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Florence, Wisconsin: [specimens] 41565-41703. No. 342 July-Aug. 1901

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], July-Aug. 1901

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section and the dip and strike when observable, the latter always being expressed from the north; for instance 4025, 250 N., 300 W., *Strike, N. 78° E., Dip 50° S.* Then follow with a full description of the ledge. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small-sized specimens, trimmed to a uniform size of $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$ 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 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.

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Field Notes

of
W. S. Bayley

July - Aug. 1901

Florance, Wisconsin

Specimens 41565 - 41703

John Williams, Iron River
John Rudstrom, Commonwealth

1.
Reached Florence July 4 and began
work July 5. During July 6-9 was
engaged with mining men and
in copying blots and records.

July 10:

40 N. 9 E Examined country around Florence
mining, locating with respect to
Florence Mining Co's map. Made
special examination of pits - so that
might understand the Co's maps
and names

41565 Pit 53. Clay slate? Typical Hamburg
containing much *Leucile*? In places
it is mottled red and white, being
stained with iron oxides.

In pit 52 to the SW of 53 the rock is
not so uniform. Bands of soft coarse
gray wash-like rock 2 in or less
wide lie between bands of black
slate. The coarser rock is spotted
with little white spots of some al-
tered mineral.

41566 Specimen represents coarser band

2

The "new pits" are in
a fibrous black slate mixed with
graphite and shot with veins of
pyrite.

At 40 paces in line
of pits and 25 paces S.E. are several
pits in graphite.

The pit that took No. 30 has
graphite slates on S. side and chert
on the N. side.

20 paces S.E. of this is a pit in chert
and a little south is one in graphite
slates. These are all located on
map.

The other pits located on the map
are in chert. Some of the southern
ones on south side of the hill con-
tain black slates with broad bands
of white quartzite in chert.

41567

Badwater.

July 11.

40-19E

Drove down to Badwater Settlement in Menamie river and walked back along north side of river to

just south

41568

Just north of the settlement, found a little falls over greenstone. This is partly brecciated in broad bands, where it resembles strongly a greenstone conglomerate.

41569

Further up stream where channel turns west is a large ledge in a fine gray rock that might be either quartzite or a dense greenstone, and further west where channel turns north is another ledge

41570

in the bank. It is a low exposure trending about E-W and hence running obliquely across the stream. The rock looks like a slate but it is devoid of distinct bedding. It is schistose and contains a few inch-wide bands which are parallel to the schistosity but which are themselves massive.

41571

The ledge N of Sec 20 in Brooks's map is a dense quartzite^d apparently in ledges on both sides of the river and for 100 paces to the S.W. The rock is a dense gray quartzite without noticeable strike or dip.

41572

This specimen is from a great knob of quartzite^d on bank of stream opposite 26273. Near the water's edge on S.W. portion of ledge the quartzite^d is cut by a dyke or a wide

41573

band of rock. It may be a fine grained greenstone or a coarse grained quartzite^d.

41574

Low ledge marked by Brooks as hornblende-schist opposite end of S. line Sec 15. It is massive like a quartzite^d, but is not micaceous. This is the southern of two ledges. The upper one is 100 paces further up stream.

41575

About 50 paces further up stream there is a small ledge on bank of stream, and this is more like quartzite^d than

last two. But above this again at a little breakwater or quarry the greenstone again appears as a typical Spheroidal form.

July 12

Again examined country near Florence.

40-15E

In the NE 1/4 of NW 1/4 Sec 21 T. 40 R. 18 are three little knobs of Schistose greenstone. Specimens from S.E. one

41577

On the road to the Prairie running through Sec 16 T. 40 R. 18 are several small Exposures and several large knobs of Schistose greenstone.

The first, travelling north, is at 3.6 from center Sec 16. In this the rock is much sheared. Great lenses and bands of the dense rock are separated from each other by dark Schistose layers in which there is abundant evidence of truncation. The rock has a typical Archean

aspect

4154-8

At 690 U of the center is another knob on the west side of the road and at 816 another

At about 1000 U and SSE in a field is another small knob and at 350 E side another - all of the same rock.

From this point we take trip into pits 69-75 in NE $\frac{1}{4}$ Sec 16. These are all in soft greenstone. Nos 70, 72 + 73 are in what looks like red dolomite, but through the mass are small white decomposed crystals, and these seem to indicate that the rock is a decomposed greenstone.

The pits 69-75 north are in a soft gray chloritic rock that I take also to be greenstone. These pits are marked on the map as containing Sericite schist or talcose schist.

41579

Pit 9. White talcose
slate?

July 13.

Sopares west is another pit in V
which the rock is much more staly.

Pit 56. Banded slate? This pit ✓

41580

also contains the white "talcose
slate" which takes like a decupro-
so slate? The same rock is in pit
55.

41581

Pit 57 is in a white or gray talc-
ose rock, presumably sedimentary ✓

41582

Pits 58 and pits between 58 and 59
are in a rock that looks like
a ferruginous greenstone

Pit 59 is in rock like 57.

41583

In pit "1" found a ferruginous schis-
tose slate and some in the other
little pit that numbered in the map
found banded slate and quartzite
with quartzite layers in and less
in width.

The pits about 200 to 400 are in
schistose slates

4115-84 Massive gray slate^s from pit #12 ✓

The rocks on Summit of #19 are beautifully faceted.

July 15.

40-18

Boat between Point and Uitchigumme was again examined though examination was interfered with by rise of water.

In many places the greenstone and slates are so decomposed that found it difficult to distinguish between them. In some places it seems that slates overlie greenstones in the banks of the river.

Toward the west end of the series of Exposures there are several knobs of greenstone forming little conical hillocks at the river's bank. These are cut in two by the river giving steep banks where the rocks occur. Shoreward the greenstone is separated from the ledge in bank by valley of low ground distinct of Exposures.

At the water's edge the greenstone appears to grade into slates through rocks that are schistose greenstones or tuffs. If this is so the greenstones are Upper Huronian.

W041910

41585 Slate East side of greenstone knob at water's edge.

41586 Schistose greenstone into which slate seems to grade.

41587 More massive phase of same rock
41588 Greenstone quarry, knob.

41589 Slates west side of knob
Of course this knob may be Lower Huronian or Archean and the slate may grade into greenstone through a recrystallized greenstone, just as a granite conglomerate may grade into granite through a recrystallized granite? ✓

40-17E

Examined manganese conc. in NE of SE Sec. 12. T. 40 R. 17. In this portion of the Sec. are a number of small hillocks of slates, exposed best on their west sides and in top. The slates

to this strike
+ dip cor-
rect?

seem to strike usually N to W and strike is OK dip must be N. 4 or S. W.

dip 85° SE. There are slight variations in the strike, but nowhere did find any dip varying much from 85° . The strike in the places differed as much as 25° from that recorded above, being NW. The rock seems to be a decomposed black slate with quartz or quartzite bands through it.

41590

On the west side of the hills are several openings to natural caves which seem to have been formed by opening of joint planes, or perhaps by separation along irregular cracks. Water continually drips from tops of caves and build stalactites of manganese oxides and corresponding stalagmites.

41591

The whole cave roof is covered with coating of manganese ore, sometimes 1 in thick, and stalactites 5 in long are common.

40-18E

41592

At the Calloway Pit (see Florence
 Mine Map) a great amount of work
 has been done in black slates,
 red slates, decomposed white-seri-
 cite schists and black slates banded
 with white chert. No definite
 formation is shown in dump, but
 a little hematite is seen cover-
 ing joint planes and filling
 joint cracks in the bedded rocks.

41593

At pit ^{no} 64 the same rocks occur ✓
 but they are denser. Here the rocks
 are folded in many ways, rounded
 folds being most prominent

on the highway between Florence
 and Commonwealth at 175 E
 and 300 E. Expos-
 ures of slates and cherts. The west-
 ern beds strike N 57 W. and dip
 85° ~~SE~~ E. In the eastern beds the
 rocks are contorted the slates and
 cherts forming rounded folds, the
 dip of which could not be deter-
 mined.

In this strike
 + dip cor-
 rect?

July 15. 12 ✓

30 paces North of pit #1 (Florence
Mining Map) and 75 NW. are two pits
in red slate, which seems like a
decomposed black slate. And 40 paces
NE is another pit in practically
the same rock.

41594 Pit #3 Black slate resembling
limbless schist. This is decom-
posed in places into a greenish
and red slate.

Went down to 1/8 post. 500 S of NW ✓
Cir Sec 20 T. 40 R. 18. Here found
several red pits.

35 paces N of stake is a pit in red
slate and about 20 NE a pit in
black slate and one

41595 80 W. 100 S of same stake is a third
pit in red, mottled slate containing
sericitic layers

41596 The one of the Florence mine is of
two very distinct kind. One is a
soft, well bedded, bluish reddish
one streaked with thin layers of
gypsum that run continuously.

41597

The other is a dense finely ^{one} which too is banded.

41598

The ones disintegrate rapidly to finely divided red. mass of small fragments. Many of the ones are cut by veins of quartz and calcite and contain little vugs lined with crystals of hematite, calcite and siderite. Some of the vugs are filled with clear, white gypsum.

41599

41600

41601

Many of the ones, especially those ^{some crumbled} that are coated with a soft white efflorescence with a taste like that of Glauber's salt.

41602

Some of the bands of the ones are changed completely to brown limonite. This substance weakens the cohesion of the one and tends to break it disintegrate.

July 16. 14

From 0 1/2 Sec 9. T. No P. 18 ran north
to Bruce's locale? Struck river at
500 N. 425 E. ft. this 1/4 S at the western
margin of two knobs of greenstone refer-
red to on preceding page.

At 135 above this struck ledge
41603 of a white rock, a micaceous
41604 quartzite and a dense quartzite.
The micaceous quartzite extended
up stream as far as 215 N.

350 above this, faced in side of
river is a rock that I presume to
41605 be black slate. It strikes about
E-W.

54 below this is a knob of green-
41606 stone that looks like a dyke in
the slate, but its contact with the
surrounding rock could not be
seen. Near the contact the green-
stone is very schistose.

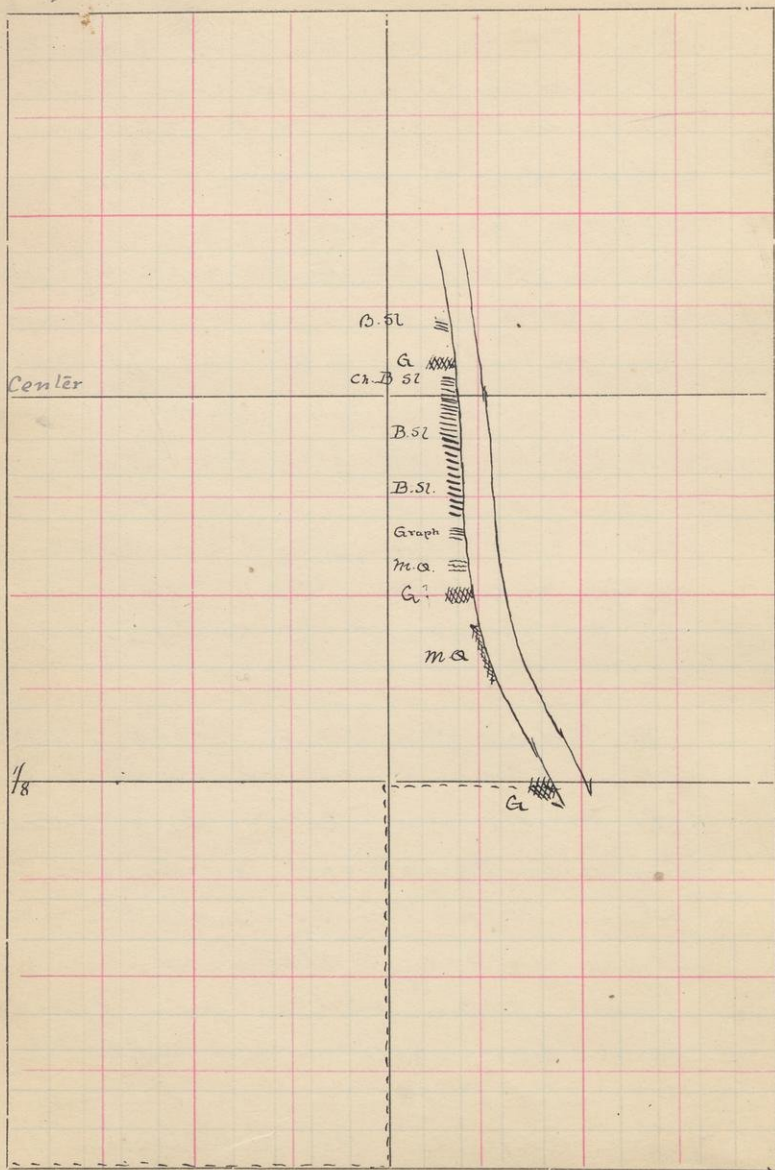
Such ft. slates and mica-
cous quartzite occur all the way to
where Spec. 39 was taken.
(41603)

For 100 paces down stream from
Northam greenstone knob (No

S. 9

T. 40

R. 18



41607

43

41608

44

The slaty rocks strike a little N of W. Near the greenstone they are very chloritic, passing gradually to the south into a ledge of more typical slate.

41609

45

Slate 125' below 43 (41607)

Below the last specimen are graphitic slates and micaceous quartzites.

Just above the little island the west end of which is near the range line is a steep bank of black slate on south side of river. The rock strikes E-W and dips 40°. At the water's edge is a more massive chloritic rock that looks bedded but which is not slaty. It weathers quite differently from the slate. It looks as though it might be greenstone under slate.

41610

46

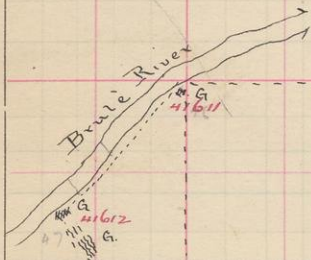
S. $\frac{7}{17}$

T. 40

R. 18 W. 15

7

8



Farm

Cor

B. Sl and Ch.

B. 52

N 47 W

Cur

July 17

Ran from Ow Cir Sec. 7 T. 40 R. 18 ✓
 North 1100 paces, East 500, N. 1400,
 W. 1100, S. 1000, E. 100, S. to R.R.
 At 200 N. of junction of County road
 and road running west along S.
 side Sec. 7 is a strip of land at base
 of Florence Hill. It is about 100 paces
 long and exposes the usual black
 slates interbedded with bands of chert
 or quartzite. Their strike varies be-
 tween N. 47° W and N. 55° W with dips
 40°-45° N. E. In one or two places
 are gentle folds which cause slight
 changes in strike.
 At intervals along the hill as far
 west as the section line the same
 slates are exposed.

Is this dip
 correct

- 416.11 At 538 W. 480 N. of S.E. Cor Sec 7 is ✓
 47 little knob of greenstone near river
 bank, and at
 416.12 about 100 N. 850 W of same corner is ✓
 48 a ledge of greenstone, marked Slaty
 on Mook's Map. This runs S. E. to
 top of hill where it is schistose

S. 35. 36
S. 2 1

39
T. 38

R. 18

27

26

25

Pine R.

Sec Line

Sand Plains

35

36

Sand Hills

Sec Line

Pewap's Road

Farm

spring

Farm

G

41613

July 18 17

39-18E

Ran down road along W. section
Sec 35 T39N R.18E to road running
E along center of Sec T.38N R.18E
then E to Little Popple river, N
to line Sec 36 and west to NW
Cor Sec 35.

41613

49

38-18E

When struck Little Popple, about
400 E of W 1/4 pt 1 Sec 1 found great
series of rapids and falls over green-
stones. The rock is a dense, massive
lun. breccia variety, certainly very
similar to the Menominee greenstones.
No other rocks were seen in run.

Found Sec 1 about 2 1/2 miles too long
N.S.

39-18E

When reached NW cor Sec 35 went N
to Pine river in section line in search
of ledge, worked clay slate in Brooks
map.

41614

50

At 800 N. 100 W of SE cor Sec 27 is a
small smooth ledge of a banded
micaceous schist and quartzite-like
rocks at the breakwater of Pine river.
Strike is N 70 W. Dip 85° SW.

41615-

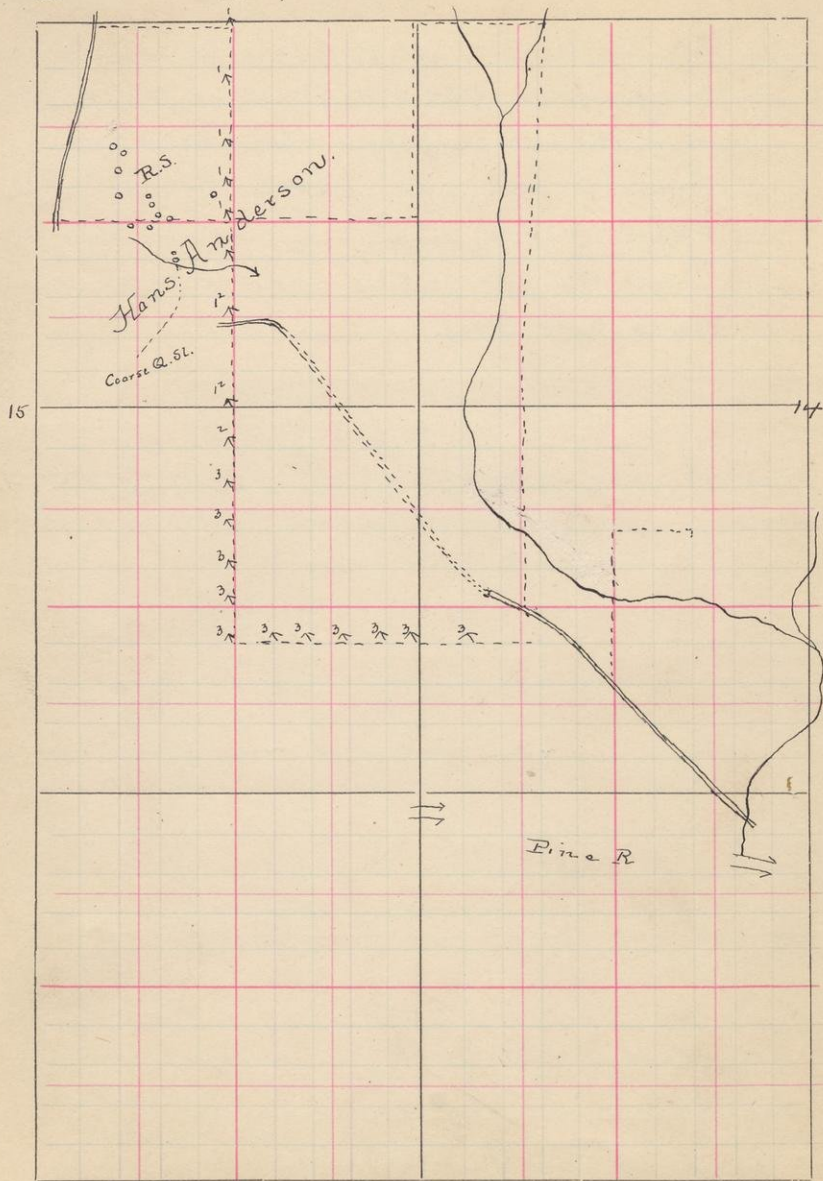
At 810 N. 225 W same cove, another ledge was seen in which the strike was the same and dip 77° SW.

Quite a number of other ledges of the same rock were seen about here but in all the rock was alike with similar strike and dip.

S. 15. 14

T. 39

R. 18



July 19

39-18 E

Examined pits in Hans Anderson's place in Decs 14 & 15 T. 39 21 R. 18 E. Found nothing but red slates except in one pit where was a little coarser phase of same rock containing much quartz.

The increase in the variation which was regular indicates nothing but that Dial was not in best order that deal ^{best order}.

41637

At a later date visited Anderson's pits again with owner and found as before that all pits to the South are in red slates. But in extreme Southwestern pit there is a little chert with the slate. This is the old famous ^{the} "blau-schist".
famous blau-schist

July 20

40-17E Made Examination of hill north of Keyes lake between Shavers. This hill was studied by Van Hise and myself some few years ago. No additional light was thrown on geology by present trip.

41616 Black slate and chert from 50 ft E of timbered shaft.

41617 Marzite schist from bluff near range line. The rock is sericitic but is not as distinctly micaceous as the rocks north of the Point + Brule. There and there are bands in it containing quartz pebbles but no other fragments were seen. These bands apparently strike N-W but the rock is platy and this structure gives an other strike E-W with dip S.W. In places the rock shows distinct current bedding.

41618 In some places the rock is reddish, sericitic and quite schistose. In several such places it has been pitted for ore. While containing ferruginous there has obtained from it.

41619
65

no one.

On the S.W. side of the quartzite this rock appears like banded with black slate and finally like replaced entirely by the latter rock. On the whole the slate is quartzitic and is very much like the Brian slate further East. In many places bands the slate is nodular like specimens.

41620
56

Later ran N. along East 78 line through Sec 25 T. 40 R. 17 one mile East 500 paces and South, finding nothing but quartzite after passing the black slate.

41621

Schistose quartzite from NE cor Sec 25.

41622

The Actinolite schist of Brooks seems like a black slate. In places it contains magnetite and possibly Graphite. As will be seen from map it attracts the needle very strongly.

S.

T.

40

R.

18E

Van Hise?

Stopped on my way to Florence at Lake Eliza. Here again examined the explorations visited several years ago. Found these explorations to be in what appeared undoubted iron formation slates. The argillaceous slate, however, is rather dominant, and the chert bands subordinate. All are stained heavily with iron oxide. On going south, find pure quartzite with conglomerate bands. The break between the two is about four feet. In the center of the interval between the break, a small outcrop shows iron-formation slate, and directly in contact with this, what was taken to be a conglomerate resting unconformably upon the

conformably upon the iron formation. This quartzite may be a continuation of the quartz-conglomerate of Brooks, and the slates representatives of the underlying Menominee series between the quartzite and the green schist series. If this is correct, it would probably make the slate and actinolite rock of the first falls Lower Huronian.

40-18E

Ran South from N¹/₂ Sec 31 T40 R18
to see the quartzite conglomerate
mapped by Brooks.

At 650 S. on North side of the promi-
nent hill of quartzite is a pit in
gravel and at 670 S. 100 W. a pit ✓

41623

from which a large quantity of gray
slate has been thrown. This is not
connected to the quartzite of the hill &
exposures, but this rock just S of
the pit seems to be a little more
slaty than elsewhere.

On the top of the hill are numerous
well exposed ledges of an almost
white or pinkish quartzite often
mottled. Between the bedding planes
there are zones of shearing along
which the rock is the usual pink
sericite schist. The main strike
is N. to W. and dip 80° S. but in
places the ^{dip} strike changes to S.E.

Ripple marks and banding are
use as criteria for determining
bedding. On the west side of the
hill the rock is a little coarser.
To the South of the quartzite is

41624

- L. 625 a black slate as in the hill
 U. of Keyes Lake, and further S. at
 L. 626 1300-1400 the roots of upturned trees
 show many fragments of gray
 graywacke slate.
 L. 627 At 1600 S is a large ledge of black
 slate that looks graphitic in
 places.

Went west from this point
 200 paces to the U.

- L. 628 At 900 S. 200 W of U. 1/4 post Sec. the
 last ledge of black slate is found
 near the quartzite. South of this
 the black slate is continuous, as
 far as went

on the north brow of the hill, i.e. V
 at 1150-1200 S. and 200 W of the
 1/4 post slates and graywackes ap-
 pear with the quartzites south of
 them. These slaty rocks cover the
 side of the hill to base.

Immediately above the slates at top
 of hill are several conglomerate
 bands 6 in or more in width. They
 strike in general N. 30 W. The distri-

butting of the bands is such as to in-
 dicate the presence of open fold
 pitching very steep to the S.E. The
 pebbles in the conglomerate are
 mainly quartz. Indeed some others
 were seen unless ^{there be} some quartz-
 ites among them.

S. 23

T. 40

R. 17

n/w

Cor

0.52
ch.

23

5 1/2

26

Took run into Dec 24 to Oliver Iron Mining Co. Exploration. Started from SE Cor Dec 24 T. 40 R. 17. Ran along trail to point 500 N. 650 W of SE Cor. Then N. 800, W. 550, N 200 to N decling, W. 500 and to Exploration.

The whole run up to point we reached the Exploration was one straight line. At the Exploration found two shafts and a number of pits, all of which are located in the map.

4.629 In the dump of the shaft found great quantity of a soft green decomposed rock that resembles very closely a greenstone. It contains soft, purple lenticles that look like druse or amygdules. It may be that the rock is a coarse gray wacke and that the lenticles are fragments.

The location of this shaft is 85 N. 185 E of W 1/4 post Dec 24

4.630 Usually this rock is soft and red with this is mixed a slaty gneissoid rock banded in some specimens, and free of one in others.

Two pits a little SE of the shaft ✓

S. 26

T. 40

R. 7

26

G₁
XXXX

35

are in the green-schist(?) and one, and the slate that are usually
 found for quartzite in the vicinity
 S.W are from this. At extreme west-

41632 here we are graphite slates, then west
 68 East black slates, ferruginized in
 places and in the eastern two yellow
 ochre and a banded ferruginous slate
 41633 like one.

69 There are several other pits in this
 neighborhood in which however the
 rocks are like those described above.
 Out at 28 N 20 W of Shapt is in material
 like 68, also pit 105 and 35 W of this
 one.

41634 at 66 N. 30 W of last pit is a ferruginous
 70 and slaty one. Probably same rock as
 68

Two other pits at 7 & 15 respectively
 from above are in a sericitic slate
 mixed with red slate.

41635 At 60 E of Shapt the rock is a banded
 71 black slate - a rock which when
 decomposed gives a red ferruginous
 one

at 12 E, 37 E and 52 E are three other

pit in same rock.

41636

At 50 S. 23 E of Shaft is a pit in the
hard green rock - probably the original
from which the soft greenstone of the
Shaft was derived. ✓

41637

73

See p.

S. 35-36

T. 40

R. 18

35

$\frac{1}{4}$

36

✓

o *hike 74*
□ *711634*
o

Penob's Pils

□

Made trip from East side of Cum-
mew wealth property to Keyes Lake.
Records of observations were placed
directly on the map of this property.

At the Pewabic pit 95E. 112 N 7 SE. ✓
On Sec 35 T. 40 R. 18 the rocks are a
thin bedded red and white "sericite" schist,
Some graphitic slate and some chert
masses.

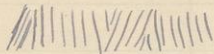
4.638

The pit at 195 N 95E is in black ✓
slate.

4.639

White schist from Pewabic Co. pit
in Sec 35. This is specimen of the
fine clay. Location on big map.

The Badger pit of the Commonwealth Co. is a large open hole. In the west end the rocks are cherts closely bedded.



In south the pit side is graphitic^d shale, or think it is a gray shale. At the SE end the rocks strike about at right angles to long axis of the pit and pitch steeply W. & W. Evidently we have here a steeply pitching fold, almost perpendicular according to Mr. Hopkins' statement. And in this fold the one occurred the pit being deeper to the East than toward west.

The Fried Shap is NW 62 S of R.R. Crossing in main road (See map.) The rocks are chert and on the north side of north pit, cherts on north side of south pit dipping vertical. On S. side of south pit are gray slates dipping 50° N. These are heavily curved, being convex to W. Strike of cherts is N. 5 N.

E 1/4
S. 33

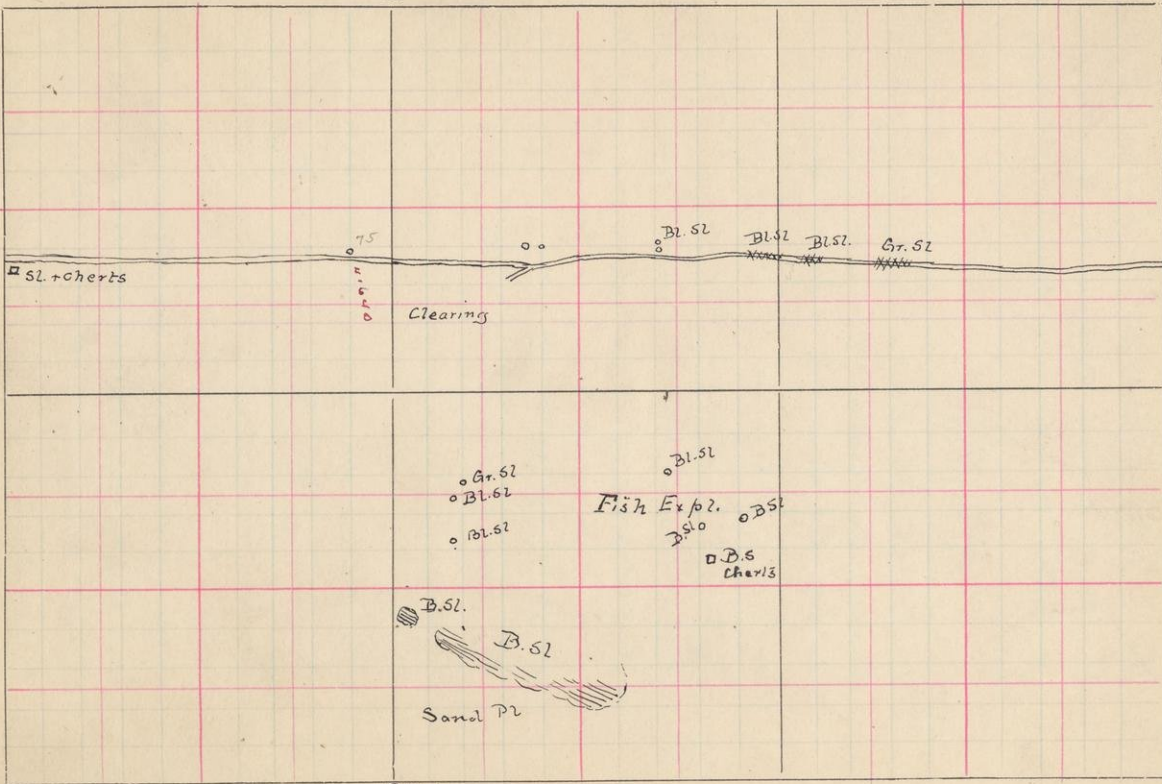
T. 40

R. 18

30

Center

0-177

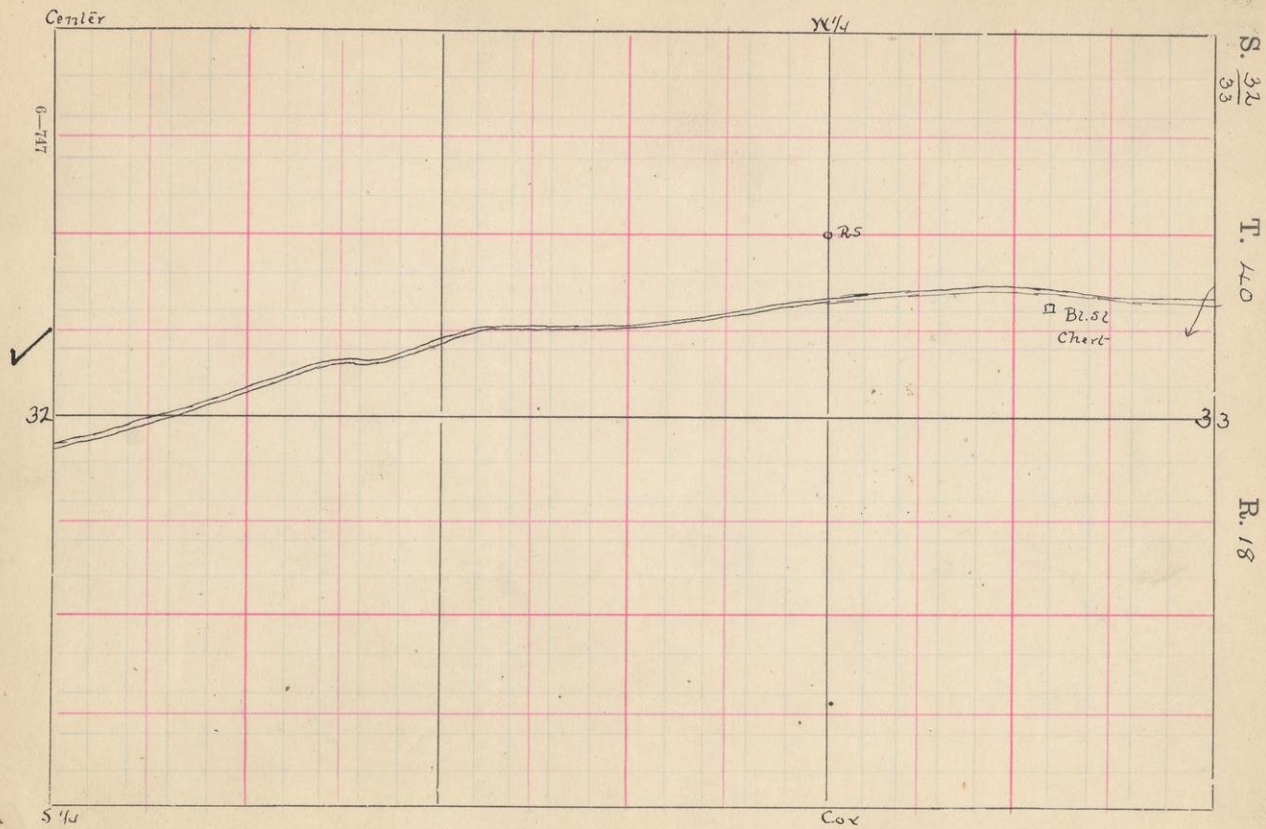


S 1/4

On the Pike river road where it crosses the bluff and also sand hills are the exposures of Graphitic shales. These are interbedded with layers of gray slate dipping 80° - 85° N. Strike about N.W. These together make a series 100 ft thick. To the north of these are chert and gypsiferous exposures, a scene of faces.

Made then a trip across country ✓ along an old road. Outcrops located are indicated on opposite and following pages.

41640 The one specimen was taken, viz:
 10 a mottled red and gray slate from pit indicated near Center Sec 33



The Buadde Shaft according to Reid-
 show is that 675 N 1495 N of SE.
 in Dec 32.

According to the Fisher it is the
 shaft 250 W of this in opposite
 side of stream

Did not know of this discrepancy
 until day I left Florence so
 could not correct the inaccuracy
 in me or the notes. This is im-
 portant because so many pits are
 located from it.

S. 32

T. 40

R. 18

SW

W 1/4

SW Cor

Log House

32

6-717

3

40-17E

32

Made another Examination of the
bluff N of Keyes Lake and ran
N. & W. Thru. Dec 25 and 26.

See map
opp. p. 21

At the Baird, Lunsberg Explora-
tion the rocks in dump appear
like chert impregnated with mag-
netite? Some graphite slate is also seen.

41641

Specimen of the iron like phase ✓

41642

" " " " (chert) " ✓

A little more of the "pits" or "shafts" ✓
the rock is in place with a dip of 80°
both NE and a strike varying between
N and NW. At the place where the
strike changes there are many small
sharp folds in the bed cut by tiny
quartz veins. The pitch of the fold is
high 80°-84° (NNE).

Is direction of
dip correct?
JFK

From this point made the traverses
indicated finding many pits in
graphitic and cherty slates.

41643

Now are of the pits at 300 W. 60° ✓
N of S. 1/2 post Dec 24. There is a group
of cherty slates pits?

41644

Again at 500 W. 250 N of same 1/2 post ✓
is a nest of pits in a somewhat band-
ed red slate?

Went N. from D.E. cr Dec 27. Found
this corner in road instead of at a
distance of 200 N as in Brooks's map.
At 650 N of S.E. cr Dec 22 I to R. 17
Went W. one mile then S. to
W. 1/2 post Dec 27, E 1000 paces, then
S 150, E 150. to Center of D.E. 1/4 of Sec.
then S. to road

The first rock seen in the run was
in a group of low worn cornered ledges.
It is apparently a bedded rock. but
on close examination it is seen that
it is in reality - schistose and that
the supposed bedding lines are produced
by parallel veins of pyrite or
some other light colored minerals.
The fresh rock is probably a fine
grained hornblende schist (cf with
rocks from falls etc of Pine River)
It rots into a crumbly brown rock
something like Brooks's actinolite
schist

41645

81

41646

82

a little further N. are ledges of a green-
stone which may cut the schist.
Near the 1/2 post (50 SW of E 1/4 Dec 27)
is a group of ledges of a coarse, brown

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

T. 40

R. 17

22

Farm

Glacial Hills

Gr. Sl.

Farm

41647 schistose rock like that in Brooks
actinolite schist area. A fairly
good specimen seems to show that
it is same kind of a schistose,
weathered greenstone containing
mica and Epidote.

41648 At a little distance NW of Sec 22
is another small knob of
greenstone. The rock is a dense,
black variety that is schistose
in places. This is where Brooks has
marked slate, but I could find
none. There are however slate ledges
400 feet further west.
Greenstone occurs also in several

In this "East
line" of west
line"

large bare knobs on the ^{west} ~~east~~ line
and
Sec 22 as far south as 200 S of
Cor. between 22 & 27.

41649 At 500 S of this corner ^{SW corner} found an
old trench and a pit in a banded
schist, undoubtedly Brooks' actinolite
schist. The rock is crystalline, like
the rocks in Pine river, and is
heavy. It looks however, like
a sedimentary. Its strike is NW
dip about vertical. In this trench
is also greenstone. The two rocks

are not in contact but it seems
as though latter must cut former.

- 41650 Greenstone 300 E 300 S of Center ✓
86 Sec 27.
- 41651 Chlorite Schist 300 E. 400 S of Center ✓
87 Sec 27
- 41652 At 500 E. 400 S. find again green- ✓
88 stone at point at which Brooks
located Carbonaceous Slate. Exam-
ined vicinity? Carefully but could
find no evidence of the existence of
the slate.
- 41653 500 E. 160 S of S $\frac{1}{2}$ Sec 27. Actinolite ✓
89 Schist of Brooks.

39.17E

Run N. from O. to Sec 15 T. 39 R. 17 E.

41854

90

On south side of the road at S $\frac{1}{2}$ post Sec 15 is a great boulder of quartzite conglomerate. The rock is evidently from place beneath the boulder. The rock has a slaty cement enclosing elongated quartz pebbles that look micaceous like the micaceous quartzite. The strike of Christianity and also of bands seems like N.E. but the position of the boulder may have shifted and strike of ledge may be different.

41855

91

At 40 N. of the $\frac{1}{2}$ post is a bare ledge of pure massive quartzite.

41856

92

At 165 N. and a little west is a large bluff of schistose quartzite. It looks much like the matrix of the conglomerate at the $\frac{1}{2}$ post. The rock is much sheared along bedding planes and a great quantity of garnet and hornblende or hornblende have been developed.

41857

93

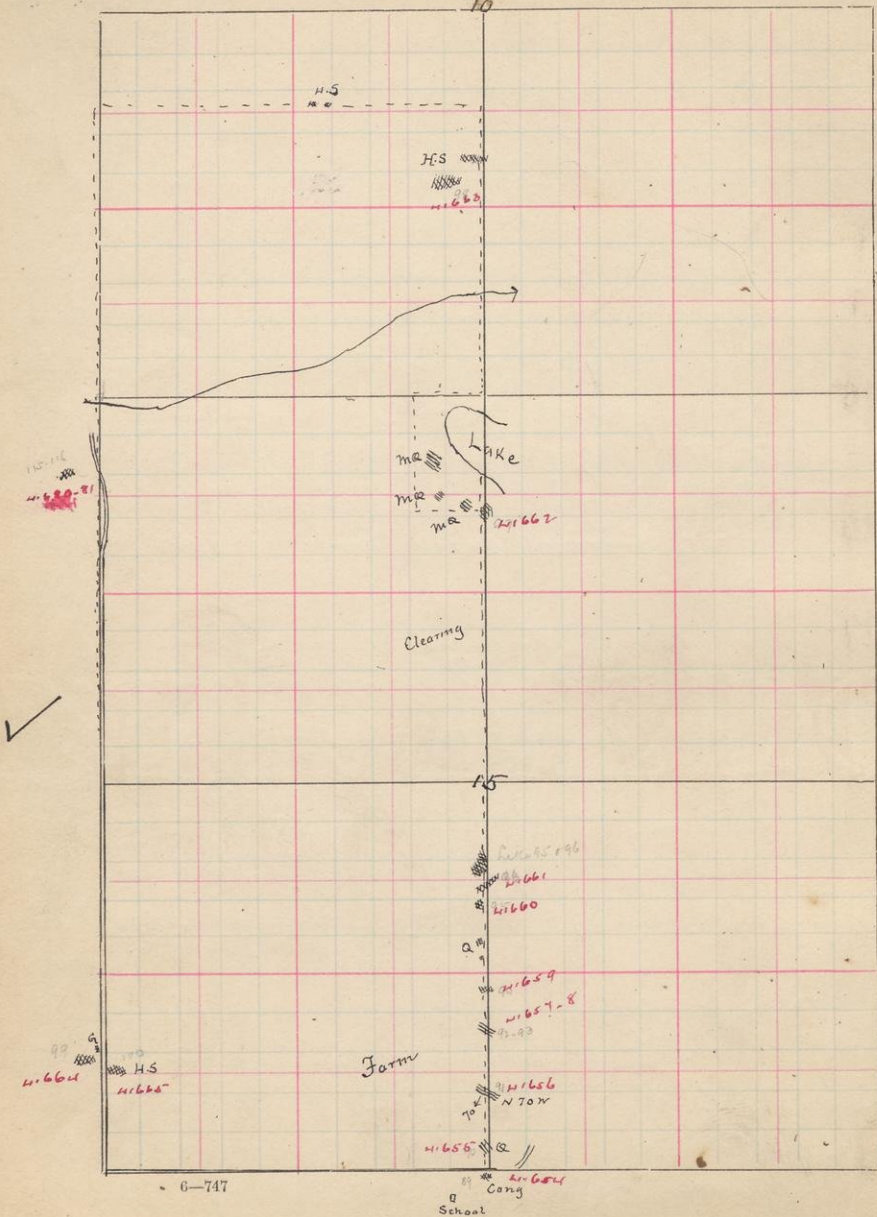
At 363 N. is another knob of a banded rock. This seems a little different from that to the south though it is probably the same. Bands

S. 15

T. 39

R. 17

10



rich in hornblende are interbedded with others that are very quartzose. The former look like a hornblende Schist.

41657 Specimen Dark band ✓

41658 Specimen light band. ✓

41659 At 435 ft. the whole rock is more quartzitic ✓

41660 At 700 ft. is a small ledge of a dense, banded quartzite, and ✓

41661 At 730 ft. is a dense hornblende variety in a low bluff. ✓

41662 At 1700 ft. ledges of the typical micaceous quartzite begin to appear. ✓
It seems plain that the specimens taken so abundantly, represent a variation between the conglomerate and a quartzite. The different phases of rock probably representing different portions of band in the original sediment.

41663 Hornblende-schist at 550-600 ft. of ✓
S. C. Dec 10.

4.664
190

At 300 ft. of SW cor Sec 5. is lens ledge
of ledge of hornblende schist with
pink grains of some feldsparites
numerous scattered through it. It
looks as though it might be a schis-
tine phase of same conglomerate con-
taining much hornblende.

4.665
101

Across the road is another thin ob-
but in this the rock seems to be more
typically a hornblende schist.

at about 200 S 100 W of ^N corner between
Secs 10 & 15 upturned trees expose
bare surfaces of a greenstone cut
by dykes of a white rock that is
probably a fine grained granite
or pegmatite. The greenstone is
of thin schistose near the dykes but
is coarse and massive elsewhere.
Moreover the light colored rocks
form large lentils and oval
masses in the darker rock as though
sections of dykes.

4.680

(missing) Specimen from 3 ft wide dyke. This
is fine grained in edges, hence
intrudes the greenstone.

41681

Specimens from small vein or dyke.

41682

21?

Made a run with Thompson of the new-
port south along the west side of Sec
21 T. 39 R. 18.

Took one specimen from the basin below
the falls of Pine river. Found a number of
rocks some of which had been seen before.
Found river S. of W 1/4 of Sec. 28 instead
of N 1/4 same 1/4 Sec.

S. 78
17 18

T. 39

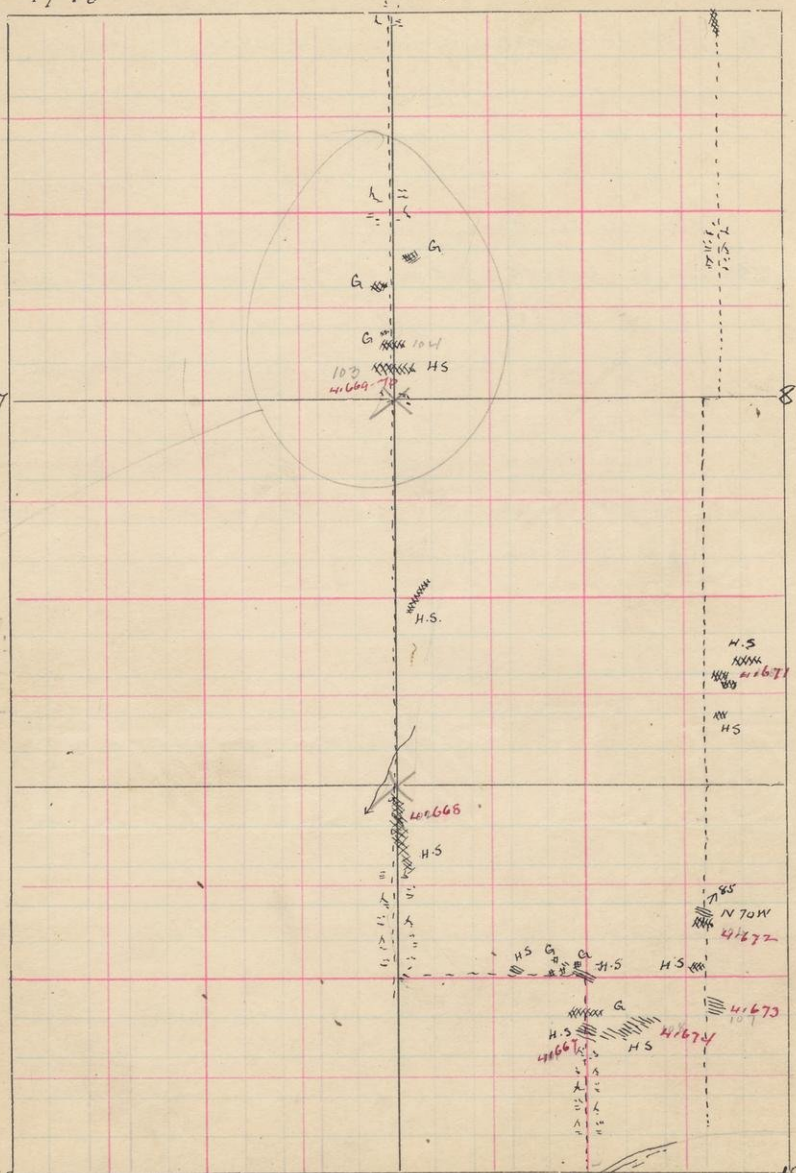
R. 17

not
platted.
Coyles
mill in
large
on base

✓

18

6-747



Price's Lake

17

Started from Price's Lake and ran north and west to corner between 7.8.17 & 18. Continued N to $\frac{1}{2}$ between 506 then East 850 and S.

In Decry are the banded hornblende schists? but these are not so definitely banded with distinct dark and light bands as is the case at the ✓
 41667 ¹²Jann. The rock is very schistose and perhaps the supposed banding is due to this

Here and there ledges of greenstone are scattered through the schists? suggesting that the two rocks are the same or that greenstone is intruding

41668 Near the New Car Decry the schists are again seen. At this place is ✓ a single small granite vein or dyke. Large area of the greenstone is exposed but my this one dyke was observed.

At about the $\frac{1}{2}$ point the rock is much more massive. It is a coarse hornblende schist in places and a dioritic greenstone in other places - the one appar-

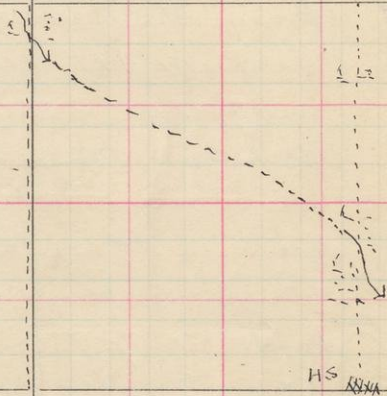
S. 6.5

T. 39

R. 17

6

5



41669-670 Anty grading into the other.

Specimens from these ledges.

41671 At 850 E 325 N ysw cr Dec 8 ✓

Another group of hornblende-schists occur like these near Corner.

41672 We run through Dec 17 the rocks are again banded hornblende-schists with lighter and darker bands the former predominating. The dip is 41673 always nearly vertical and the strike nearly uniform. N. 40 W, but buckles in the beds are noticeable. These rocks are like those in Dec 15.

In one place there seems to be a band of greenstone in the schist that runs parallel to the bands in the latter.

41674 425 N. 825 E SW cr Dec 17. ✓

41675 The Hill South of Prices Lake is said to contain many ledges of granite and schist. A large boulder on bank flake seems to show that this is the case.

S. 26

T. 39

R. 17



went hills in Dec 26 J. 39 R. 7 visited
by Van Hise and myself a few years
ago.

Found the rocks well banded and
schistose hornblende mica schists with
variable strikes and dips of about 60°-70°. They are cut by quartz veins, by green-
stone dykes and by pegmatites. They
have an Archean aspect and yet re-
semble closely the hornblende schists
seen north of Prince's Lake. In places
they look like injected gneisses. The
country is so rough and is so thickly
covered with windfall that did not
examine area as thoroughly as had
intended. The rocks at the falls of
the Poplar and all these seen to-day
are alike. It would have taken
three days to cover section so did
not do so. Am convinced that
rocks throughout the hills are the
same.

The rocks East of road appear to be
more evenly banded than those to
the west. They form an immense

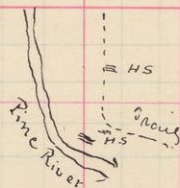
rough hill with precipitous W side
up which it is extremely difficult
to climb. The rocks seem to differ
from those seen yesterday having
in the great number of granitic
veins in them and the consequent
metamorphism to which they have
been subjected.

J. H.

S. 22

T. 39

R. 17



41676

300 N of E 1/4 per Dec 26 ✓

41677

650 N. 120 S of E 1/4 per Dec 26 ✓

41678

650 W. 125 S of E 1/4 " " ✓

41679

530 N. 100 N of E 1/4 " " ✓

41680

Waste vein in Hornblende schist. ✓

Two ledges of the Hornblende schist
like those on west side Dec 15 are
also found at

850 S. 500 N of NE cor Dec 22. J. 39 ✓
R. 17

Other ledges of the same rocks are at ✓
200 N. 65 E of there

The ledges are on the driven trail be-
tween the the bridge on the Ping on
D. side Dec 15 and La Salle.

41680

41681

41682

See p.

See p.

38-39

S. 9

T. 39

R. 17

9

Clearing

✓
5/1/15

117-8-0-20
41683-686

15/1/15

41680-91

Went up W.S. Dec 9 T. 39 P. 17 ✓
 to examine some greenstone cut
 by granite dykes reported by Merrill.
 East of the $\frac{1}{2}$ post are great ledges
 of greenstone on top of high hill. In
 one place a little stream cuts
 through the hill and forms a gorge
 bordered by precipitous walls of
 the rock.

at from 100-200 ft of D's are large
 thin covered ledges of the rock and
 nearer the $\frac{1}{2}$ post the rocks are more
 abundant. This rock is a banded
 hornblende schist at a distance
 from granite veins. Near the veins it
 is more like a greenstone. The dykes
 and veins that intrude it are fairly
 fine grained, very feldspathic granites.
 Very near the granite and sometimes
 in contact with it the greenstone be-
 comes coarse grained like a gabbro.
 The greenstone may be an intrusion
 in the hornblende schist and the
 granite in the greenstone, in either
 case the schist is older than the
 granite. It looks however as

Though greenstone and Schist were
the same rock.

41683

Schist ✓

41684

Greenstone from 200 E of S¹/₂ Sec 9 ✓

41685

Granite from Dyke several feet ✓
wide cutting last rock

41686

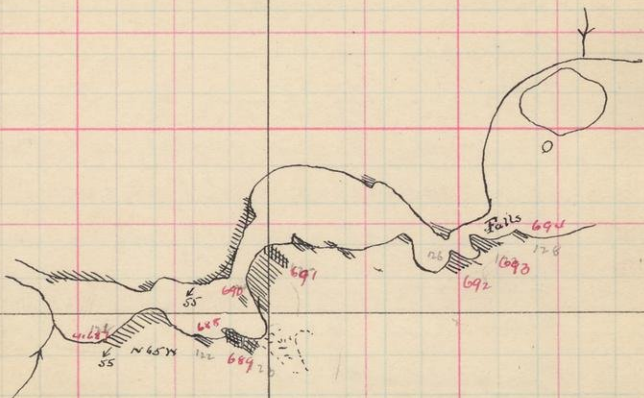
Coarse alluvial greenstone near
granite. There seems to be a gradation
here between the Schist and
the greenstone.

The granite is either Huronian
or the banded Schist are Archean.

S.

T.

R.



Sketch Map Falls of Pine River. Sec 29
about 500 E of NW post

Scale 125 paces = 1 in

Made a rapid trip down the Pine river to the falls following S. side of stream.

At head of falls where stream comes in from S. side, i.e. on west side Dec 29 T. 39 R. 18. is a series of Schistose rocks striking N. 65 W and dipping 55 S. The rock is also banded in dark chertlike bands and lighter ones. It looks like a banded gneiss or Union Limestone Schist.

Made section down falls of which map is on opposite page:

- 41687 Greenstone Schist at head of falls ✓
- 41688 Hornblende feldspathic rock ✓
- 41689 Marginal looking rock ✓
- 41690 W. side barrier forming steep bluff. ✓
Rock cut by quartz veins
- 41691 Greenstone seems to be part and parcel ✓
of above although in some places this same rock looks like Dyke or foliated. Its trend is approximately parallel to banding in Schist.
- 41692 Break of 1st plunge. Greenstone. ✓
The rock possesses an indefinite banding, which may be due to wear-

ering gschistosity

41693

Possibly same rocks at west side

41694

foot of falls with differences in the perfection of the bedding.

From this place went west and followed up the Horse race below La Salles Dam which is 105 E. 1300 N T.S. Sec 30 T. 39 R. 18 (W 1/2 Sec. is 150 long)

41695

180

As indicated in former note book the lower rocks on the south side of the Horse race are coarse gabbros, then west of here are banded green-

41696

stones and gabbro-like rocks again. Near the Dam the rocks are more definitely banded with white bands and green chloritic ones. The green-

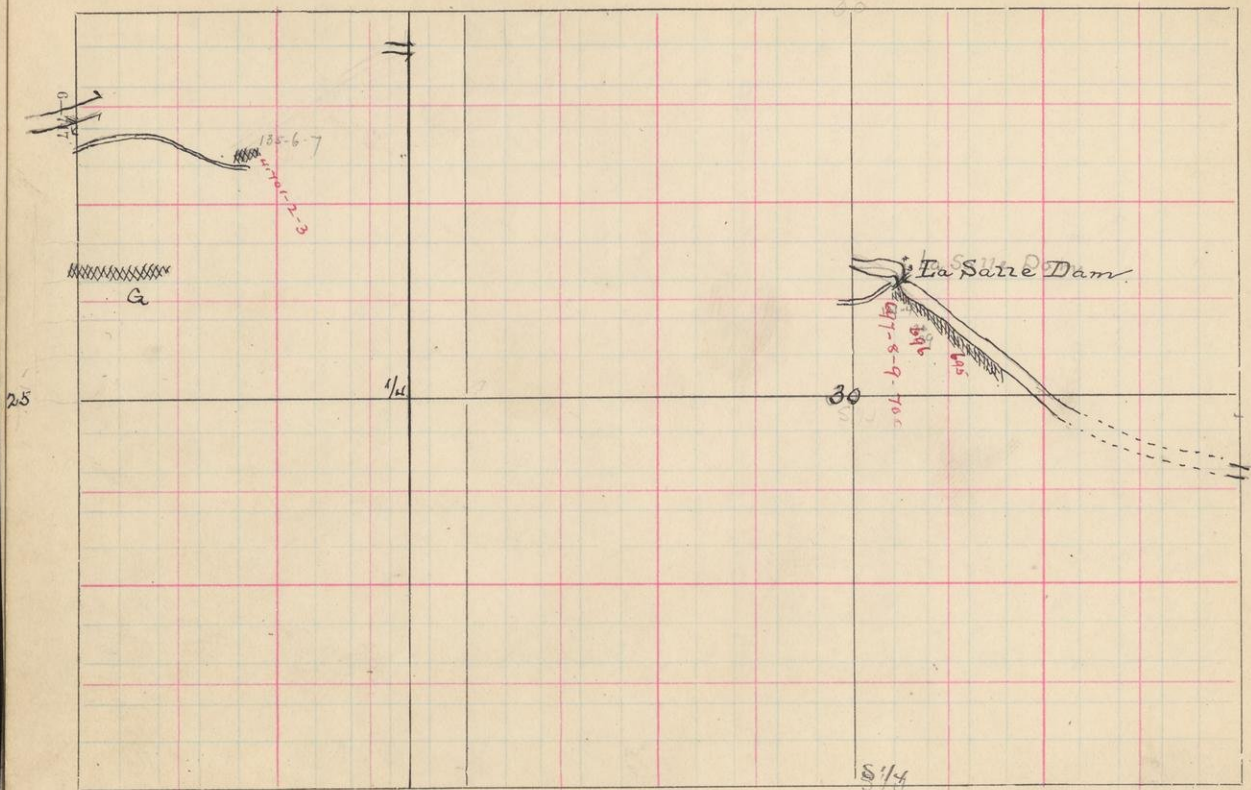
41697

bands weather soft and decompose. At one place just facing the dam below the Dam some prospectors has dug hole in the bank. Here the banded rock is prominent. Below it is another banded and schistose rock that looks like a hornblende schist. It forms an anticline with gentle

S. 25.30

T. 39

R. 18



41698

open fold having a pitch of about $\checkmark$
 40° E. Specimen is from apex of fold.
 Beyond this, up stream, the rock seems
 to contain lenticles of quartzite? which
 when squeezed appear to become long
 thin layers. On the other hand the
 lenticles may be layers that have
 been pinched out. Could not deter-
 mine which is the case.

41699

Specimen showing lenticle of quartz-
 ite. Main mass of specimen is the
 quartzite? $\checkmark$

41700

Specimen showing principally matrix $\checkmark$

At about 620 N. 420 W of E. Sec 25 $\checkmark$
 there are several mus-covered ledges
 of greenstone cut by granite?

41701

The greenstone is schistose and weath-
 ers the rock seen down stream. $\checkmark$

Sometimes it is very schistose and looks
 like regular member of the schist series.

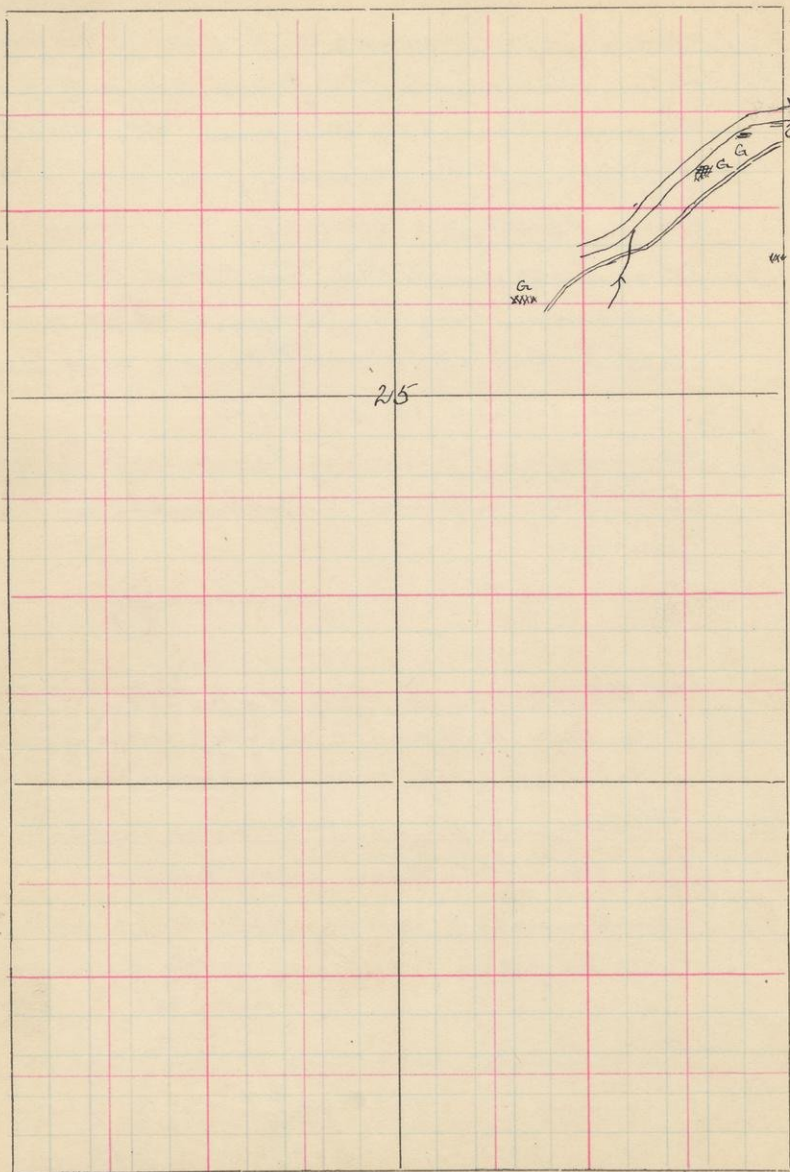
41702

The granite weathers white, but in fresh
 fracture it appears like a gray quartz
 or very feldsparitic greenstone $\checkmark$

S. 25

T. 39

R. 18



Sometimes it is very schistose and ✓
looks like a regular member of the
Schist Series

The Fisher Exploration is in the S.E. of
the U.E. Sec 6 T. 29. 18

S.E. of Hayes Lake.

A number of pits are found in a
series running from about 700
S of the ^{N.} Cor between 5 & 6 to about
the U.W. Cor for the SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec 6.

The pits are in graywacke and black
slates and perhaps porous cherts?

The sand covering the ground is
impregnated with ochrous material
and cemented into a ferruginous
sandstone. There is no evidence
of the existence of an iron formation
in the place however.

Mennimuc range in Michigan
East of Mennimuc river.

Made hasty examination of several new developments since last year. Found work going on on Dec 6.

Found that a shaft has been put down in the second pit N. of the main road and 100 paces W of the old Norway Electric Station, near the N-S center line Dec 6.

About 125 paces N of shaft begins a trench cut in side of hill. Exposing the rock for some distance north. For 65 ft from end of pit, the formation material extends, then Red Seal.

About 50 E and 40 N of shaft a second trench uncovers similar rocks. Slate extends 34 paces from end of trench, and from 31 to 80 in formation. Found at 80 E slates.

These locations are probably wrong as day was cloudy and variation

great. The observations are important
and may as giving proof of Existence
of new formation between States.

Some work was done in Dec & Jan by the
Federal Steel Company is being pushed
by Spencer. A shaft has been
put down in the sandstone, about
100 paces N of road and a trench
run from a pit South of road. The
trench begins 20 paces S of road and
runs South 100 paces. New formation
material extends South to
45 paces, then States to end of trench.
The new formation is composed of
lean ones dipping to the North a
few degrees from the vertical.
Shaft is in last drill hole put down
by Federal Steel Co. Should be loca-
ted more carefully, though nothing
would be added to geology as
the rocks have already been mapped
in these places.

An extremely interesting Exploration at present known as the Federal Exploration was found just N. of the Indiana line, of which Capt Andy is Manager. This is in the SE of SE. Sec 22 T. 40 R. 30. 800 ft E from W line and 100 N of S line.

The shaft is 100 ft down in limestone. There is a drift N. 178 ft to an ore. South of the ore is 75 ft red slate and South of the slate 100 ft in limestone dip is 40° - 45° N. of E.

Little shaft 60 ft a little W of N of main shaft in ore.

This is extremely interesting as showing without question the existence of an iron formation N. of the limestone.

Further data was obtained from J. J. Andy, Manager.

on Sunday made rapid trip to
E. Vulcan mines in the NW of NE.
Sec 11 T. 39 R. 29.

From the westernmost edge of lime-
stone E of Section house in Schlesinger
road a row of 13 very old pits extends
south for 370 paces, all in various
stages, indicating an embayment
of this rock when had formerly
placed limestone. The embayment
must come from west as plain
extends from this direction and
moreover there is no opportunity
for same to come from East as
limestone extends across from
Schlesinger R.R. to Verma mine

556

Van Hise notes. R. 39-18E

July 29th, 30th, and 31st.

In Camp with Bayley.

Examined the set of schists south of LaSalles. These are regularly laminated, crinkled, hornblende-biotite schists, cut by schistose eruptives of various sorts, and also to some small extent by granite veins. The intrusives at various localities vary from subordinate to preponderant. If the oldest rock, the hornblende-biotite-schist is igneous, tuff or lava, it must have had superimposed upon it a schistosity, and after this folded with slipping along planes of schistosity, and before, during, or after, or some combination of them, more or less of cementation and perhaps some injection. In places, the schist contains lentils of cherty quartz. These may be a source of the quartz pebbles of the quartz-conglomerate of Brooks.

Down the river from La Salles examined the exposures of the third falls. There is unmistakably amphibole-schist, regularly laminated. No certain bedding; rough, pitted weathering, such as generally characterizes tuffs. Probably they are surface lavas or tuffs profoundly altered.

In notes of previous year, I say similar hornblende schists are interstratified with actinolite schists at second fall. ~~That~~ But the actinolite-schists at one end grade into the hornblende schists at the other end.

Also that the actinolite schists of the first falls are interstratified with the slate.

quartzite 1

This, however, leaves the question open as to structural relations of the slate series to the *hornblende* schists.

At places where the latter are most cut by intrusives they have an Archean aspect. At places where they are least cut, some of them may be sedimentary, but think upon the whole that the series is all, or at least nearly all, igneous.

On Popple river, about five miles south of La Salles, is coarse and fine schistose granite with gradation phases. This unmistakably cuts an older black hornblende-biotite-schist, although this is in subordinate quantity, and both are cut by granite veins.

Have a strong feeling that this variable schistose granite has Archean aspect. If hornblende-schist be cut by same, the continuation of hornblende-schist south of La Salles, this would make all Archean, provided lithological character could be so determined.

who wrote this? G. A. H.

