 0-2-28 N. 1719 W.

Section Line
 0-1 Shaft. - 1980 N. 1791 W.

27 Sec 27

The Ashland Mine

The workings upon this property extend for a distance of more than a fourth mile across it, and like the mine previously spoken of, have for their floor well crystalline quartzite, and ^{south of} ~~above~~ this quartzite is the siliceous slate as shown by test pits. Specimens from this mine were obtained at a previous visit.

Also at the dump piles of the mine may be seen, the peculiar decomposed disintegrated, before several times referred to.

✓ Saturday, July 24 1887
Montreal Mine
 NW $\frac{1}{4}$ of SW $\frac{1}{4}$ and SW $\frac{1}{4}$ of NW $\frac{1}{4}$ Sec 33
 T 46 N R 2 E, Wis.

The workings are in an
 open pit which shows lean ore,
 ore, flint and little Jasper,
 but nowhere any fragmental
 quartzite. Workings have
 also begun a short distance
 south of this pit, but so
 far no quartzite has been
 struck. The present pit is
 nearly worked out, and
 no reserves have yet been
 developed.

There is found at the Mon-
 treal Mine in some of their
 more southern test pits in
 connection with lean ore, slightly
 altered greenstone like the
 found at the Colby and other
 places.

12565 ^uSlate. Just S. of R.R. in Boneⁿ
 property. Lean ore just north
 of R.R. S. 2. $\frac{1}{4}$ Sec 32, T 46 R 2 E

T.

R.

33 Co.

Sec. Cor.

 $\frac{1}{4}$ Post

Sec. Cor.

S. 150' $\frac{1}{4}$ PSec. 33 $\square$ Spruit $\frac{1}{4}$ P

Cor Sec. 33

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

Shaft 100 feet N. of 2nd gili (Supt)

one lens

Shaft in

Dore

4200'

North post

Shaft in ore 400 ft. West + 100 feet
 North of East + West line from $\frac{1}{16}$ post
 corner of $N \frac{1}{2}$, N.E. $\frac{1}{4}$ Sec 33, (Supt)

33 Co. Mine

E 1/2 of N. W 1/4, Sec 33, T 46 R 2 E,
Ar 33 Mine, which is shipping
on upon a small scale is
shown the usual cross section
at the range.

12566 Vitreous Quartz 120 steps in
a direction each of South across
formation from 450 feet ~~to~~
West of N 1/4 foot of Sec 33.

12567 Limestone and Flint 100 steps from
above point in direction each
of South. Some is found 80
steps across formation.

12568 Ferruginous slate, R. R. Cut
65 ft across formation from
same point.



Frimble Mine

W 1/2 of N. E. 1/4 Sec. 33, T 46 R 2 E,
This mine has a large stock
pile of good ore and appeared
to have a much larger deposit
shown up than either the
Montreal or 33 Co. The

main shaft starts from a small open pit about 200 east of N & S. $\frac{1}{4}$ line of section and 100 from railroad track across formation upon the south side of latter.

12569 Vitreous magnite, upon south side of open pit of main shaft.

12570 Flints 5 feet north of 69

Another open pit from which some of the have been taken, but which is now abandoned 60 south of 69

12571 Jasper ore from main shaft.

12572 Decomposed "diorite" from material about shaft.

12573 Rich ore from Stock Pile

The Moore and Bourne

Moore $E\frac{1}{2}$, N.E. $\frac{1}{4}$ sec 33, T46 R2E

Bourne $W\frac{1}{2}$ of S $W\frac{1}{4}$ sec 27 " "

These properties are not yet shipping although it is claimed that ore has been struck, and the main workings upon both options are along the line of the nitrous quartzite, large quantities of which with baron has been raised.

Superior - Father on
Bessemer

Katagon

Nimhon

Gennania

Amazon / 57

Brookston. on

Sunday Lake

Iron Chief

Scale - About - 200 ft to the inch

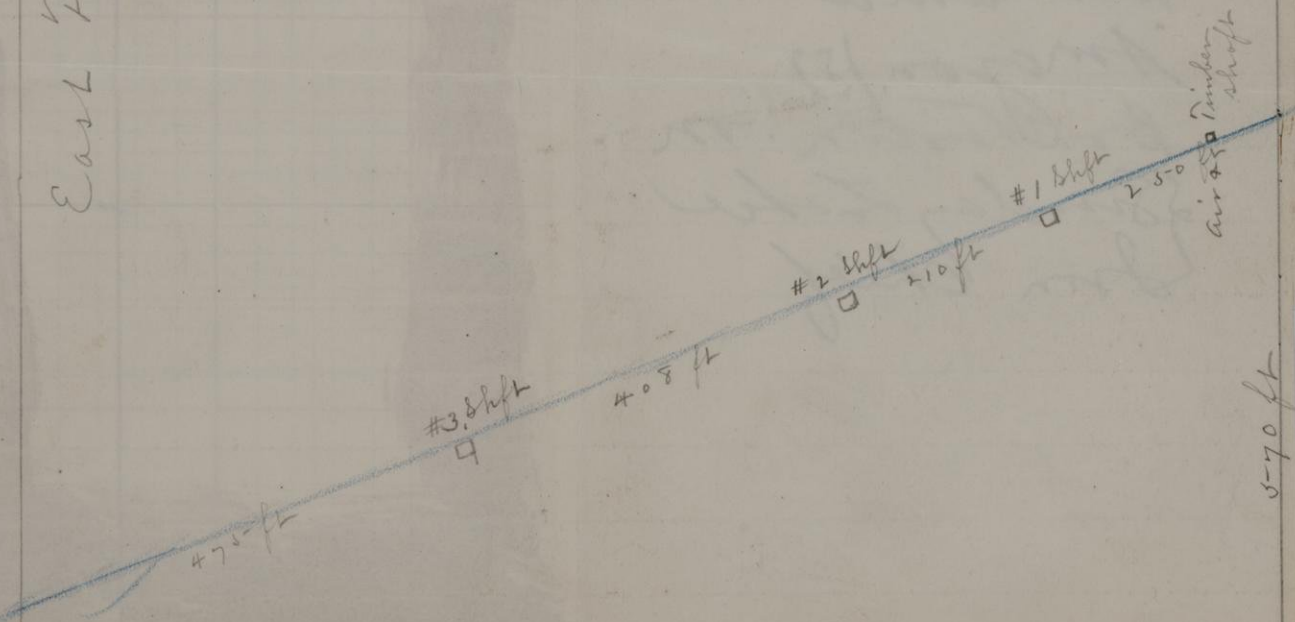
N.E. of S.W.

N.W. of S.E.

Edna Mine 17-46-2 E Wis

West Forty

East Forty



Monday, July 4, 1887

Odanak Mine

46-22

N.E. $\frac{1}{4}$ S.W. $\frac{1}{4}$ and N.W. $\frac{1}{4}$ S.E. $\frac{1}{4}$ sec 27

Shipping as present although not largely from these shafts. Most interesting shaft upon west branch of Odanak Fork and near south line of property. This shaft has struck large quantities of siliceous quartzite. The other shafts are in a direction N.E. they almost from this one and they show no southern quartzite.

Superior Mine

(46-22)

N.E. $\frac{1}{4}$ S. E. $\frac{1}{4}$ and S.E. $\frac{1}{4}$ N. E. $\frac{1}{4}$ sec 27

Two shafts, both shipping. Neither show foot wall quartzite in debris thrown out, but 200 steps east of E shaft (the two shafts are about 30 steps apart) the siliceous slate are shown in a rail road cut. Strike of slate E 32° N. Magnetic dip 75° to 80° N.

34a

T.

R.

Bessmer 2765

- ✓ No 1 shaft Open Pit 727 ^{feet} N of south line
 52 ^{feet} W. of east line
- No 2 shaft 590 feet north of south line
 135 " west of east line
- No 3 shaft 377 feet north of south line
 454 feet west of east line
 (Parker)

Kakagon

S.E. 1/4, N.W. 1/4 sec 26, T 46 N R 2 E. Moio

- No 1 shaft 120 feet east of west line
 739 " north of south line
- No 2 shaft 345 feet east of west line
 953 " north of south line
- No 3 shaft 389 " west of west line.
 222 feet S. of north line
- No 4 shaft 78 feet west of east line
 15 " south of north line
 Parker.

Beesemer Mine

S. W $\frac{1}{4}$ of N. W $\frac{1}{4}$ sec 26, T 46 R 2 E,
Mining now mostly under-
ground, but here is also
an open pit more than 200
feet long, and here the section
is as usual in such cases

12574 Quartzite - Foot wall of pit.

12575 ore

12576 Flint with bands of ore.

Kakagon Mine

Open pit at Kakagon shows
same things as the Beesemer.
The change from quartzite to
ore is gradual; the fragmented
material becoming rapidly less
and less as the quartzite is left intact
in the distance of one or two
feet the material is ore

12577 Foot wall Quartzite

12578 Ferruginous Quartzite or iron
ore. In transition zone.

12579 Ferruginous Flint foot hanging wall.

T.

R.

Kissikon

N $\frac{1}{2}$ of the N.E. $\frac{1}{4}$ Sec 26, T 46 N R 2 E.		
No 1 Shaft	213 feet	east of west line
	38 feet	north of south line
No 4 Shaft	933 feet	east of west line
	361 "	north of south line
No 5 Shaft	1135 "	east of west line
	462 "	north of south line
No 6 Shaft	1351 "	east of west line
	533 "	north of south line

(Parker)

Germania

N 3-495 feet N 1320 feet W. of $\frac{1}{4}$ post bet. 24+25
 N 2-415 " N 1555 " W of $\frac{1}{4}$ " " " "

(Hayes)

Sept. 1904 there is here large quantities of diorite in a more or less altered condition. Some of it so completely altered as to be called soap rock and some of it is literally fresh diorite.

Timmon Mine $N\frac{1}{2}$ of N.E.,
 $\frac{1}{4}$ Sec 26, in its west shaft
 shows fragmental quartzite,
 but in the east shaft this
 was not found

The Germania Mine

$N\frac{1}{2}$ of T. W. $\frac{1}{4}$ Sec 25 and $S\frac{1}{2}$
 of S. W. $\frac{1}{4}$ Sec 24, T46 R 2 E.
 This mine is shipping largely
 and the section as shown
 in original open pit is as
 usual, quartzite &c. This
 pit is now filled but the
 quartzite is seen in R.R. cut
 just south of 82 fts, and
 this quartzite extends south
 about 100 yds when the sil-
 iceous slates appear.

The Minnewawa is like
 the Germania and Ashland &

T.

R.

85 a Marble. From large bluff
just east of Presque Isle River in
Sec 21, 47, 43. For location see
note book of first year.

Here on

Tuesday, July 5th 1887 37

✓ 12580 Chloritic Slate, Pit 1610 W 460 N
of the S. E. corner sec 20, 47, 43.

✓ 12581 Lean Banded Ore and Flint, 1000 W
500 N of S. E. Corner sec. 20, 47, 43.

✓ 12582 Lean Banded Ore + Flint. Pit
810 W, 533 N of S. E. corner sec 20
Shaft or some depth and all ma-
terial like sample

✓ Shaft 525 N 1625 W of the
S. E. corner of sec 20, 47, 43
contains lean ore and slate
like 80, 81, 82, slate at bottom
of shaft. Lean ore and flint at
top.

✓ 12583 Slate

12584 Banded Flint + Ore

12585 Jasper. all from shaft 867 N
of the S. E. corner of sec 20, 47, 43

This pit shows ore and flint
just west of Presque Isle River
Location

Lean ore, slate, flint and Jasper
All from same pit 500 S. 210 E.

✓ of N. W. Corner sec 22, 47, 43
12586 Specimen of Lean ore and flint

12587 Slate - Pit 530 S. 210 E. of N. W.
Corner sec. 22, 47, 43

✓ 12588 Marzite, Pit 688 S. 210 E. of N. W.
Corner sec 22, 47, 43

Workings have also some material as in main shaft (80)
in the N. E. $\frac{1}{4}$ of N. E. $\frac{1}{4}$ sec 21,
This pit near middle of south
line of 40 and short distance
to the northward.
Location - Swain, Berneer.

✓ Lean ore and Jasper 400 S of
N. $\frac{1}{4}$ post sec 22 47, 43 Like
that contained in pits previously
spoken of.

Banded Lean ore and flint in
N. E. $\frac{1}{4}$ of N. E. $\frac{1}{4}$ sec 22, 47, 43.

- 12589 Marzite, Pit 500 N. 925 W of
the S.E. Sec 14, 47, 43.
- 12590 Black slate Pit 155 N. 225 W. of
S.E. Sec 14, 47, 43.
- 12591 slate 1986 N 1077 W. of S. E. corner
Sec. 24, 47, 43
- Granite 1955 N. 1925 W. of S. E.
24, 47, 43. Pit (Channing)
- 12592 Recompound Granite Pit 1700 N.
12593 232 W. of S.E. corner Sec 24, 47, 43
- 12594 Flint Conglomerate, 48 N of 92, 93. Pit
- 12595 Foliated slate, Pit 70 N of 92, 93
- 12596 slate, Pit 124 N of 92, 93
- 12597 Greywacke, Pit 152 N of 92, 93
- 12598 slate, Pit 176 N of 92, 93
- 12599 Marzite, Pit 27 2 of S. N. corner
to Sec 18, 47, 42

✓
12600 Quartzite 62 n. of 99. Pit.

✓
12601 Slate 71 n. of 99. Pit

slate like 101 150 n of 99.

East part of 47, 43 appears to contain an unmistakable ore formation, but this ore-chemical sediments after once commencing, instead of continuing until the whole belt is deposited is mingled to a greater or less degree with mechanical sediments - clay slates which must once have been clays and which consequently make the ore formation of greater breadth than ordinary. That there are several alternations of lean ore with these green ²⁰slates in 22 and 21 cannot be doubted, this is particularly plain in sec 20. There is here no such sharp distinction in age of the chemical and mechanical sediments as there is farther west. What have the interbedded eruptions to do with this?

Thursday, July 6, 1887,

✓ 12602 Slate, Pit about 550 N. 360 W of
S. E. corner sec 20, 47, 42.

✓ 12603 Slate. Pit 356 W. 427 N. of S. E. 20.

✓ 12604 Granite 366 N. 400 W of S. E. 20.

✓ 12605 Mica Schist Pit 1000 N. 340 W. of S. E. 20

✓ 12606 Slate, Pit 1000 N. 450 W. of S. E. 20.

✓ 12617 Mica slate. Pit about 1250 N. 1200 W.
Alt. of S. E. corner of sec 28, 47, 42.
~~Transition?~~

About 50 steps north of the center
of sec 28, 47, 42, upon a north
slope of the granite ridge is a
cliff some 15 to 20 feet in height
which shows the contact of
the Laurentian gneiss and
the Huronian. The latter here
being in slate and conglomerate.
The granite is farther south;
immediately ^{north} above this is a
thin layer of slate and north
of this conglomerate, composed

almost entirely of granite debris,
but containing a few white
quartz and other pebbles. The three
varieties of rock constitute a sin-
gle exposure.

12608 Granite

12609 slate in contact with granite

12610 Specimens of conglomerate, showing
12611 its character and the species of
frag 12612 pebbles contained

5114 12613 Conglomerate, blasted from huge
12614 boulder, found in pit from which
07 is taken.

12615 Granite. Ledges S. 50° W from
20, 126 steps = 1519 N 1456 W, 28

12616 Limestone - Pit S. 50° W from 20
90 steps = 1542 N 1429 W, 28, 47, 42

5114 12617 Peculiar Conglomerate, the pebbles
12618 of which appear to be almost entirely
from Basic Kamenawa eruptives
and the matrix a old sandstone.
Pit S. 50° W. 63 steps from 20.

12619 Gneiss, Pit S. 58 W. 25 from
20. = 1581 W, 1376 N. 28, 47, 42

12620 Peculiar fine-grained pebbled con-
Frag glomerate 1360 W. 1600 N. of S. E.
flint 28, 47, 42. Pit.

In passing from 115 to 120 there is a rapid descent in the ground so that it is entirely possible that the granite or gneiss to appear between the various pits & joining the conglomerates.

12621 Sandstone and Fine Pebbled
S.E. Conglomerate, Pit between 120
and 122.

Pebbles from Pit 1250 W. 1600 N. S. E. 28.

12622 "Conglomerate with soft ma-
S.E. trix containing so many pebbles
and boulders - all well rounded
as to be a typical pudding
stone. These fragments are
of all sorts, granitic, basic
and acid eruptives, flints,
jaspers, banded flint lean on
fe, white quartz &c. That there
are pebbles and boulders which

belong to the Laurentian, Huronian and Keweenawan, there can be little doubt, and so the matrix is one which is like the eastern sandstone the rock here shown in pit must belong to the eastern sandstone or the Keweenawan series. From its position it can hardly be Keweenawan and is therefore in all probability a conglomerate of the eastern sandstone. Taken in connection with this pit there is also little doubt that 17, 18, 20 and 21 also belong to the eastern sandstone.

12633 Sandstone N 50'E, 120 steps from
E.S. 20. Pit 1687 N. 1268 W. S. E. 28.

12634 Sandstone Pit 1965 N 1050 W.
12635 of S. E. sec 28, 47, 49.

E.S. If there was any doubt that the above conglomerates belong to the eastern sandstone, this doubt must be set at rest by the appearance of this typical eastern sandstone in this

position and that occupied by
83

12623 Granite, ledge facing N. E.
1720 N. 1490 W. of S. E. 25.

Pit which contains various friable and compact sandstones for a depth of 24 feet and under this a peculiar conglomerate located 1480 W. 1780 N. of S. E. 25.

12624 Specimens of sandstone from this sand pit. The beds varieties were struck near top of shaft.

12625 Flint Conglomerate material taken some deeper down in pit. This flint conglomerate varies into in the fragments thrown out into

12626 } Conglomerate from some pit
12627 } which is composed largely of granite
12628 } debris, but which contains some
flint. Inquiries - Are not these
conglomerates Huronian? Is the
sandstone Huronian or Eocene.
The conglomerate is also found in ravine a few feet distant from pit.

12627 Schist ^{Pit} 25 steps N.E., from
Trag previous pit.

12630 Granite, ~~Ledge~~ 53 steps N.E. from
Rec. Iron 24-28.

12631 Conglomerate

12632 Pebbles from Conglomerate, Pit
E.S. 74 steps and 88 steps N.E., from
24-28. This conglomerate, ~~like~~
all its characteristics is like
the conglomerate from which
122 is taken. The pebbles were
chosen to represent the iron
bearing formation of the Huron-
nian and also the flint which
is probably laid down near
the base of the series.

In passing from 123 to 132 there
is a very sharp decline.

+

Friday, July 8, 1887.

- 12636 Mica Schists, micaceous
 12637 Mica Schists, foliated mica
 12638 schists, lean magnetic schist-
 12639 all from shaft of Appleton
 12640 Option upon sec 12 & 13,
 12641 46, 42 Mich. These specimens
 12642 are taken from several shafts
 12643 in immediate vicinity of each
 12644 other. The whole of these speci-
 12645 mens appear to be Laurentian.
 12646

The Brainard Option

46-42 was also visited,
 but is contained in shaft only
 green crystalline schists.

47^a

T.

R.

Atlantic

N. W. $\frac{1}{4}$, N. W. $\frac{1}{4}$, Sec 12, T45 N R $\frac{1}{2}$ EastNo 1 shaft ^{275 ft} 718 feet ³⁰ east of the north line,
78 feet south of the north line,
(corner)

Saturday, July 9, 1887.

Iron Belt Mine N.E. 1/4

Sec 11, 45 T. 1 E. Wisconsin

#1 Shaft. According to Captain Shoff is situated 1575⁶⁰ feet west and 1106⁴⁰ feet south of the N.E. corner of the section. The stock pile contains quite a quantity of clean ore. In the debris of the shaft no fragmental quartzite is found, and the Captain says that he has not yet reached it.

12647 Pains Rock: Selected on a peculiar variety of clean ore. The greater mass of the rock is

12648 Flint containing bands and shales of ore.

Atlantic Mine

S.W. 1/4 of S.W. 1/4 Sec 1 and N.W. 1/4 of N.W. 1/4 Sec 12, 45 T. 1 E. Shaft 630 feet east of N.W. corner of Sec 12 and 70 feet south according to Captain. Quite a quantity of clean ore has been taken out. Nowhere has the

fragmental quartzite been found. Rich flint with bands and cherts of ore.

12649 Ferruginous slate 125 and 75 (nearby main shaft).

Shaft 2 contains as yet no ore - is upon flint with bands and cherts of ore and is distant from shaft one 118 steps in a direction S 30° W.

Atlas Option

12651 Vitreous quartzite 85 ft and
12652 215 W. of S $\frac{1}{4}$ part of Sec 1, 45 ft.
12, Pit

12653 Slate - Pit 38 steps S. 30° E.
from 51, 52.

12650 ~~Atlas Shaft~~ ~~now~~ Pit containing
lean ore and Jasper 25 steps
N. 30° W. from 51, 52.

225 N. 250 W. of S $\frac{1}{4}$ part 1
Atlas Shaft is 115 ft and 25 W.
from 50. Pit contains lean
banded ore and flint.

12654 Slate - 2' exposure 125' N of E 1/4
Sec 1, T 45 R 1 E. Strike S 40°
W. Dip 70° N. Main part of
exposure in Sec 1.

12655 Fragmental Quartzite. Pit
said by Captain to be 290' N
and S 40° E of the NW 1/4 post
of Sec 8 45 N 2 E.

12656 Slate. Cut upon ^{Wis. Cen.} ~~Rocky Mts.~~ ~~W. S. West.~~

12657 R.R. Spur near the east line
1/4 post of Sec 32, 46 N 2 E. just
east of crossing of ^{N. & S. + W. R.R.} ~~Two Central~~
and where tangerine begins
after this crossing in running
west. Strike W 22 1/2° S. Dip 65°
to 70° N. The spur runs pre-
cisely parallel to the strike
of the slate at this point and
the same slates outcrop upon
the embankment about a half
a mile farther east than
56 and 57

- 12658 Magnetitic slate containing
 - 12659 Jasper. The jasper is frequently
 12660 in oval lenses which are
 12661 they are generally parallel to the
 magnetitic slate. Often however
 the slate contains continuous
 bands of jasper. The proportion
 of jasper although great in the
 specimens is not so in the
 exposure - it being mostly a
 lean magnetitic schist.
 Strike is $E 23^{\circ} N.$ dip. Road
 runs $N 30^{\circ} E$ where exposure
 is first found and it continua-
 ves along the spur of the road
 in the $E \frac{1}{4}$ part of the $N. E. \frac{1}{4}$
 Sec 32, T 46 R 2 E until
 the road makes a bend north.
- 12662 Slate. Cut Milwaukee L. S. &
 W. R. R. Cut near the $N. \frac{1}{4}$
 part of Sec 28, T 45 R 2 E
 Strike $E 25^{\circ} N.$ Dip $75^{\circ} N.$
 Here M. L. S. & W. rapidly
 approach the Wis. Cen.
 and 20 rail lengths later
 they are side by

side. Between these two points there is a continuous exposure of slate and the cut upon the N. Central is here accurately located upon tracing. Slates and greyniches continue along the Mil. E. S. & W. for a distance of 45 Rail lengths beyond this. At 38 lengths east of 62 the N. C. & E. S. roads begin to diverge and here

12663 Greyniche is taken from the extreme northern part of the exposure.

12664 Slate from eastern end of exposure.

Amazon

Amazon Mine

N.E. $\frac{1}{4}$ of S.W. $\frac{1}{4}$ and S.W. $\frac{1}{4}$ of N.E. $\frac{1}{4}$
Sec 27, T46 R2E.

Main shaft just east of the river at contact of fragmental quartzite and ore belt.
Ore rock flint with bands and cherts of ore.

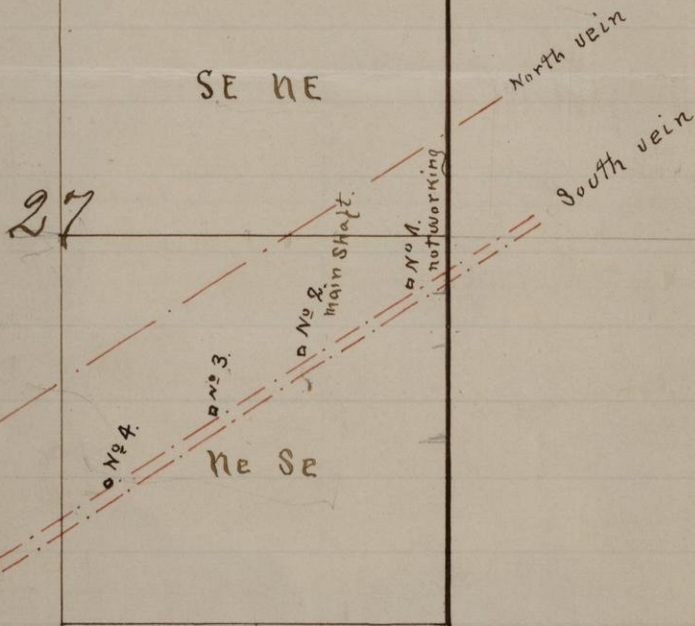
12665 7 room belt of Jasper and Iron
Conglomerate for sec 7, T47 R45-
525 feet ^{= 200 steps} north of south line and
1400 feet ^{= 525 steps} east from west line
North of this on carbonate
slate and brown magnetic schists
(Channing)

✓ Iron belt shown upon sec 7-
47-45-127 paces N and 200 paces
E. of center. (Channing)

✓ Clean quartzite 100 feet wide in
contact with lean ore at 800 ^{= 1100}
feet north and 350 ^{= 1300} feet west
of S. E. Corner of Sec 27, 45 N, 1 W,
(H. E. Warner)

Row of pits across formation
at above points showed quartz
rock and ore for distance of
750 feet and for 300 feet
farther lean banded formation
(Warner)

Superior Mine
North



"Slight sketch of the Superior Mine
drawn as accurately as possible
without measurements"

J. S. Wolls. Sept 1

Marquette Mine.

"Present working shaft in ore,
No 1, 60 ft. west of Ashland
Mine - east line"

No 3 - 57 feet east of Germania
mine - west line.

Book on granite fort wall"
Sept.

T.

R.

Brookton Mine

N $\frac{1}{2}$ S. E $\frac{1}{4}$ Sec 9

747 R 45 Mich.

pre. out workings
 2-772 N. 436 W.
 1-770 N. 410 W.

old shaft
 about 200 ft
 20 W.

DO NOT WRITE IN

THIS MARGIN.

Remarks on Chips sent to Washington
for Section

12611 Portion of schist pebble

