Menominee Iron Range, Mich: [specimens] 41277-41461. No. 393 1899

Bayley, William Shirley, 1861-1943
[s.l.]: [s.n.], 1899

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 ¾ 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.

41277 – 41461.

Notebook No. 393

Menominee Iron Range.

Mich.

1899.

W. S. Bayley.

393

Keel Ridge

At the red pit which was visited a few days ago one jasper that was said the fragmental looking. It however is in very even bands. The one also is beautifully banded and is very flaky.

41277 Jasper 1 one
41278 Flaky one

This is probably Cussy.

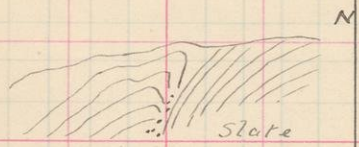
Indiana

At the Indiana dump beds found Conglomerate one,

41279 quartzite,
41280 banded one and fragmental jasper
41281 banded one, beau, dense gray slate
41282 Red Slate
41283 jasper that looks original

These are all heaped on the dump in such a way that can learn nothing as to their distribution. Think however we have here the decomposed one, with perhaps a little original one beneath.

S. T. R.



Iron form

W End Northern Greens Pits.

Cyclops

In the northern "Green's" pit find flat lying slates on north side. At the East end of the pit they strike about N-S and dip E at 30°. On side at East end the igneous formation appears, apparently under the slates in an anticline pitching East. On west side of the pit the slates apparently pass under the igneous formation. The contact between the two being marked by a breccia of slates on the one side and of one formation on the other. There evidently is a small fault here with a reibungs breccia between.

41784 At Green's pit proper, only the igneous formation is exposed. In this long pit it seems as though we had the south side of an anticline whose north limb is on the south side of the northern pit. The one is very much brecciated and at the base of the north side of the pit is strongly conglomeratic. The general aspect of the material is very like that at Norway. At the S.W. end of the pit

S. T. R.

There is a dyke red rock overlying one that may be a red slate, but which possibly may be red sandstone. The same breciation one is exposed at west end of pit in surface.

The north side of the syncline in the western Greens pit is brecciated and also that in the pit to the west. Indeed all the one looks alike except perhaps that in the South-western pit which may be Curry.

The formation of the reservoir was probably in slate as find large quantity of this material in the heaps thrown up. It is mixed with iron formation stuff. In the little pit SE of reservoir, about 20 paces, are exposures of iron formation

H1285 striking about N. 80-78 W and dipping 55° S. It looks very much like the upper.

The most westerly pit is entirely in jasper and here one striking about N 65° W. and dipping 40° S in north side and 55° S in South side. In the surface at the north edge of the pit are fissile

slates - which are however not typical slates since they contain much jasper and some ore.

H1286 jasper and ore. N.E. end of pit.

In little pit East of Shaft [See Map preceding page] the iron formation on its South side dips N 70 W and dips 60° S. The slates on its N.W side are crumpled. On west face of pit the contact for two feet looks as though a fault contact.

Briar Hill.

Made another section at Briar Hill. Traveling north from Shaft on north side of railroad track, from

H1288 } H1289 } which slates were taken, and north of this abundant exposures of the Briar slates. These are beautifully banded brown and black, heavy slates dipping N. 65 W and N 45 W and dipping 60° S. These extend to track running to old Briar Hill mine. A little west from section mine found pit on N side of track from which jasper, slaty

ore and quartzite were taken

H1291 quartzite

H1292 Clay ore

The material taken from the little pit
in W. of the hill East of Briar Hill mine
is a dense red jasper and a very
compact ore that looks very much
like the Marquette Negaunee ore
and jasper

H1293 Specimens

H1294 banded ore and jasper
Continued East to trace & possibly
the Negaunee if it exists?
From little dump head N.W. of
Curry Shaft No 2 took Specimen
H1295 of what looks like Negaunee jas-
per, and from dump of Curry Shaft
H1296 Specimen of fragmental jasper
In this dump found also great deal
of slate.
In little pit S.E. of that from which
H1295 was taken the jasper dips 60°-
65° S and strikes nearly E-W. This I
H1297 take also the fragmental
Examined again carefully the

little NNE of Curry where supposed contact of Negaunee and Traders formations occurs. Are the jaspers strike and dip alike, N 65° W at N end and N. 70 W at east end. The supposed red jaspers is veiny, homogeneous, dull red, waxy, in even bands resembling some of dense, brilliant, crystalline one, partly specular. The Jungen jasper where red in weathered surface is darker on fresh fracture. It breaks with an uneven, fragmental aspect, is full of white jagged edges and is not sharply separated from one. It apparently passes into one by the addition of little specks and scales of hematite, which give the rock a mottled look. The one is more micaceous than supposed Negaunee one.

41298 N. side east end - probably Negaunee
41299 S. " " " - Traders
Specimens taken from pumice 10 ft apart.
41300 Marble slate near house N of 41298
41301 Black & Mica slate from pit N. of Curry Shaft No 1.

41302 Fragmental jasper. North side Pitch No2.

[N.B. The location of these specimens is given on copy of Penn Iron Co's map by Vulcan and Reinick.]

The one in the rock pile of No1. Quarry is mainly well and evenly banded

41303 black and gray in layers only a fraction of an inch wide. There are often interlaminated with jaspery bands,

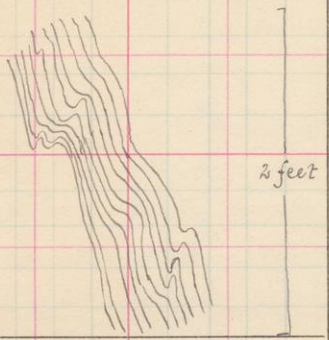
41304 the whole looking like a replacement of flakes

Much of the ore is sandy looking-as though made up of loosely cohering grains of hematite; and again it is in part brecciated, but not as distinctly as in the pile of the north. The jasper is not well defined. It is more fragmental looking as though cemented sand grains.

Under the ore clubs I found several specimens which are supposed to characterize the South formation. Since this mine is said to work in the South vein. Of these

41305 is banded black one,

S. T. R.



Banding of slate on W side of Cut at Curry No 1.

41306 less rich,

41307 hard and calcareous looking.

41308 One containing much secondary carbonate.

Just East of the shaft are exposures of slaty ore in the road. This is silicified and fragmentary jasper.

41309 banded ore

41310 jasper, interstratified with same. Dip 75° S.

Examined again out on railroad from which 26506 was taken. The dip of 65° in the north side may not agree as slates seem the same. There is a contortion in the jasping on the west side.

41311 jasper silicified with slates in north point of East side.

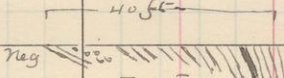
41312 ferruginous slate from railroad track north of Engine house. Strike 10° S fl. Dip 78° S.

41313 jasper from pit No 3.

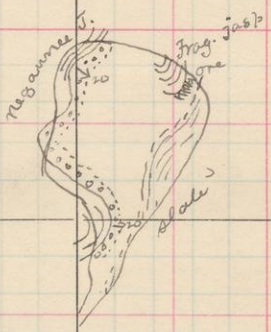
At the NW corner of this pit is a little synclinal in the ore formation and here the contact between the supposed regenerated and the Tradic can be well seen.

41314 The older formation forms a little syn-

S. T. R.



Section across N end No 3 Pit



Plan of No 3. Pit

H1315 cline pitching about 20° W.N.W. S.E. with minor rolls and above this in the sides and filling in its irregularities is a well marked conglomerate; made up of angular pieces of ore, and jasper cemented by sandy material that looks as though composed of the same material as makes up the overlying slate. The conglomerate here is not more than 3 or 4 ft. thick and this is overlain by banded slate and jasper. This is brecciated & conglomerate to a large extent.

The fragmental deposit further East is well bedded - large lenticules of jasper occur. At its contact with the slate it is brecciated and at this point a deposit of rich ore was mined

The whole series from the old jasper to the top of the fragmental jasper in this place is not more than 50 ft. and an average dip of 30° S.E.

H1316 In the little pit S.W. of No 3. the conglomerate is almost flat and is over-

lain by sandstone and sandstone-conglomerate.

The little pits in the new portion of the W. Vulcan's Sec. are not all on the map. A great number, including within the area indicated, have been scratched through the sandstone overlying them on to the conglomerate. This is the fragmental formation and much pits are in conglomerate.

41317

Is it possible that this conglomerate may be Potsdam? It looks very unlike the Potsdam are conglomerate elsewhere, but at the same time it is more conglomeratic than anything of the Trader's formation that I've seen.

Perkins Pit

Capt. Perkins states that the Perkins ore body extends to a point about 500 feet E. of the open workings.

He also says that he put a number of pits in the S.W and S.E. of the NE¼ Sec 4. T. 39 R. 29 W. and between these in these states.

At the little log barn in the plain

East of Perkins Pit. (location elsewhere) a shaft was sunk about 120 ft. of this 90 ft. was through sand, 30 ft. through Sandstone. Then a horizontal hole was put in the work through 60 ft of Sandstone, 10 ft. faint rock, 1 ft. ore, then slates and limestone. It appears that the basin is a valley covered with slates overlying limestone, except where a gully was cut which is now filled with Sandstone. It is more probable however that the basin was cut in limestone and slates and that these were covered with Sandstone, over eroded edges of the slates and limestone.

Runnels

West of the Runnels running with the Jamestown and then south to some pits in the Hamburg slates.

41318 Number 1 slates west of the new Jamestown, west end Runnels pit. Next south of this is a foot thick bed of quartzite and one mixed, i.e. a quartzite composed of grains of quartz-cement.

41320

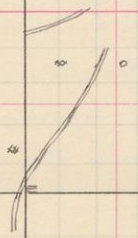
ed by one, and South of this is
41319 banded ore and jaspers. The jaspers
looks very much like the Veganne
but of course cannot be.
41321 The ore is banded.

Dec 11, T. 39 R. 30.

Proceeded along the road W the Jasper
mine. Near the crossing of the road
and the open railroad found the pits
on top of a hill. The pit nearest the
railroad is in slates which appar-
ently strike E-W. as there is a small
outcrop showing this strike a little
to the East.

About 150 paces E and 150 or 200 paces
West is another pit on which dump
found a number of interesting
things, among them
41322 a jaspery quartzite with a facing
of ore,
41323 a mottled chert and red and green
41324 jaspers; and
41325 an ore cut by quartz veins.
This pit is sunk on a large ledge
of Vanburg slate, the schistosity
of which is well developed. It

S. T. R.



Plan of Marble ledges N of Aragon Mine.

has an E-W. strike and a vertical dip. Evidently we have here the conditions favorable for the development of ores.

Aragon Mine

In the Aragon Dump heap saw well banded ore and jasper which in places looks fragmental and in other places looks crystalline

Specimens:

H1326 banded ore
H1327 fragmental jasper
H1328 less fragmental jasper
H1329 clean jasper
H1330 " "

The jasper bands are from 3 to 4 in. in width and run regularly. They look like Veganne jasper.

In the wall surrounding the stock piles saw a great assortment of rocks, but took only two specimens

H1331 mottled jasper, looks fragmental
H1332 jasper filled with shale and irregular masses of ore.
H1333 band ore and jasper - looks like Veganne.

41334 One filled with nodules of jasper. Looks like fragmental rock. Or it may be slightly brecciated, the nodules being separated from the jaspers layers by movement. It is noticeable that the jasper is in regular bands, here and there opening into lenticules

The ore is occasionally brecciated, but

41335 it is usually a black crystalline, porous banded ore which in some places becomes crumbly and soft. When brecciated and when contorted the ore is much softer and sandy.

There is little difference between

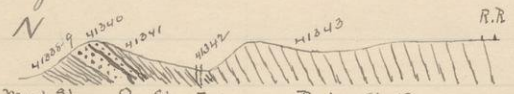
41336 the harder and the softer ores Except that latter breaks into granules

41337 Surface showing faulted and brecciated ore.

Much of the ore is cut by veins of white quartz and that interbanded with the jasper is often micaceous.

Briar Hill

Made map of exposures at Briar Hill mine and vicinity. The slates in the brook for mile, as has been reported before, dip brook at 80°-70°. They extend to a little north of the Lucas railroad running into the Briar Hill mine. lies, the enclosing mine siliceous and jaspery and characterized by a greater and greater abundance of quartzite layers from 1/4 - 1/2 in in thickness toward the north. North of these are quartzites and ores of which the former consist of fragments of quartz, ore and jasper and the latter of mottled ores. These strike N. 80 W and dip 20° S. They are followed to the north by about 3 ft. of conglomerate and this is underlain by light colored slates that have heretofore called the marble slates. Interbanded with these are thin layers of quartzite. The section is as follows



H1338 "Marble Beds" under conglomerate.
Northernmost Exposures at this place.
H1339 Quartz band in same.
H1340 Conglomerate layer
H1341 One rider to be added with conglomerate.
H1342 Quartz-Beds.
H1343 Brian Beds.
Much of the one seems like Specular.

A little further East and at northern limit of the Exposures are two small pits from which much material was taken. On dump heaps of northernmost the ore and jaspers are beautifully ribbed and the jasper
H1344 is of the clean, waxy variety.
The ore is slaty. Specimen but on
H1345 its cleavage surface are little knots of ore
The material containing knots like the ruganne. The pit is about 40 ft along strike from the East end of the quartzite ridge (H1338-H1340) and nearly in direct contact by this. The material evidently comes from below the quartzite - i.e. from the

position from which the older formation material should come.
In the northern part was a rather rock that looks as though it might be a conglomerate.
At 40 or 50 ft. further east is a little
41346 ledge of soft conglomerate. Dark rock that was thought like pebbles to be rolled conglomerate in the field, but which is now known to be the talc-schist lining the bottom of the Aragon through

The limestone, chert and breccias, here before referred to, round the west and east ends of the valley west of the Exposures just described. The valley itself is probably underlain by the talcose schist.
To the west this limestone is fairly evenly bedded, striking N. 70 W. except where otherwise indicated on the map. In it are many chert beds some of which are so thick as to warrant mapping. Some contortion is noticeable in

the westernmost ledges - the little
beds pitching west on E side of
one of the little hills and East on
the W. side of the same hill. The mar-
ble is brecciated in many places, but
the brecciation does not seem to be
limited to the axes of folds, but
rather at places where there have
been fractures produced, as some
of the breccia bands cut across the
bedding of the limestone
Upon going from west found a
little less but about 20 paces NE
of place from which 41347 was taken,
but to my surprise its summit con-
41347 tains nothing but Shale.
If 41347 is old Jasper cannot
explain this occurrence at all.

Millis Mine

Millis ore-body pitches 32°-33° W and dips 70° N.

The 2nd & 3rd levels is 160 ft W of 1/4 line.

"C" is the most westerly shaft. A pit was put down about 85 ft NE of this. It went 15 ft. through drift, 9 ft through brown slates like those in S side Chapin sink-hole and then a cross cut was put in 45° W S. all in brown slates

3rd level is 650 ft from collar of shaft.

Drill Holes

NW¼ NE¼ Sec 31. No-30

85 ft from E. line. 120 ft from N line. Dip 56½°

Stand pipe	29 ft	Gray & brown sl.	15 ft.
Brown slates	238 "	Jas. & gray sl	21 "
old + jasper	11 "	Brown sl.	4 "
Banded Jasper	20 "	J. and Qtz	146½ "
Qtz. J. & gray sl	10 "	Total	697½ "
Gray slates	64		
" & red sl	45 "		
Sl. ore & Qtz	12 "		
Gray slate	24 "		
Jasper	4 "		

196 4 2 2 0

S-W of Mill's Engine House
450 ft. from W. line of E 20 (NW of NE 1/4)
1/3 way Distant from N. line.
Dip S. 65°

Surface 20 ft.

21	"	brown iron slates
26½	"	slates, one, quartz & jasper
8	"	slates & hematite
22	"	" & qtz & hematite
18	"	gray slate & qtz.
12	"	" " & jasper
21	"	gray slates
39	"	" " jas. & qtz
10	"	green slates
116⅓	"	slates & qtz.
100	"	banded iron ore & jasper
413' 10"		Total

The little hill just E. of the railroad station at Norway is composed of calico Hamburg slates - much jointed and cracked. The folding is into very sharp folds which on the west side of the hill seem to pitch E. and on E side of the west at fairly low angles. The rock is crossed by joint cracks cutting each other at angles of about 50° and 130° with acute angles E and W.

In addition to these there are numerous finer joint cracks closely crowded. The rock is thus schistose in two directions and breaks up into little rhombs that are often extremely small. The principal strike of the bedding is E-W. but of course there are variations from this due to the folds. Quartz veins occur here and there and occasionally chert masses appear in the slates. No carbonate was seen.

Iron Hill.

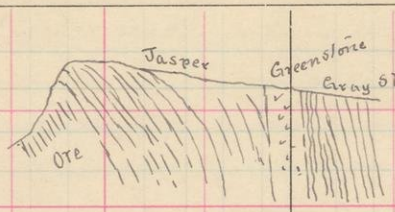
Made a map of Iron Hill and took a few specimens.

H1348 Slates from pits in Sharpe in side of hill South side of swamp. Look extremely like slates associated with the limestones

H1349 in one of the little pits East of Iron Hill found a distinct bed of conglomerate which appears white in the red slate. At any rate the pits both work are all in red slates

Mr Cuff says no work has been done South of the conglomerate So don't know what exists. Of course the conglomerate may be a coarse bed in the slates, as of the Northern slates are nearly a portion of the Marble series, the conglomerate may be an extension of the Iron Hill conglomerate.

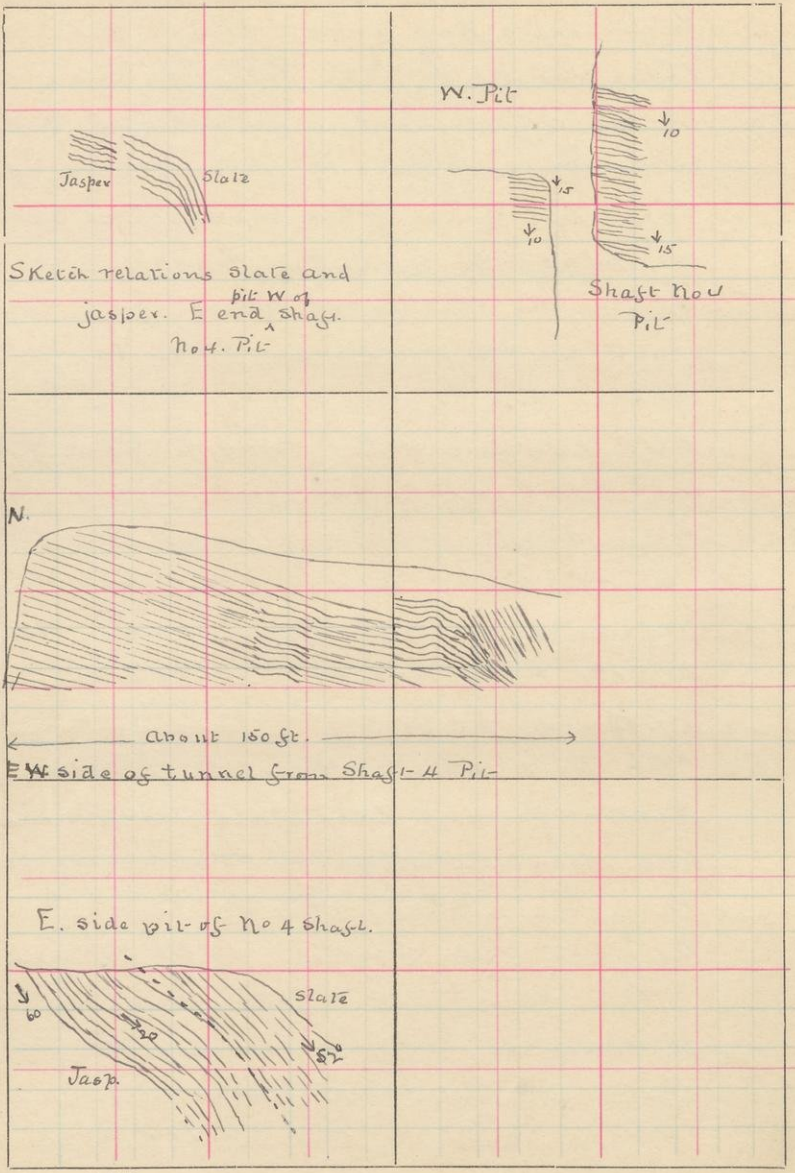
S. T. R.



E. End pit at No1. W. Vulcan

W. Vulcan and East wind.
Examined pit of No 1 Shaft. and region
there about. In the pit on west side
H1350 is lime formation material dipping
65° S. Found this to extend all along
the west side of the pit. It is cut in
one place by a decomposed green-
stone. On the north side of the pit
and on the railroad to the north
slates are exposed striking N 70 W
and dipping 65° S ~~and~~ at E end of pit
and 65° S. at west end.
H1351 Iron slate on railroad track.
On the East side of the pit the
relations of lime formation and
slates to the south are shown on
opposite page.
At No 4 Shaft there is probably a
little fault cutting between
ore and slates on the little divide
N. of No 4 Shaft. The ore dips low
and its top portion is shattered. There
is here unquestionably an ore con-
glomerate where upper surface
shows on E. side of pit.
Slates are on the South side of
the pit and extend South in the

S. T. R.



Sketch relations slate and jasper. E end pit W of shaft No 4. Pit

E W side of tunnel from Shaft 4 Pit

tunnel extending southward from the pit. The slates are low dipping to the north end of tunnel, then they become flat near south end and at the south end the dip steeps.

See sketches on opposite page

1. E end pit just W. of that in which is shaft 4. Shows tunnel.
2. Plan of tunnel.
3. East end shaft #4 pit.
4. Tunnel running S. from this pit.

Jones Shaft

At Jones's Shaft nothing can be seen but small fragments of Jasper and one, the former looking very much like the Veganuccelli. A few large pieces of Conglomerate or brecciated stuff was also noticed. Two little hills to the west are in sandstone, some of which is conglomeratic

H1355-2 Jasper from dump of Klondyke Shaft.

H1355-3 Jasper from central Vulcan

H1354 Hanbury slate - light coloured. From dump of shaft East of Klondyke.

H1355 Jasper from old Exploring Shaft N of Whitesides.

The trench marked on big map just East of this place runs N 15 E. from Spring. Up to 45 paces along trench we found rotted slates like Hanbury. The next 100 paces was occupied by the iron formation, and beyond by the Brian Slates.

H1356 Iron formation from South end of the Exposure of this rock.

H1357 Do. from North End.

H1358 Brian Slate at 155 N from Spring. 1 E. 10 paces from S. End Slates

The Dump of the Exploring Shaft in the OE¼ Sec 10 contains an abundance of Hanbury slates and a large quantity of banded ore and jaspers. The jaspers is very much like that of the Millie mine, very fairly dense but marked by small spots of translucent jasper &c. There is also a small quantity of breccia ore which is from the N. end of a drift near contact and intermediate slates.

41359 Much of the jaspers looks original
41360 banded jaspers like the fragmental kind.

41361 Hanbury slate from same dump.
Ran N. from this point 180 paces to pit in Brier slates and then S. to a Shaft. At 65 struck found pit in what appears the Sandstone.

41362 At 85 S. found another in iron formation
41363 and at 121 S another in same materials. At 15 W pits, 10 E and 60 E are other pits in iron formation.

From Exploring Shaft went East 100 paces then N about 30 paces

old shaft on dump from which found great deal of iron formation materials. The rock side of the pit around the shaft is in a rotten state. In the pit the jasper strikes about N 80 W and dips 70° S. Other little pits in this vicinity also show the iron formation.

41364 Red slates & rock of iron formation.

41365 Mine like intermediate slates, little further north.

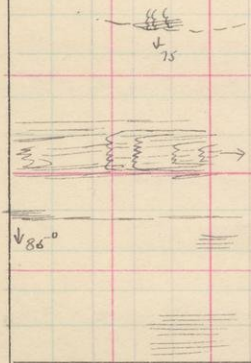
41366 Jaspers, near contact with slates.

41367 Exposure on side of gully near section line between Secs. 10 + 11

Hamburg Slate

Walked over west portion of Hamburg hill. Found greenstone & the north, calcareous slate and then & the south siliceous slate. Traversed hill in various directions, finding the calcareous rock being replaced & the north by the siliceous slate, which apparently trends in from the west in the valley between the greenstone and the calcareous

S. T. R.

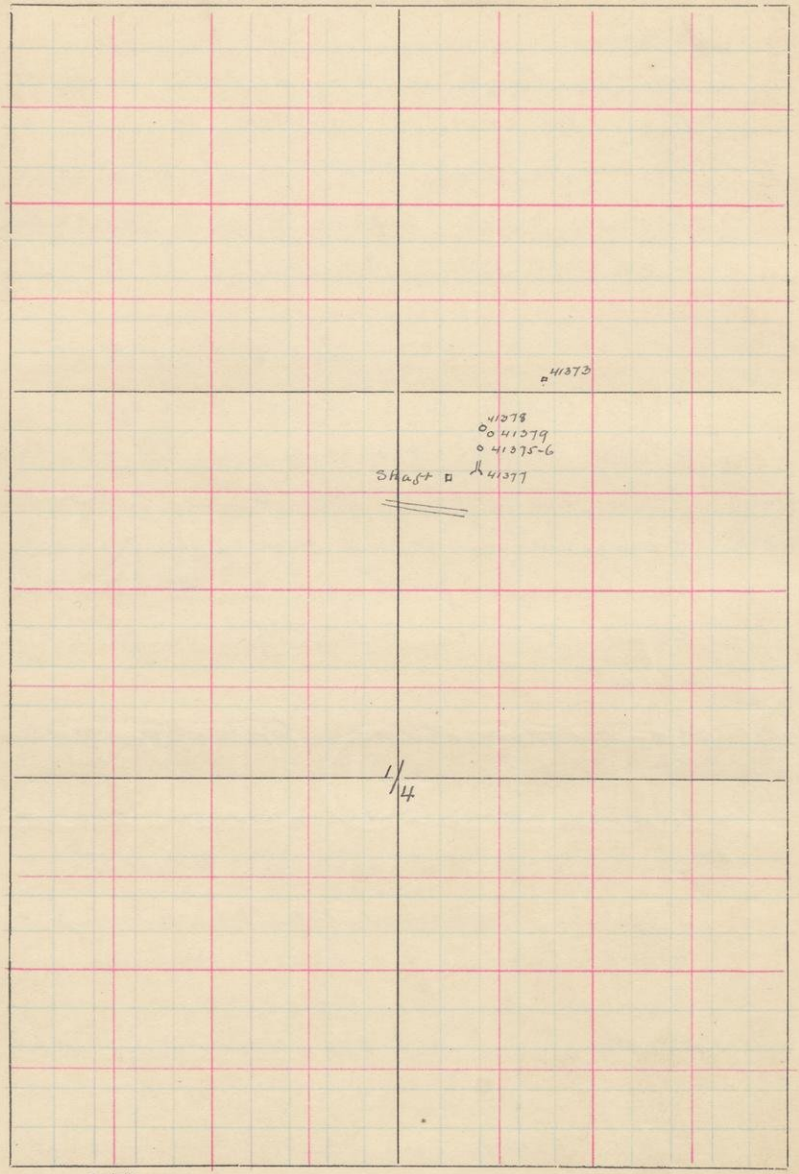


slates.
On the highest part of the hill to the west the slates strike across the hill - nearly N-S - and are closely jointed into little flats pitching E at 20° and striking N 85° W.

Dec. 6. T 39 R. 29

From little pit. work of shaft on top of hill took specimen that looks
41368 like quartzite at base of upper
41369 formation and one of a sandy slate.
41370 On dump of shaft is slaty one that looks like ferruginous mica slate.
41371 The jasper looks like the Negaunee
41372 The slates on the dumps are white mottled slates that resemble most closely the limestone slates.
Of course can get no relations from distribution of rocks on dumps.
The rocks in pit dip 70° S.
The shaft on the top of the hill is at about 1050 N. 370 E of S¼ post Dec 6.
Mine dumps are chert belonging with the limestones, limestone slates,

S. T. R.



Sandstone and Potsdam one conglomerate.

H1373 Marble slate.

Some of the fragments in the sandstone consist of a dark black chert filled with angular fragments of red and white chert, that are apparently shattered portions of veins of white chert cutting through the black variety, as veins of this same character are occasionally seen in the black rock.

The pits and tunnel near the Electric plant S. W. of the above described shaft were examined in some details. Just from mouth of drift is a

H1375 row of pits running almost to the

H1376 N. of drift opening took two specimens (H1375 and H1376)

H1377 from dump at end of drift.

H1378 apparently interbedded slate from pit at 115 ft of entrance to tunnel.

H1379 looks like marble slate. From pit 8 or 10 paces E of that from which H1378 was taken, but probably much

41380 deeper. This often contains bands of quartz.

Next west to this is west of center line of section. Found in dumps same

41381 general rocks, viz: brown one with chert jaspers like that at the shaft near the road

41382 Slates that look like Granby Slates.

41383 Red Slates that may be intermediate slates, but which might be Granby.

Tennessee Mine

Made detailed map of Tennessee and vicinity beginning at the S ¼ post Sec 34.

41384 Intermediate scale from pit at 15° W of S ¼ post.

41385 iron formation from pit 115 N of this ¼ post. Strike N 70 W. dip 75° 80° N.

41386 fragmental looking rock 230 N of ¼ Post. Same rock is also in pit at 260 N.

A little pit 8 f.w. of W and of the Tennessee open pit is in Scale.

41387 iron formation

41388 intermediate scale } from pit 100 S and 40 E of ¼ post.

41389 micaceous banded one,

41390 quartzite associated with same, from pit 150 E. 120 N of ¼ post.

Dips and Strikes indicated on map and Expenses located.

Good fragmental!

E. Vulcan

Examined pits & trs. of E. Vulcan, locating exposures also on big mass.

41391 red slates from pit on hill. Strike N. 70 W. dip 85° S. Very fissile with schistosity parallel bedding.

41392 banded red and purples from dump. Loose fragments

41393 25° E of slate pit (41391) is a small pit which seems to be on the contact of slates and iron formation. The iron formation is sandy, indefinitely banded with jasper that looks fragmental.
There is evidence of a little strengthening anticline here, since the strike suddenly changes from N 70 W to N. 80 E. Pitch must be steep NE.

41394 Slates and

41395 iron formation from shaft. This shaft seems to be on the contact between the iron formation and the slates. The jasper seems to contain fragmental material and the mass banded with red slates, to judge from specimens on the dump.

The iron formation strikes N. 60 W and dips vertically

H 1396 Immediately E of "3 Shaft is a small Exposure of jasper & slate which in the surface seems to strike about 10°-15° W of N and to dip 87° E. The rock is brecciated but do not think it belongs with Trader's. Think it is upper and that slate to the East to Sunbury.

H 1397 At about 60° N. 15-20 E of "3 Shaft is another shaft in the same formation but in dump is slate more like the intermediate slate than that to the East

H 1398 At about 240 W of Shaft 30 N. is an Exposure of siliceous slate contorted into little folds pitching about 45° to S.E. This slate like Briar though its character is not definite?

40 W of this is the East side of crater like depression in the slates.

H 1399 Iron pit in slates, mine like Sunbury (N of 398) Prob. Drum for.

41400 40 W and 47 S. is an old trench in rhyolites which again are like Hanberry.
[For further details see map made in 1900]

41401 At No 1 Shaft Cried find no exposure but at base of foundation of one of the trestles saw quite a heap of banded Jasper and one which supposed the upper
41402 Jasper
41403 and
41404 banded one
from dump. Looks as though mining was from two formations.
41405 green amphibolite or green quartzite from dump heap.

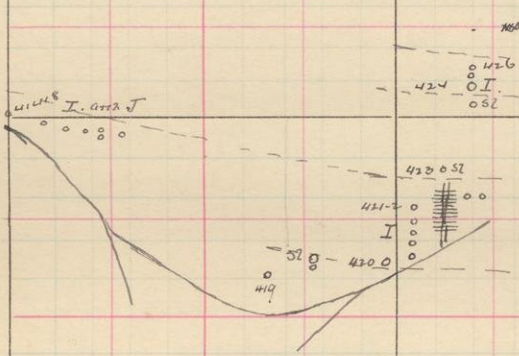
The pit at No 1 Shaft shows very
41406 well bedded jointed jasper and one striking N. 75°-78° W. and dipping 85° S.

D. E. Vulcan

along railroad leading E. to S.E.
Vulcan found series of banded ores
and jaspers striking N. 80 W and
dipping 85°-90° N. The rock is evenly
H1407 banded like the Sunk formation
H1408 and the jasper is silicified
At the dump of the shaft found the
same rocks, ferruginous & limited
and covered with oxides & calcite
H1409 ore, banded.
H1410 jaspers

H1411 At Woods shaft the same rocks
H1412 occur and in addition slates
that look like Tamarack.
Though some look like the Mica.
At the old shaft N.W. of the existing
shaft located on map are
banded jaspers and one - the jas-
per looking very much like
H1413 the old jaspers.
At 30 S and a little E of this is
H1414 a pit in slate but on the dump
H1415 are a few fragments of ferruginous
This makes it look as though
we had the old jaspers and re-

S. T. R.



NW¼ Sec 10. T 39 N R 29 W

Scale 1 in = 250 paces

contorted ore in the N. belt. Sourth formation in second belt. and a syncline in slates to the south.

The little pit about 175 E of shaft of SE Vulcan is now a well. On its dump heap are

41416 lean ore and

41417 a rotten slate that may be Brier

Sec 13. T. 39 R. 29

At what supposed to be location of Weidmans 26632 found 5 test pits in space of 125 paces E + W. The westernmost one is about 40 paces N of Easternmost. The jasper is like the Willie jasper and the ore

41418 specimen

At about 310 E. 200 S of westernmost pit is pit in what looks exactly

41419 like the Hanbury slate and 70 E. 20 N of this is another

41420 From southernmost ore pit.

41421 From Northernmost of 5 pits

41422 just W of trench

The trench is in a series of evenly bedded jaspers striking E-W

and dipping vertically.

Abut 30 paces N. of end of trench
41423 is a small pit in slate and at
abut 75 further N and 30 or 40 E a
deep pit in which dump is a great
41424 quantity of ore and banded jasper
and slate - dipping vertically.
41425 North of this again are dumps of pits
in which are great quantities of ore.
Abut 70 N. 40 E. is ledge of marble
when found marble so near went
back to carbonaceous dump and
found in it some small quan-
41426 tities of quartzite mingled with
marble slate

Hanbury Hill

Took another look at Hanbury
Hill at abut 1/2 line finding slate
on S. side with schistosity striking
abut E-W. and on extreme S. side
E 15° S. Schistosity oblique wheading
at many places as this is contorted.
In center of the section is carbonaceous
slate and on N. side of main ridge
quartzite. W of Greenstone is
ledge of carbonaceous slate. Rocks

S. T. R.

411427 Are very much contorted. Bedded quartzite somewhere near with Greenstone	about 20 ft. thick Contact of slate

Millis Mine

4114-27 Upper slate

Made a detailed examination of country between the Pewabic and the Millis Mines.

4114-28 From Millis shaft. Dump heaps, showing spotted character of the ore

4114-29 Banded jasper and ore, from Waspale Dump.

4114-30 Mica slate, old shaft about 100 S. 20 W. of 1/8 post.

At 133 paces from old shaft on S. side of the Millis hill along line from this shaft to the Waspale mine and about 20 paces W. of the line is a trench or pit exposing slaty

4114-31 rock which appears to be interbedded between slates and one formation

4114-32 Conglomerate ore from pit W of shaft

4114-33 Banded slate } From pit S of
4114-34 Iron bearing slate } B. Street, near Rec. line.

[N.B For further notes in this area see Note-book for 1901]

Cyclopes Mine.

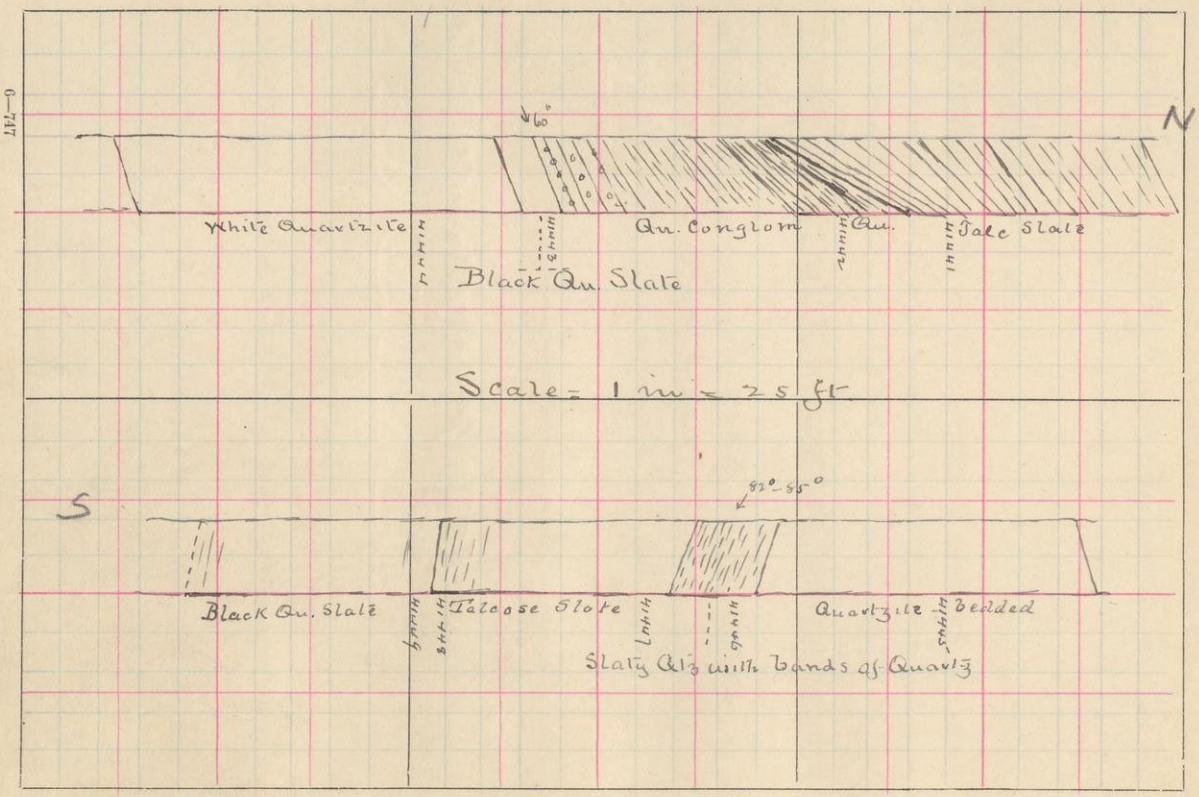
Again visited the Cyclops Lode but could make nothing additional out-of-them. The syncline in the western Greens pit seems to be the same one as that further west and yet former is conglomeratic and latter not.

Following Eastward the syncline passes to the N. side of Greens pit and then appears whe the South side of an isocline in tracing N. side of Greens pit and S side of Barbara's pit. In other words this formation which appears to underlie the slate to the South, as one passes westward, appears to be as one it.

In the ~~Anticline~~ Syncline W. of Greens pit the slates that are brecciated may be marbled slates.

H1436 Slates in N of Syncline (~~Anticline~~?)
H1436 " " S of " (")

S. T. R.

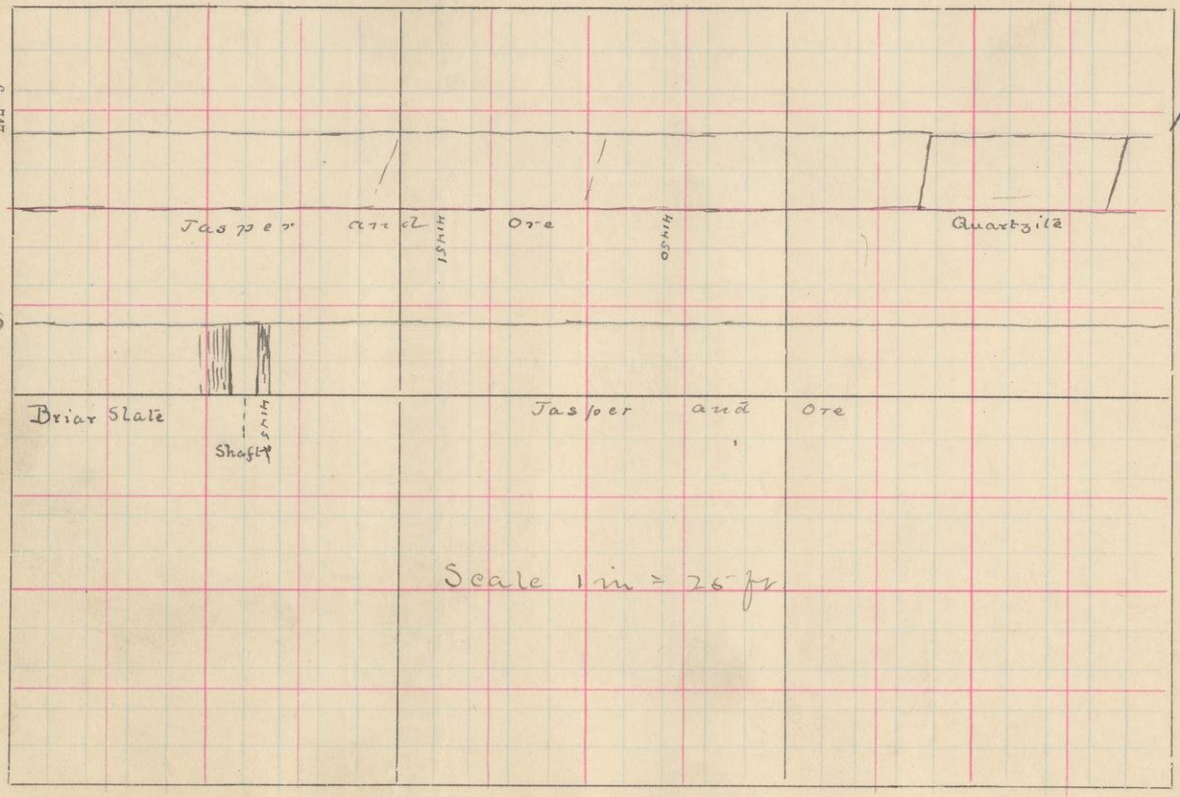

N
S
White Quartzite
Limit
Limit
Black Qu. Slate
Qu. Conglom
Limit
Limit
Talc Slate
Scale = 1 in = 25 ft
Black Qu. Slate
Limit
Limit
Talcose Slate
Limit
Limit
Quartzite bedded
Limit
Slaty Qtz with bands of Quartz

H1437 Slates that may be from base of
H1438 Ore Dump or probably the marble slates, from pit W of Driveway open pit and 20 paces N of road. Near center Sec 5.

H1439 One } from pits in Hamburg
H1440 Jasper } Slates. About Center S½E¼, N.E¼17. T. 39 R. 29

Examined cross-section of Penobis mine, 1st level, along the long drift. Shown in plan of 1st level. Could not get to end of drift. because of falling in of roof.
Beginning at N. the order of the rocks seen in walls of tunnel is as shown in section on opposite page and that following:

H1441 35 ft. talcose slates
H1442 45 ft Conglomerates quartz pebbles
H1443 6½ " black quartz slates


S.
N
T.
R.
S
Jasper and Ore
Quartzite
Briar Slate
Shaft
Jasper and Ore
Scale 1 in = 26 ft

Contact between black quartzite and conglomerate's dips 60° N.

41446 50 ft. white quartzite

41445 42 ft. bedded quartzite's or perhaps talc slate's

41446 11⅓ ft. slaty black quartzite banded with quartzite beds

Contact between 41445 and 41446 dips 82°-85° South.

41447 33⅓ ft talc slates - N. end

41448 do. S. "

41449 32½ ft. black slaty quartzite

24½ ft. quartzite

41450 237 ft. jasper one, N end

41451 do about ⅓ way from N. end.

41452 268 ft. intermediate slate's. Specimen from North end near contact.

Dip's about 100 ft. S strike is 85° N.

41453 118 ft broken ironstone formation

300 ft broken ore, cut by sandstone dykes. A 5 cent film is in doubled sandstone - one conglomerate's cut by dykes of sandstone. Where iron formation stops and sandstone

conglomerate begins was not deter-
mined since transition seems to be
gradual - as might be expected. Meas-
urement was to undoubted undis-
turbed beds one and jasper.
36.8 ft clear sandstone.

On 4th level of the mine found con-
tact of intermediate slates and ore
formation at the fault.
41454 slate near fault line
41455 " at " "

Cundy Mine

Made another trip around Cundy mine.

41456 From

41457 series

41458 of little pits

41459 S. of 1/4 post.

All look like rim of mallin or like enriched intermediate seale.

41460 Seale from pit S curve of above seales

41461 Hawbury seale from pit SE of 41460. see p. 5 notebook 394.

Blank Pages

44-56

Skipped

Drill Holes

Sec 9. T 39 R. 29

No 1. Angle 22° N.

Slates	18 ft
Jasper	176.6 "
Slates	321.6 "
Ore	15.
Jasper	8. "
	539.

No 3. Angle 35°
About 500 ft. NW pit No 2.

Sandstone } Slates }	300 ft
Ore	3
Jasper	53
Limestone	10
	366

Cyclops No. 1. 400 ft. S. of No 1 Pit
Angle 45° N.

Slates	375 ft
Quartzite	33 "
Soapstone	26 "
Jasper	13 "
Quartzite	13 "
Jasper ore	24 "
Quartzite	13 "
Jasper	5 " 68
Quartzite	58 "
Jasper	3 "
Quartzite	10 "
Red clay	1 "
Quartzite	6 "
	580

Quartzite is thought by Mr Jansson the Cherts of limestone formation.