Penokee-Gogebic, Michigan: [specimens] 12666-12865. No. 60 July, 1887

Van Hise, Charles Richard, 1857-1918
[s.l.]: [s.n.], July, 1887

U. S. GEOLOGICAL SURVEY

FIELD SECTION BOOK

No. 60.

July, 1887.

Penoke - Gogebic

C. R. Van Hise.

12666 - 12865

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 2x2½x¾ inches will be allowed, but in all other cases *large sized specimens*, trimmed to a size of 3x4x1 inches, must be selected, in accordance with ¾ 3, 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.

#68

Continue

Tuesday July 12, 1887.

12666 Flint Breccia, Test pit 40 N. 20 S
Sil SC of the N. E. corner Sec. 20, T47 R44.

12667 Actinolite Slate 15 N. 65 W. of the
12668 S. E. corner Sec 17, T47 R44,
Sil SC

12669 Flint. 67 steps N. 20° E = from 63 N 23 E
Sil SC 67, 68 allowing variation of 5° E.
Test pit

12670 Slate. Pit 105 W. 100 N. of S. E.
Sil SC corner Sec 17, 47, 44.

12671 Lean Ferruginous Schist, Test pit
12672 450 N. 729 W. of the S. E. corner.
12673 Sec 16, T47, R44,
Iron B.

12674 Ferruginous Slate. Test pit
12675 50 east of 71, 72, 73.
Iron Belt

12676 Pit N. 15° E. = 20 E 72 N

12677 75 Steps from 71, 72, 73. magnetic,
12678 no sun. Pit also contains flint in
Iron Belt large nodules also
Test
12679 Peculiar greenish cocks. Dip accord-

ing to Superintendent Peck 55° & 60° W.

Tax. 2nd

12680 Hematite
12681 Ferruginous Slate } Pit 477 N. 825 W. of the S. E. cor Sec 17, 47, 44.

12682 Slate. Pit 35 E. of 80, 81. Pit also contains material like 80, 81, and pit 80, 81 contains material like 82.

From Belt

12683 Magnetic Jasper Schist and Actinolite
12684 Magnetite Schist. Test pit
12685 1260 N. 1350 W. of the S. E. Corner Sec 17, 47, 44.

J. B.

12686 Pit 850 N. 1650 W.
12687 of the S. E. corner Sec 17, 47, 44.

12688 Pit 650 N. 300 E.
For slate of the center of Sec 17, & 47 R 44 W.
Wednesday, July 13, 1887.
12689 Slate of "Slate Conglomerate" Pit
Sl. Cg. about 275 N. 100 W. of 90, 91, 92, 93

1380
1605

From Belt.

12690 Slate } All from pit with
12691 Flint } diamond drill 1380 N.
12692 Flint & Ore } 1960 W. of S. E. Sec 15
12693 Ferruginous slate } 47 R 44

61

12694 Gravel. Pit in the N.W. 1/4 of
Gr. the S. W 1/4 Sec 23, T. 47. R. 44.
About 80 rods south of the center
of the north line of the 40.

12695 Slate — Pit, doubtful if ledged;
Tex. R. however if not ledged - a large
boulder, 15 or 20 rods south and
15 or 20 rods west of the N. E. corner
of same 40.

12696 Actinolite Magnetite Schist. Ex-
12697 posure 150 E. of the W 1/4 post
Iron Belt of Sec 23, Strike N. 50° W. Dip
55° N. E. Above this exposure the hill rises rapidly in a
north east direction for a
a distance of twenty steps in
Gr. Mat. this direction
12698 Greenstone is taken.

12699 Slate. Pit in the N. E. 1/4 of
Sl. eq. the S. W. 1/4 of Sec. 23, T 47, R 44
1904 30 rods east of west line of 40 and
BB 10 rods north of south line of 40.

12700 Sec. B. Actinolite Magnetite Schist, Pit 1100 N. 650 W. of the S.E. corner of Sec 17, T47 R44, Mich.

12701 D. B. Same 25 N of 12700.

12702 D. B. Same. Pit 55 N of 12700.

12703 D. B. Same. Pit 80 N of 12700.

12704 D. B. Black Magnetitic Slate, Pit 100 N.
12705 of 12700.

12706 Sec. Trap. Pit 115 N. of 12700.

12707 Sec. Trap. Pit 130 N. of 12700.

12708 Sec. Trap. Ledge 175 N of 12700.

Agenda, Saturday, July 16.

12709 Specimens taken from dump pile
12710 of test shaft having a drift of 200
12711 feet north from its location in
12712 the N. W 1/4 of the N. W 1/4 Sec 3,
T 41 N. R 12. Wisc. There is
here also large quantities of
12713 soft brown material rich in
iron oxide with smaller quantities
of ochre and also material
which resembles

12714 Mica schist. Pit 200 feet north
of 9-13,

12715 Lean ore and ferruginous schist
12753 Pit S. E 1/4 of S. W 1/4, Sec 34, T 42 N. E.
12754 A pit containing schist is found
12755 between this pit and the next
12756 upon Sec. 3, T 41-12. containing
12757 lean ore, The more ferruginous
portions of the rock appear here
to be simply the altered schists
a part of the schist having
been dissolved out, leaving

the iron oxide behind, and
A part of the iron oxide too
may be an infiltration.

July 17, 1887.

12717 Mica Schist. Ledge striking
N.E. & S.W. approximately. Dips
about 45° N.W. to sun; strong
magnetic variation. In extreme
N.W. part of Sec 4, T 41 N R 12,
12716 Mica Schist. Pit in N.W. 1/4 Sec 4.
12718 Mica Schist } Ledge some distance
12719 Mica Gneiss } north of 2171. Strike
estimated to be nearly east and
west. Dips north at a high
angle

12720 Magnetitic Schist. Pit about 80
12721 rods E of N 1/4 post Sec 29, T 42 N.
R 12 E. In the N.W. 1/4 of the N.E. 1/4

12722 Diorite? From a pit a few
feet south of 20, 21

12723 Mica Schist. Pit upon S.E. 1/4 of
12724 S.E. 1/4 of Sec 21, T 42 N. R 12.

Half a dozen pits upon this
same ledge all in hornblende
schist or mica schist.

12725 Schist from one of the
other of these pits.

12726 Specular and magnetic Iron Ore,
12727 and quartzose Manganese. From
12728 pit which certainly ledged,
The ledge is cut into several
feet in depth along for a
distance of 16 feet and above
which is three or four feet
of almost pure Manganese and both
ledge rock. Upon ~~south~~ side
of a hill near a swamp, In the
S.E. ¼ of the S.W. ¼, of Sec 22,
T 42 R 12, about 20 rods
north of south line and 60 rods
west of the E & S. ¼ line,
Strike apparently E. & S.W.
and dips apparently at a high
angle to the N.E.

29 Hornblende Mica Schist, Ledge
about 20 or 30 rods S.E. of
above pit

12730 Ferruginous Mica Schist. Diamond
12731 Drill Cores, near center of N.W. 1/4 of
S.W. 1/4 Sec 23, T 42 N. R 1 E.

12732 Float from swamp in which Nos
30 and 31

Monday, July 18, 1887.

12733 Specimens from bottom of test pits
12734 & ending at Mark 500 Steps N. & S.
12735 near the center of Sec 3, T 41 N
12736 R. 1. E. The same material is
12737 found in pits located well
12738 toward the S. E. corner of the section,
12739 probably in the S.E. 1/4 of the S.E 1/4.

12740 Hornblende Schist. Outcrops
upon road between Secs. 3 & 10
T 41 N. R 1 E. Strike nearly
N.E. & S.W. dips S.E. The rock
was continued some hundred
feet along the road, between
the N.E. corner of Sec 3 and
where creek crosses the line
of the sections about 120 rods
west of this corner.

80.

T. R.

Schists like those in the Agenda region outcrop upon the Kloomban east of the Agenda country and farther south upon the Kloomban on numerous granite outcrops.

12741 Mica Schist } Test pit near center
12742 Ferruginous } of S½ of N. E ¼ Sec 5
12743 Schists } T 41 N R 12 E Wisc.

12744 Set of specimens from a row of
12745 test pits running north and south
12746 in the center line of the N. E ¼
12747 of Sec 5, T 41 R 12 E. for a distance
12748 of at least 500 steps. The strike
12749 of the schists is here east and
12750 west and the dip is about 90°.
12751 Several variations of rock often
12752 come from the same pit. The
most ferruginous portions are
narrow bands in the schists
of which they form a part. 52
is farthest north and 41, 42, 43
are farthest south. However
several of the least ferruginous
schists are found in the pits be-
tween those bearing the more
ferruginous material

here
12753 drill Core. S. E. ¼ Sec 19, T 42
R 2 E. All material found
upon this section is like this.
(Doherty)

T. R.

Specimens 12759 to 12779 inclusive are taken from line of Mis. Cen. R. Way. upon plat of which exact location of specimens may be found.

Tuesday, July 19, 1887.

12759 Greenstone. Cut upon Hurley branch of Mis. Cen. R.R., just east of Bad River. S.E. ¼, N.E. ¼ Sec 6, T 44 N. R. 2 W.

12760 Greenstone. S.E. ¼, S.W. ¼ Sec 5

12761 Greenstone just west of where greywacke slates appear. 62-65

12762 Mixed slate and greenstone 12 rail
12763 lengths west and 20 steps south
12764 from 2766.
12765 Slate from same place.

12766 Slate. Railway Cut on plat. Strike for 8° S. Dip 75° E. N.E. ¼, N.E. ¼ Sec 8, T 44 N R 2 W. Wis.

The greenstones and greywacke slates 61-66 appear to be mingled in the most confused manner. After the massive greenstone is passed in moving eastward, the mixed greenstone and slate appear. Before the slate are continued, there are several

belts of almost pure slate contained in the greenstone. The eruptive has then caught slate into it, or squeezed itself in between the layers of the slate in the neighborhood of the contacts of the two series of rocks.

12767 Greenstone. Low outcrop, center W½ N.W ¼ Sec 1, T 44 N R 2W.

12768 Black slate, very soft, easily broken with pick. North side of railway. S.E. part N.W ¼, N.W. ¼ Sec 1, T 44 N R 2W.

12769 Greenstone. South side of railway. Short distance from N 768

12770 Black slate. There are several places in shallow cuts between 268 and 270 ft which there are indications of black slate, Short distance E/N ¼ Sec 1, 44 N R 2W.

12771 Slate, Low Cut. Dips north at high angle. Strike W 18° S, S.E. ¼ S.W ¼ Sec 31, T 45 N. R 1W.

12772 Slate } The two intermingled.
12773 Greywacke } Dip 80° N. Strike not
a conglomerate determined as the sun was

hidden. This slate and greywacke are upon the north side of the railway cut. Strike approximately N 15° E. N.E. ¼, N.W ¼ Sec 32, T 45 R 1 W.

12774 Greywacke south side of above cut.

12775 Thinly bedded slate interstratified
12776 with greywacke. Exposure at least 400 feet long. The thinly bedded and massive material suddenly alternate in layers of varying thickness. Strike N. 27° E. Dip 75° W. near center S.W ¼, S.E. ¼ Sec 29, T 45 R 1 W.

Wednesday

12777 Slate Cut in which the two are
12778 Greywacke interbedded. Too early to determine strike. Dip 65°. S.W ¼, S.W ¼ Sec 24, T 45 N. R 1 W.

12779 Greywacke. South side of railway. Near N.W corner of N.E. ¼ of S.W ¼ Sec 24, T 45 N. R. 1 W.

✓ continued

Thursday, July 21, 1887.

12780 Greenstone Pit near the S. W. corner Sec 15, T47 R 14, 20 ft. 1880 ft. W. of the S. E. corner.

12781 J.B. Actinolite Magnetite Slate. Exp. 70 ft. 1790 ft. W. of the S. E. corner Sec 15, Strike N. 30° E. Dip. 40 ft. This exposure is rather small, faces to the eastward. It is possible that the strike and dip as here given may not represent the true strike and dip here of the ancient ledge, but probably it does. In this case it is probable that the ledge has been disturbed by the adjacent eruptive.

J.B.
12782 Jasper & Banded Slate } Strike E 5° S.
12783 Jasper & Quartz } Dip 60° N.
12784 Jasper } 1100 ft. W. 55 S. ft. of the S. E. corner Sec 17, This pit contains mixed jasper iron ore, fragmental quartz, mingled with this non-frag-

mental material

12780 Slate, Pit 1685 ft. 900 ft. W. of the
Lil St. S. E. corner of sec 21, T 47, R 44.

12786 Magnetitic Schist 16 25 ft. & 50 W of
12787 & the S. E. corner of sec. 21, T 47 R 44.
In B. The formation extends 50 rods of this
point. Strike is in a general
east and west direction, Dip N.
about 70 or 75 degrees — not able
to determine this accurately.

Friday, July 21, 1899.

12788 Quartz Rock. Pit in iron-bearing
In B. belt, just south of the center
of sec 18, T 47 R 44.
A diamond drill is at work 180
feet north of this pit and north
of the center of the section. A former
shaft near here penetrated 38'
of soft or according to statement
of Captain.

D.B. Red Slate. Pit 120 feet south and 110 feet west of N 1/4 post Sec 13 T 47 R 45. (Markheim)

D.B. Jasper and mixed ore. Pit 170 feet south 110 feet west from N. 1/4 post Sec 13, T 47 R 45. (Markheim)

12789 "Marzite". 255 feet south 110 feet west of N. 1/4 post Sec 13, 47-45. (Markheim)

D.B. Upon George Washington Option due the center of the N.W. 1/4 of the N.W. 1/4 of Sec 18, T 47, R 44, a pit was lodged upon red slate and Jasper (Markheim)

12790 Green Schist, Pit about 100 W and 200 or 300 S. of the 2 1/4 post Sec 14 T 47 R 45

12791 Lead Bearing Ore, Slate, Jasper &c
12792 From shaft upon the S. W 1/4 of the
12793 S. E. 1/4 of Sec 14 T 47 R 45 West
12794 Shaft 1200 feet north from south
12794a line of 40. The greenstone of the

trap range rises just north of the workings.

A shaft is located in materials precisely like 91-94a near the center of the S. W 1/4 Sec 11, T 47 R 46. The workings upon it are all along the E & W 1/16 line in the S/2 of the section and extend about 500 or 600 steps along it & the westward from a short distance west of the center of the S 1/2 of the section. The materials here found are all about like 291-294a.

Saturday July 22.

12790 Slate } Rail-way cut upon. Mio.
12796 Graywacke } Cen. R.R. West of the center Sec. 24, T 46 R 2 E. Mio. Strike N. 23° S. Dip 70° W. Get location or plot.

12797 Black Slate } Rail-way cut in
12798 Graywacke Slate } the N. part Sec
12799 Graywacke } 24, T 46 R 2 E. Mio. Strike N. 25° S. Dip 65° W. Cut extends along curve and

west of end of curve 450 feet as
indicated upon plat. The heavily
bedded massive greywacke is interleaved
in belts ranging from a few inches
to several feet with the interme-
diate greywacke slates and with
the black slates. In short all
three phases, with various grada-
tions of them are interbedded in
the most irregular manner, as
to order of arrangement, abruptness
of change &c.
Almost continuous detached
exposures continue, westward almost 450
feet beyond the end of the con-
tinuous exposure, and running
for some distance into Sec 29.

12800 Greywacke slate. From ledge upon
Wis. Rail-way in the N.W. 1/4 of
the S. E. 1/4 Sec 29, T 46 R 2 E,
Cut also shows greywacke and
black slate, Exposure continues
west 750 feet from east line
of 40. See plat.
Strike N 25° S. Dip 70° to 75° E

12801 Greywacke, greywacke slate and black slate. Upon Mis. Cen. R. R. Cut in the E 1/2 of the S. W 1/4 Sec. 29, T46 R 2E. Strike N 33° S. Dip 80 N. Extends 150 feet east from beginning of curve near center of 80 and 320 feet west upon curve.

12802 Slate
12803 Greywacke slate
12804 Greywacke
} Mis. Cen. R. R. Cut in the east part Sec 31, T46 R 2E. Strike N. 33° S. Dip 75° N. Exposure extends 26 rail lengths 780 feet south from the center of the east line of the S. E. 1/4 of the N. E 1/4 of the Section

12805 Slate. Mis. Cen. R. R. Cut. Exposure south side of road only. N. E. 1/4 of the S. E. 1/4 Sec 31 T46 R 2E.

con

July 24, 1887.

Today re-examined ledge from which 1268-12 are taken. The contact between the granite and the conglomerate strikes N 30° W, and the granite dips back into the hill at an angle of 75° so that the contact between the two gives the granite the appearance of overlying the conglomerate. The hill faces N. E. east. The granite and schist are higher than and overlay the conglomerate. This conglomerate is about six feet in thickness and its face is nearly vertical. The conglomerate contains quite numerous white quartz and schist pebbles, and many more granite pebbles. No unmistakable greenstone pebbles were found, although some specimens of the conglomerate looked as though they might contain small fragments of basic detritus. The granites

and schist ledges continue beyond the conglomerate for some distance in a direction S 30° W, about. At intervals along the face of this ledge for some distance Conglomerate is also found. At times the conglomerate is so fine grained as to become a quartzite. In this connection it may be said that the Laurentian rocks in this vicinity are both granite and schist and the two sorts of rocks appear to be arranged in the most irregular fashion with reference to each other.

12806 L.S. Specimen of Laurentian Schist a short distance S 30° E. (1000 ft. 975 ft.) from Conglomerate above described.

12807 T. 2w. Quartzite at foot of ledge where 12804 is taken.

12808 Cong Specimen of Conglomerate from place above described containing schist pebbles. These schist pebbles appear to be precisely like the schist in the Laurentian here.

T. R.

Specimen 12810 is from a large mass which nearly covered bottom of pit, was 6 feet through and rested upon the typical Eastern Sandstone Conglomerate of the section. Pit sunk on 12 feet of the Eastern Sandstone conglomerate at least.

12809 Portion of marzite(?) pebble in some conglomerate. If this pebble proves to be fragmental graywacke in which the induration is caused by enlargement, this would indicate that it is probable that the conglomerate is not Huronian, and the pebbles of this rock generally come from the Huronian, no such rock at least being known in the Laurentian Series.

12810 Conglomerate. Pit E. 30° N.
T. 2. 1262 N 1180 W. 25, 47, 4, 2
25 steps from 12607. The pit material besides containing this hard material, contains for the most part a soft conglomerate like 12681-2

12811 Many specimens of pebbles taken
E. S. from Pit of "Eastern Sandstone" Conglomerate from which 12681-2 132 were taken. These pebbles were selected to show the variety of pebbles furnished by this

conglomerate - taken in connection with pebbles before selected - rather than to give any idea of the relative abundance of the various sorts of pebbles.
Laurentian granitic and schistose pebbles are much less abundant than those belonging to the Huronian Series and those belonging to the basic varieties of the Keweenawan series. This conglomerate in position is so hard that it has to be blasted, but when taken out of the pit for the most part comes to pieces, so that the test pit material looked more like a gravel pile than material taken from solid bed. However portions of the conglomerate can be found which have not thus disintegrated.

The relative elevation of one row of pits and beds work taken with the

aneroid. Calling 12623 zero,
12624-8 are 15 feet lower; 12629,
75 feet lower; 12630, 90 feet lower;
and 12632-3, 90 feet lower.

12812- Conglomerate. From ledge in
12813 ravine about 25 steps S. E.
F. 2. of pit from which 12624-8
were taken.

12814 Granite. 25 steps S. W. (up
ravine) from 12812-3.

There is another contact between
the granite and decomposed
granite 100 steps S. W. from
the location of 12616 in a
deep ravine = 1492 N. 1499 W. 28, 47 Pr.
12815 Granite at this point
12816 Flint Conglomerate in contact
with granite
12817 Granite 25 steps E. S. E. (down
ravine) from 12815-6. The
rocks are so covered with
moss in this ravine that
it is very possible that what

Granite over
1490 N. 1451 W. 25

is here taken for ledge may be a huge boulder of granite in the conglomerate, However it seems more probable that this is a part of the granite ledge, and as there is a sharp decline in passing from 12815-6 to 12817, the granite might well outcrop again.

12818 Recomposed granite 5'0 steps S.S. 150° W 146° W. 28, 41, 42
Red. Foran (down ravine) from 12815-6 ca. The location of this specimen is also about 30 feet lower than that of 12815-6

The pit from which 12617-8 were taken was examined. It was found that these specimens are but parts of a large boulder, the ledge at the bottom of the pit is granite like 12618

For.
12819 Conglomerate. From pit which
12820 furnished 12620. This conglomerate is almost wholly composed of material like ~~granite~~ gneiss 12619, but also contains

granite pebbles.

General Remarks

The Flint Conglomerates and decomposed Granites would seem to indicate that these rocks belong to the Huronian Series. The peculiar flint conglomerates are found in many places in the Penokee Gogebic series at the base or near the base of the system, while so far as I know, no such rocks has been found in the Keweenawan system or in the Eastern Sandstone. The absence of basic detritus, which if found to be a real absence upon microscopic examination will be the strongest sort of evidence that these Conglomerates belong at the base of the Huronian Series rather than in the Keweenawan Series or the Eastern Sandstone.

As to whether the horizon

tal sandstone and conglomerate is ~~from~~ the Eastern Sandstone or belongs to the Keweenawan system, the weight of evidence seems to be that it is the Eastern Sandstone. In fact everything points in this direction with the exception of the peculiar indurated conglomerate 12810 which resembles closely the Keweenawan Conglomerates.

Monday July 25.

12821 Hornblende Schists. R. R. Cut.
12822 Mile Ze. S. & Wes. about 2 miles east of Gogebic Station along railway - first cut after crossing large creek.

T. R.

Notes & locations of Specimens 12823 & 12844 inclusive are by J. Parke Channing, Bessemer, Mich.

12823 Diabase 20 paces east and 40 paces S. of the N. W. corner of sec 21 T 45 N. R 1 E. Wis.

12824 Laurentian Schist, with Pyrite 35 paces E, and 75 paces S. of N. W. Corner sec 21, 45 N 1 E.

12825 Quartzite, about 250 N, 30 E, of S. W. corner sec 16,

Rose N. 44° and E. 35° from the S. W. corner sec 16, 45, 1 E, to line of pits running N. 7° W.; 70 paces S. 7° E. on the line of pits from this point - from the point 44° N. 35° E. is a pit ledged 12 feet N. of contact of foot wall quartzite and iron formation. In this pit and in a cross cut run south from it, we get:—

12826 Quartzite
12827 Lean soft banded ore
12828 Hard ore and quartzite
12829 Banded lean ore and quartzite

with a little Pyrite & Jaces
N of point 448 ft. 353 E. of S.W. 16,
12830 Hard black, lean, laminated ore,
38 ft. of point.
12831 Banded ore and coarse granzite
65 ft of point.
12832 Fine-grained red jasper 86 ft. of point.
12833 Rusty red ore. 104 ft of point.
12834 Red Slate 120 " " "
12835 Banded Ore 120 " " "

12836 Diorite (Soap rock) 448 ft. 60 E of
S. W. corner Sec 16, T 45 1 E,
At a depth of 95 feet in ledge
and cutting a 7 foot concentration
ore.

For SE.
12837 1000 feet = 376 steps N. of S. E. corner Sec 14,
T 47 R 43, Mich.

Terminus SE
12838 Shaft, near 4th, 984 ft N 12 W Mich
W. of S. E. Sec 17, T 47 R 40.

some
12839 Shafts About 70 feet down,
12840 Some shafts as the depth.

12841 1500 N. 250 W. of S. E. Corner Sec 19
T 47 N R 42 W. Mich.

Sec.
12842 100 N. of pit ledged on ~~Sec~~ Sec 14,
47, 43, c.c. 600 N. 925 W. of the
S.E. corner Sec 14, T 47, R 43,

Terminus Sec
12843 Pit 80 W. of $\frac{1}{4}$ post Sec 14,
12844 T 47 R 43. 44 was first
struck and then deeper down
43 was found.

Baraboo, Aug 8, 1887.

Upon the Douglass Option
in the N.E. 1/4 of the S.E. 1/4 of
Sec 16, T 11 - 5E
there are three shafts down
to a distance of from 10 to
25 feet. The location is in
the midst of a sandstone area,
and there are numerous large
outcrops of the Potsdam sandstone
visible at the location & a
short distance east of the
shafts.

The section of the shafts
is as follows:—

At the top of the series an
ordinary sandstone, or sandstone
of a somewhat conglomeratic char-
acter. In passing downward this
sandstone becomes more and
more conglomeratic until it
passes into a basal conglomerate
which carries a few white
quartz pebbles and other varieties
of pebbles, but the great mass

of the pebbles of which are derived from the rock underlying it and many of which are exceedingly angular - as angular as if freshly broken from a ledge. The pebbles vary from this to every angularity to perfect rounding. These pebbles are ferruginous schists and flints of the same nature as the solid ledge below the sandstone - to be described. Below the conglomerate, near ledges of Huronian schists which strike as nearly as can be determined somewhat north east and dip at a high angle to the north. The ledge is much broken and how high this angle is, it was impossible to determine. The rocks are here ferruginous banded slate and flint. In every respect they resemble specimens taken from the iron-bearing belt of other Huronian areas, and if mingled with specimens from certain other Huronian

areas, could not be separated from them.

We have them here an iron-bearing belt, dipping north and strikes conformably with the the quartzites in the Barboo Harrison series, and hence in this series probably an iron-bearing belt. Above these iron-bearing rocks and resting unconformably upon them is a basal horizontal conglomerate of the Poldam sandstone.

One of the three pits of the Ophir is wholly in sandstone and conglomerate; the second located a short distance, four or five rods eastward is ~~partly~~ in sandstone and conglomerate in its upper portions, but penetrates the underlying ~~re~~ formation to some depth. The second pit is started at an elevation some 15 or 20 feet higher than the first, and the first is fully as deep as the second. There

is therefore a sharp decline in the surface of the underlying Huronian Rocks which must have almost amounted to a cliff face in Potsdam times and from this cliff the detritus would readily be derived to form the Potsdam Conglomerate. The third pit, which is at a somewhat higher elevation than the second and which is perhaps ten rods north of it strikes the underlying Huronian Rocks almost immediately. In this direction there is then also a rise in the elevation of the Huronian Schists, and from the three pits, the contour of the west face of the original Huronian cliff at the level of the pits could roughly be determined.

12845 } Conglomerate from Pit 1
12846 }
12847 }
12848 }

12849-50. Portions of flint pebbles

from same conglomerate
12851 Ferruginous schist. Portions of
12852 large angular fragment contained
12853 in the conglomerate. Pit one.

12854 Flint &
12855 Lean Ore
12856 Lean Banded
12857 Ore
} Third Pit.

From the second pit no specimens were taken, but from this one pit a section could be gotten which would cover the whole ground; for as before stated the upper part of the pit is in the conglomerate and the lower in the underlying Devonian rocks.

The Baraboo Option, situated in the extreme S.E. ¼ of the S.E. ¼ Sec 15
has one shaft down to a depth of 50 or 60 feet, is almost wholly in sandstone, but at the bottom has struck some

shale or slate which in all probability belongs also to the Palodam series, although it is said not to lie in a horizontal position. This might however be due to false bedded, especially as in all probability the underlying quartzite is not far below. A short distance west of the pit 20 rods perhaps is a large outcrop of typical siliceous Baraboo Region quartzite which contains some quantity of schistose quartzite.

12858 } Specimens of sandstone and shale
12859 } Barabbo shaft.
12860 }
12861 }

12862 } Schistose quartzite, ledge west
12863 } of Barabbo shaft.

12864 Conglomerate, 500 paces west of 4 stake between secs 4 & 5. T 45 N. R. 12. Misc. (B. N. White)

12865 Sandstone S. E. 1/4 of S. E 1/4 Sec 32 T 48 R 46 Mich. Two miles N. of Bessemer. (B. N. White)

12866 to 12924 inclusive used by R. D. Irving for specimens obtained upon trip to localities in Penokee - Gogebic region