Vermilion Lake region, Minnesota: [specimens] 8002-8185. No. 29 1884-19/1884-10

Merriam, W. N.
[s.l.]: [s.n.], 1884-19/1884-10

U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 29
Sept. & Oct. 1884.
Vermillion Lake Region.
Minnesota.

W. N. Merriam.
8002 - 8185

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

INSTRUCTIONS.

1. Devote at least two pages of this note book 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. 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 smaller spaces as 100 paces, each of the spaces between the red lines as 500 paces, and four of these large spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the first red 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 down one space, 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, after which give in order 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 exposure as possible. Very often the notes for one section will cover more than one page in which case pass to the next right hand page, *repeating the map on each left hand page* as long as the notes, with regard to one section, continue.

3. Collect a specimen from each separate ledge of rock, or whenever 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 the note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples will be allowed, but in all other cases *large sized trimmed specimens*, with chips for slicing, must be selected in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. All specimens are to have numbers painted on them, in white on a black background, in camp.

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, etc., etc.

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

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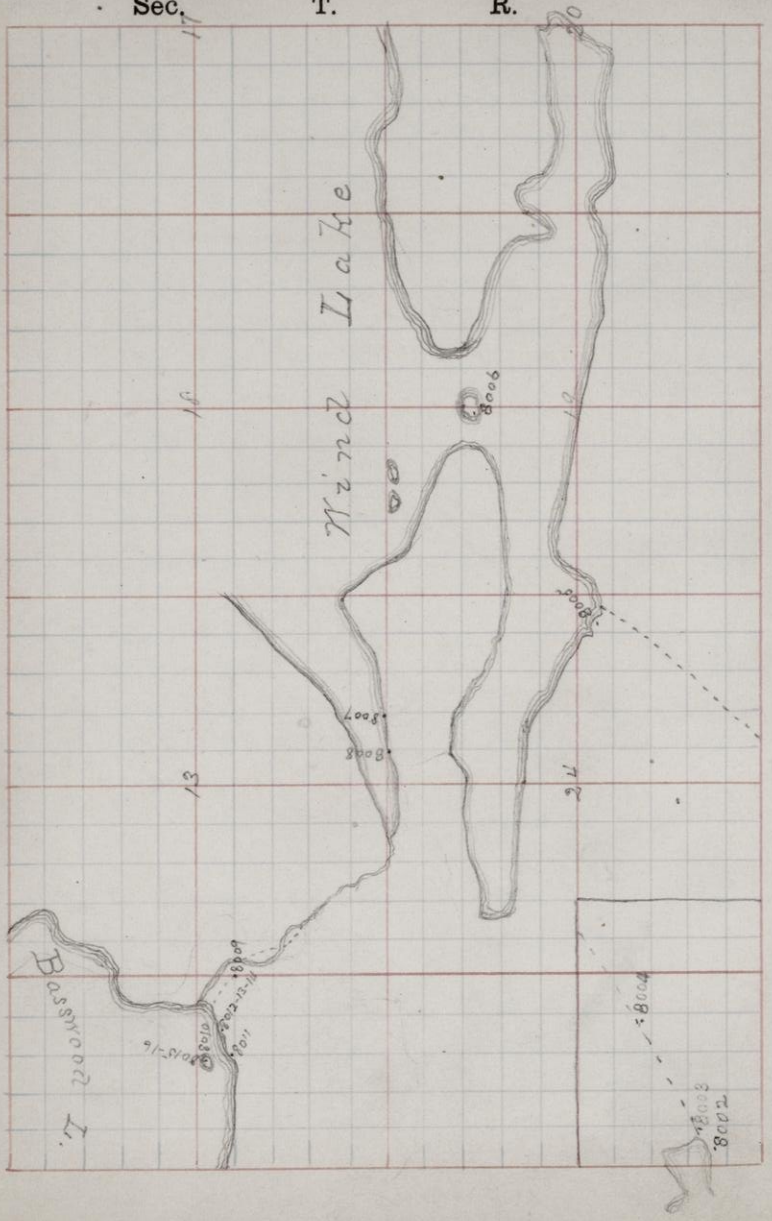
Sec. T. R.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From the meander corner between Ranges 9 and 10 on Third Lake, south shore, I went southwest 2380 paces to a small lake running into N. E. 1/4 Sec. 28 T. 64 N. R. 10 W. expecting to cross the conglomerate near here. On the north face of a ridge on south side of this lake I found the banded iron similar to that north of the conglomerate on the portage.

8002 The specimen 8002 shows this banded rock.

To the south however the rock is a schistose and like 8004 taken on the portage about 700 or 800 paces north of this. No jasper was seen at this place.

8003 Directly north of this is a swamp and the first rock in place (8003) was taken about 100 paces from 8002. It is a greenish grey rock with lighter colored spots or crystals in it.

This rock shows for several hundred paces when a more schistose rock

8004 8004 comes in and continues to Third Lake at times quite schistose and again almost a granite a quartzite.

On south side of Third Lake

(9—891.)

Sec. T. R.

See map opposite p. 1

near same meander corner the rock
8005 (8005) is a very fine quartzite. The same
rock is found along the south side
and east end of the long point running
east (The plats are wrong) and on an
island near end of point
8006 Specimen taken from above island
The same rock as the last follows for
some distance along the north side of
point and on two small islands a
short distance north
At the west end, north side of the
point, in S.E. ¼ 13-64-10 there are
exposures of a rock very like 8006. not
carrying much mica or hornblende
8007 N.E. ¼ Sec. 13-64-10 north side of long point
in Wind Lake
8008 A short distance east of 8007

On the portage between Wind and
Basswood Lakes the first rock surely
in place is a reddish hornblende
8009 Granite (8009) about 200 paces from
Basswood
8010 From an island of gneiss near the end
of portage into Basswood Lake

At the south end of this arm
of Basswood in the N.E. ¼ of S.E. ¼
Sec. 11 - T. 64 - R. 10 W. the rock is
a black, fine grained and with

8011 a trace of clavage 8011
Just north of this it appears banded with large and small bands of granite and also with these bands or dikes running in various directions through it (8012)

8013 About 6 inches north of 8012

8014 " 15 paces " " " 8013 a granite like 8009 This granite continues to be exposed on the east side of this bay at intervals along the entire distance

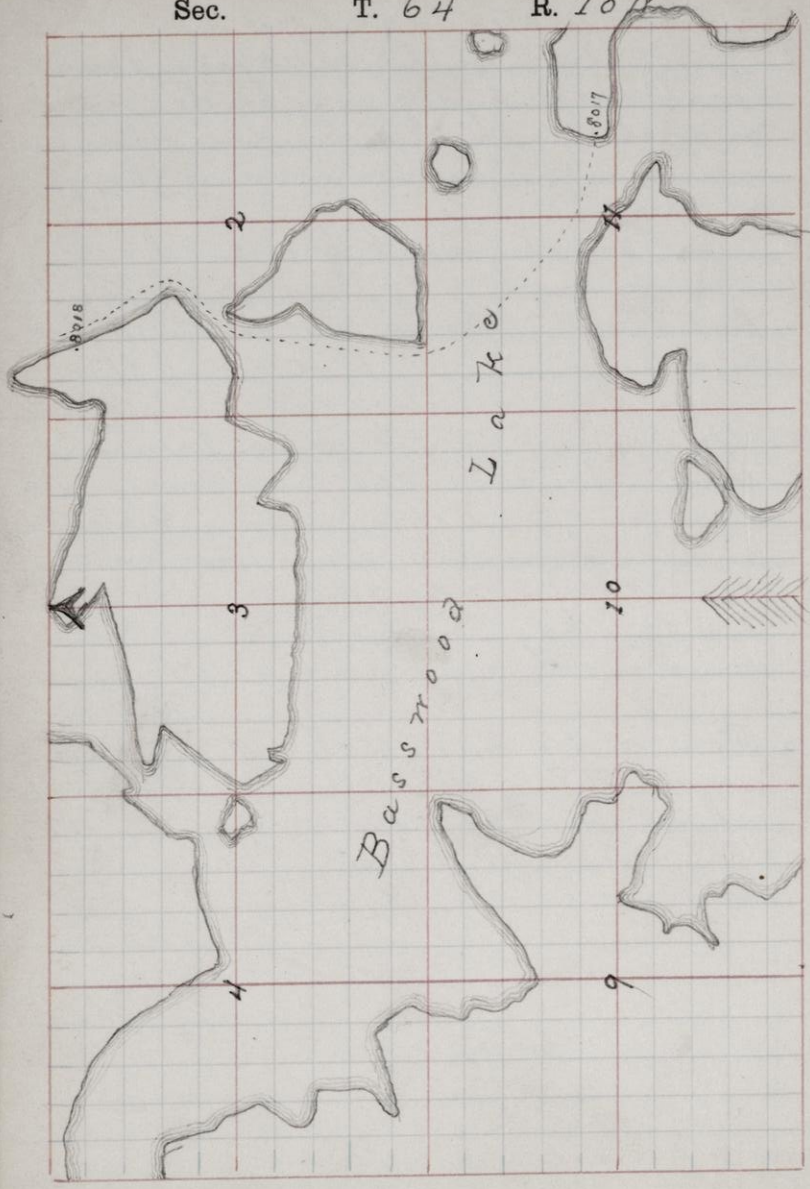
8015 Specimen of banded gneiss from same island as 8010 These bands run very regularly for some distance and in a regular curve from south to north from top of exposure (20 ft.) to water's edge

8016 Band in the gneiss near 8015

8017 Front end of long point east side Basswood N.E. 1/4 Sec. 11-64-10 Granite showing small portion of vein matter (See map opposite p. 41)

(9—891.)

Sec. T. 64 R. 20 W.

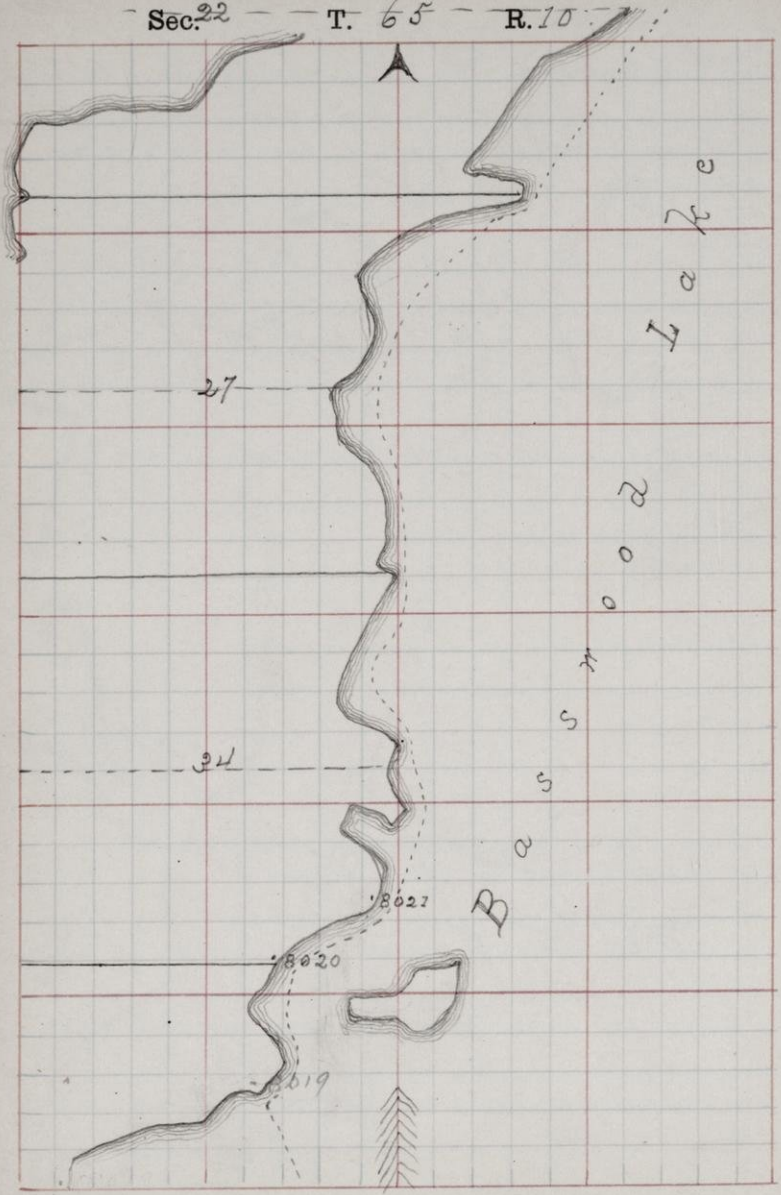


From last point in Secs 17-T 64 - R 10 W. the route lay to the northeast around the east end of a large island in Secs. 2 and 3 of the same town.

8018 From the east end of this island a sample (8018) was taken of the granite; the islands between the point and islands were also examined and nothing found but the granite

(9—891.)

Sec. 22 T. 65 R. 10



Along the east side of the long point in T. 65 R. 10 the granite changes to a gneiss; at times the exposures looking black
The lighter colored bands appear to run in every direction through the dark colored rock varying from a line to many feet in width and at times forming almost the entire exposure. As the point is followed northward the gneiss becomes more uniform and the bands narrower

8019 From base of the point N.E. 1/4 of N.E. 1/4 Sec. 4. T 64 R. 10 W.

8020 Near S.E. corner Sec. 34 T. 65 R. 10 W. about 1/2 mile north of 8019

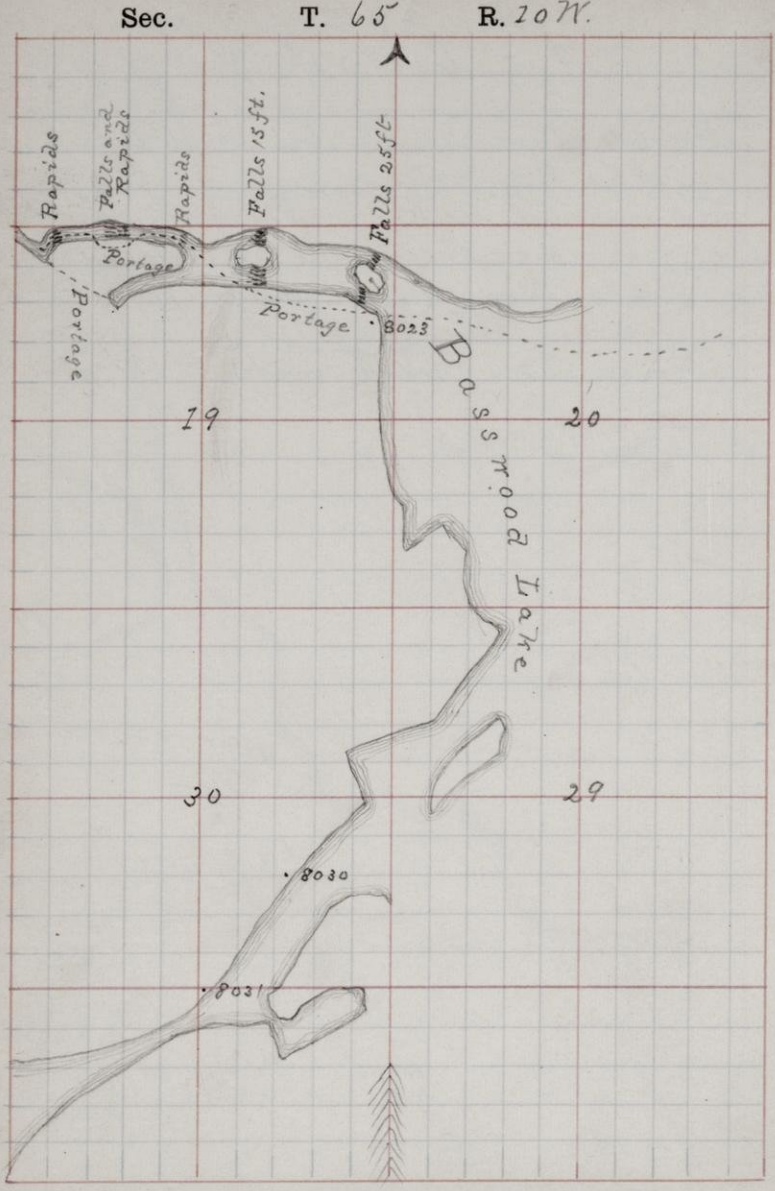
8021 About 1/2 mile northeast of 8020

(9—891.)

Sec. T. 65 R. 10 W.

8022 Gneiss from end of long point in N.E. 1/4 Sec 23 T. 63 R. 10 W.

From above point we went west on the Canadian side through Basswood Lake. The granite or gneiss is exposed the entire distance in places in most magnificent exposures. The surface of this region is almost a solid rock


Sec.
T. 65
R. 20 W.
Rapids
Falls and Rapids
Rapids
Falls 15 ft.
Falls 25 ft.
Portage
Portage
Portage
8023
Bassrood Lake
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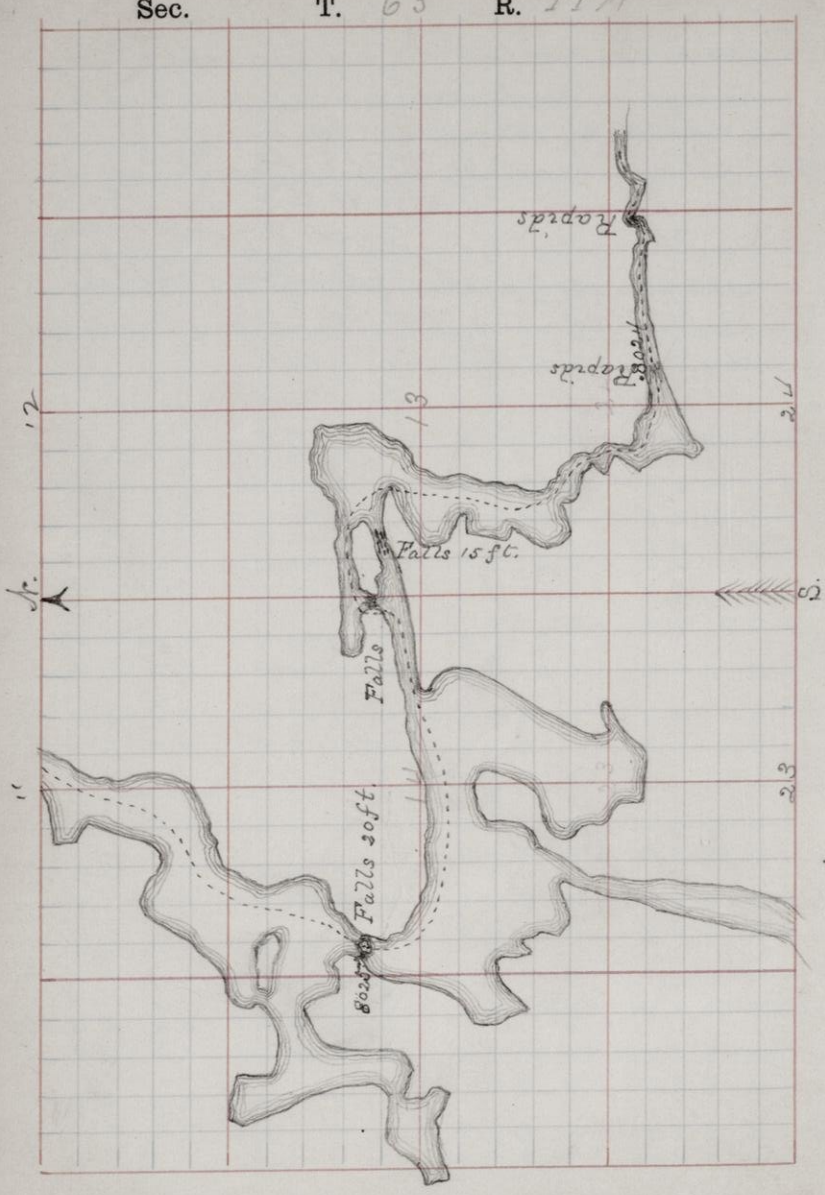
At the west end of Basswood the water falls over granite about 25 ft. and within 1/8 of a mile makes another fall of about 10 ft.

8023 From head of falls at outlet of Basswood Lake N.E. 1/4 19. T. 65 R. 10 W.

West for 3 miles the river is a series of Rapids and falls over granite with dead water between them.

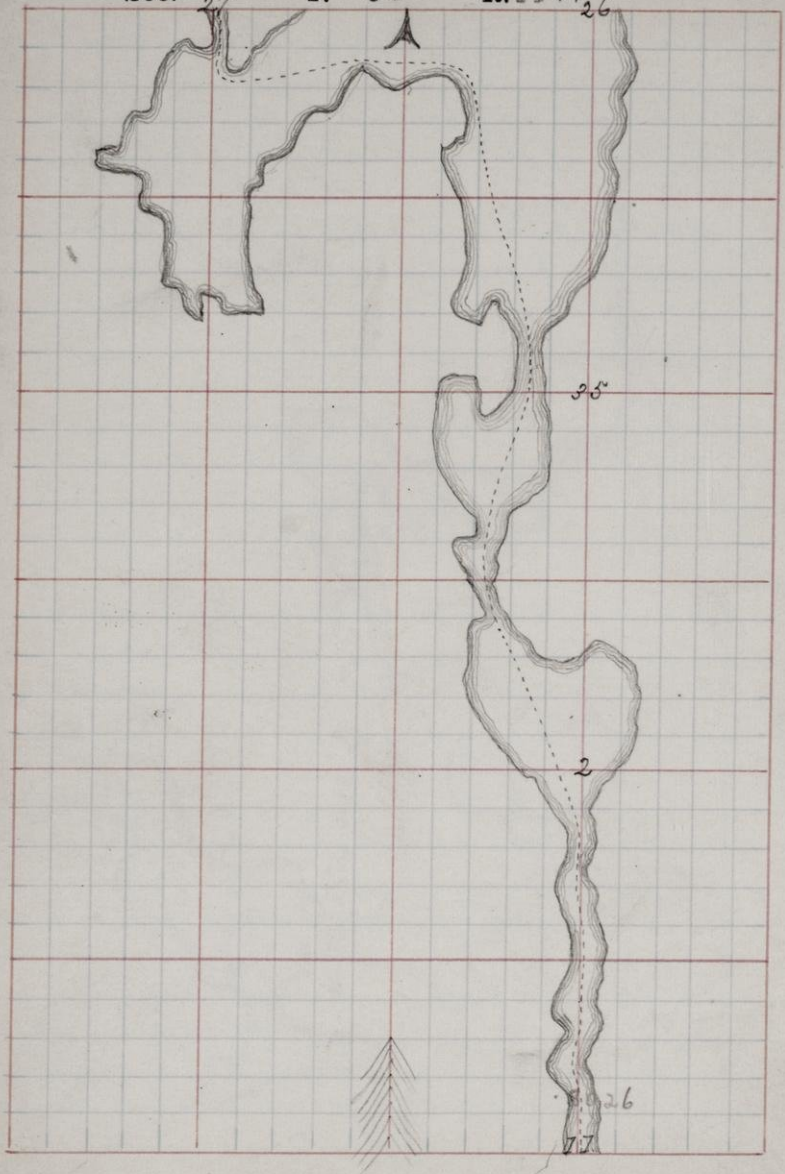
The rock is entirely granite or gneiss.

Sec. T. 65 R. 11 W



8024 Granite from N.½ of N.E.¼ Sec 24 T.65 R.11 W. From foot of rapids

8025 Granite from head of falls in S.E.¼ of N.E.¼ Sec. 14 T.65 R.11 W. The same general rock extends through Secs. 24-13-14 and 11 shown in map on opposite page


Sec. 27 T. 66 R. 11 W
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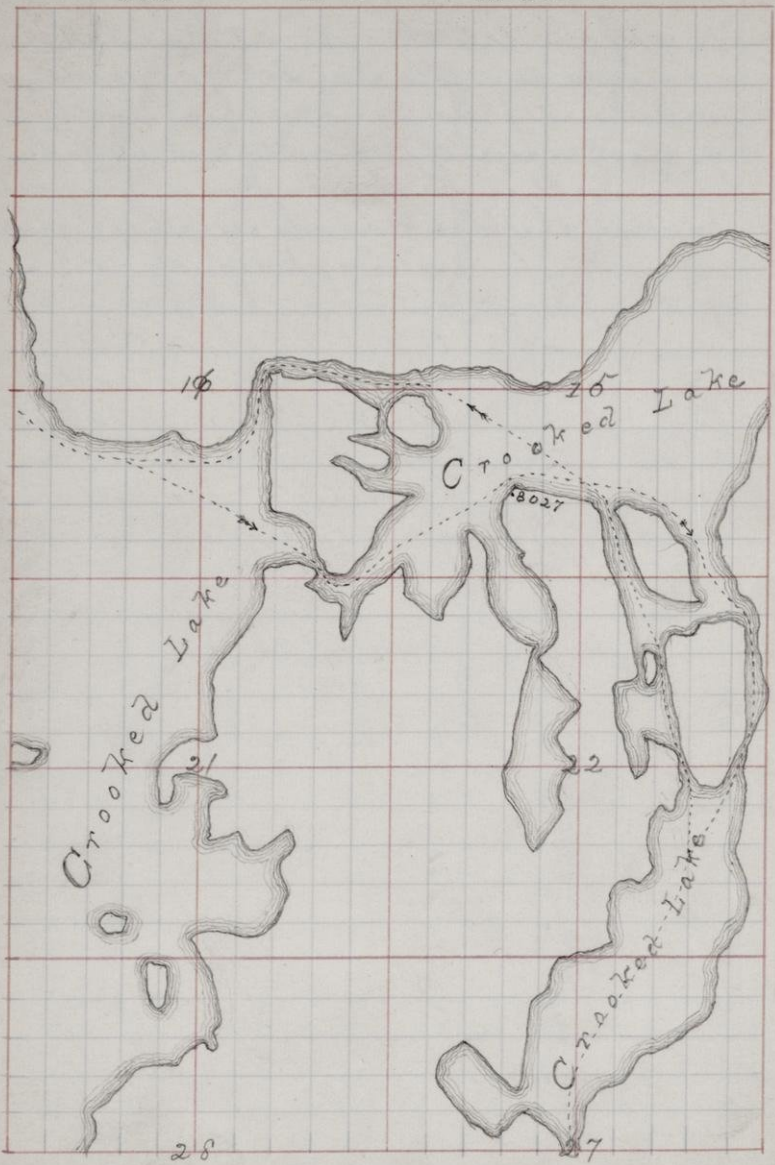
8026 From the S.E. ¼ of N.W. ¼ Sec 11 T65 R11 W. At this point the lake narrows to a channel 300 or so yards wide and flows between high walls of gneiss, especially so on the west side The rock is overhanging ~~in~~ where freshly broken the black bands in places give it a conglomeratic appearance some of the pieces being very angular I was unable to get at these latter they being on an overhanging wall but the specimen taken near the water shows the bulk of the rock to be a granite. The rock also shows a gneissic structure on the other face

Sec. T. 66 R. 11 W.


Crooked Lake
Crooked Lake
Crooked Lake
Crooked Lake
18027
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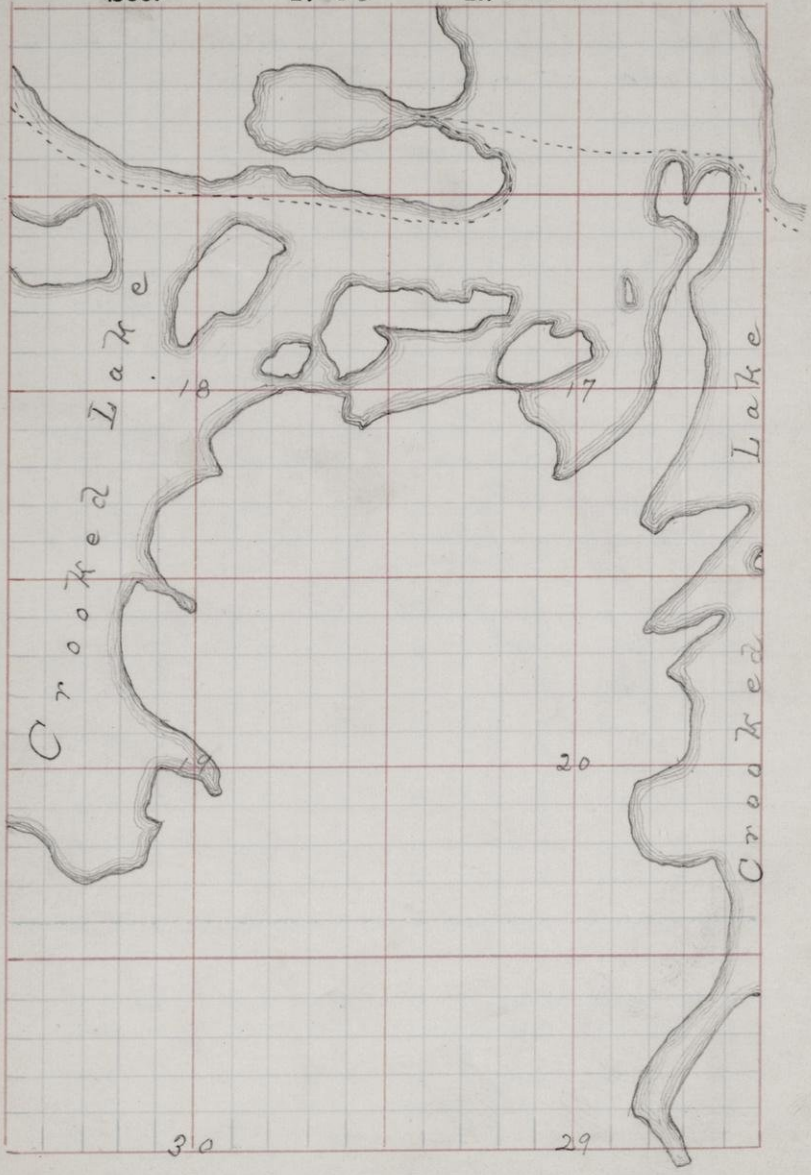
8027	Gneiss from end of long point in S.E. ¼ of S.W. ¼ Sec. 15 T. 66 R. 11 W.

Sec. T. 66 R. 21 W.



Large exposures of granite and gneiss continue through Secs. 17 and 18 T. 66 R. 11 W

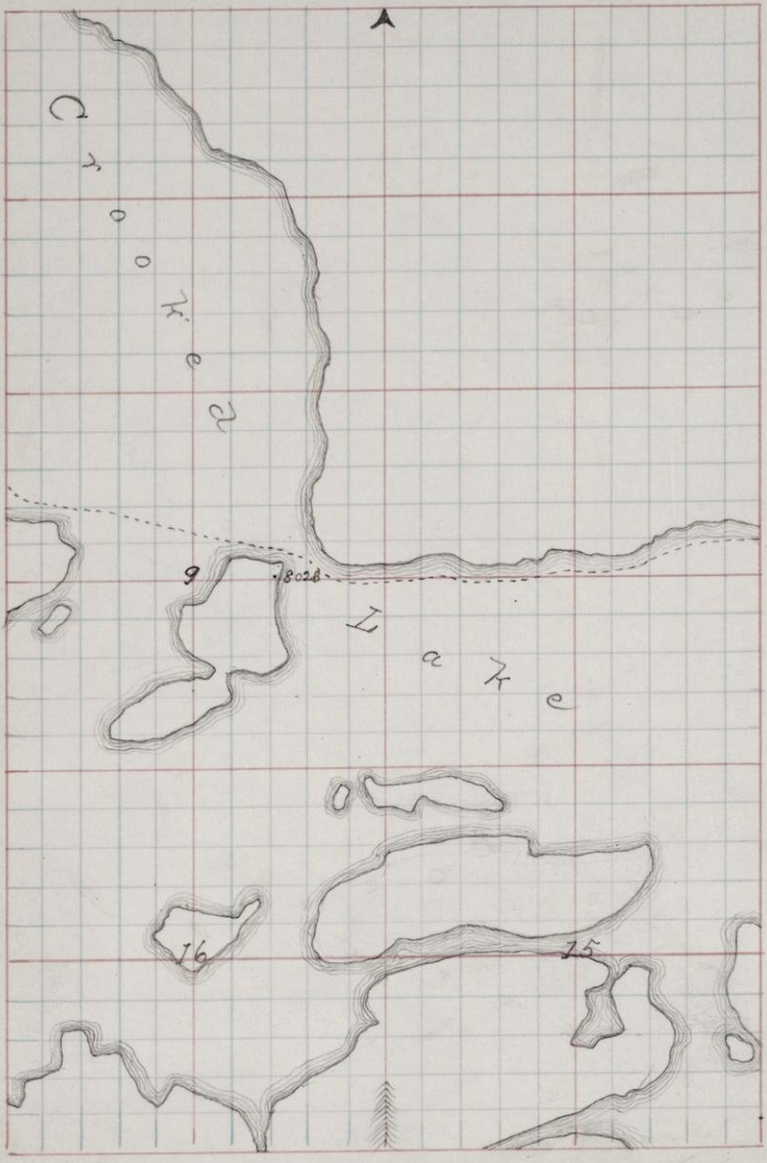
(9—891.)

Sec. T. 66 R. 12 W.

Large exposures of granite along Hunters Island. Shown on opposite page

(9—891.)

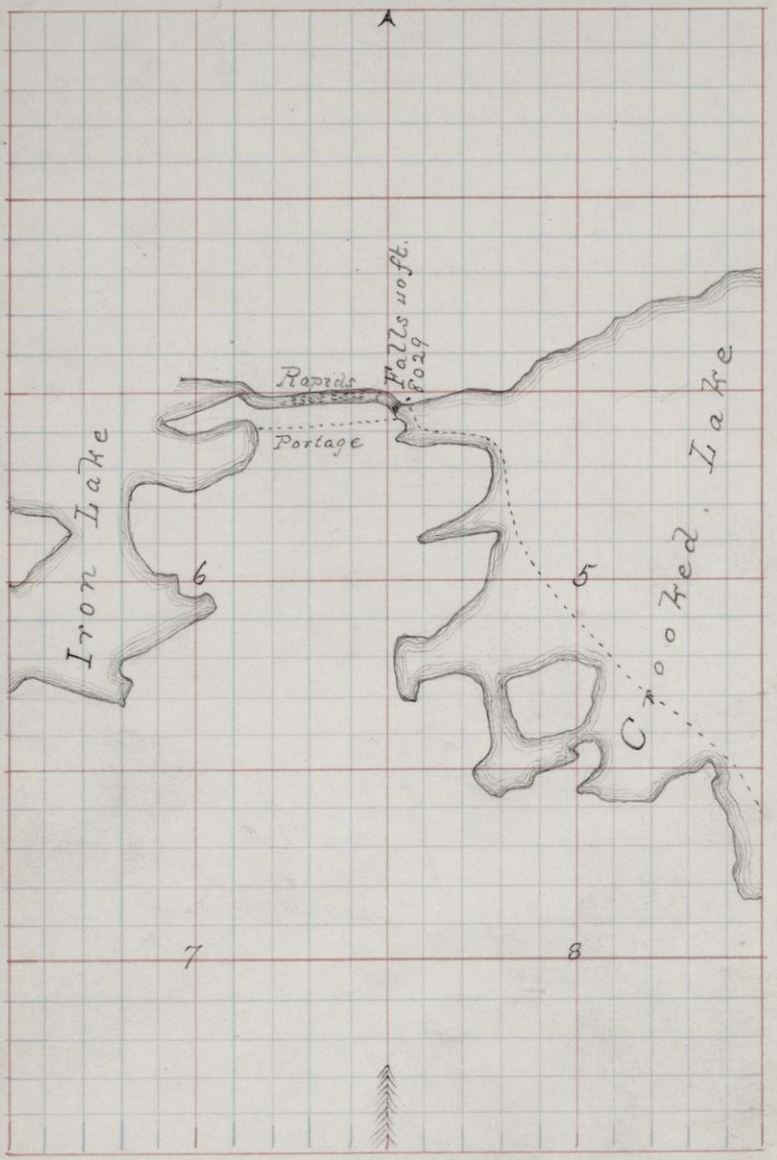
Sec. T. 66 R. 12 W.



8028 From north east corner of large island in Sec. 9 T. 66 R. 12 W. a granite similar to many to the east

(9—891.)

Sec. T. 66 R. 12 W.



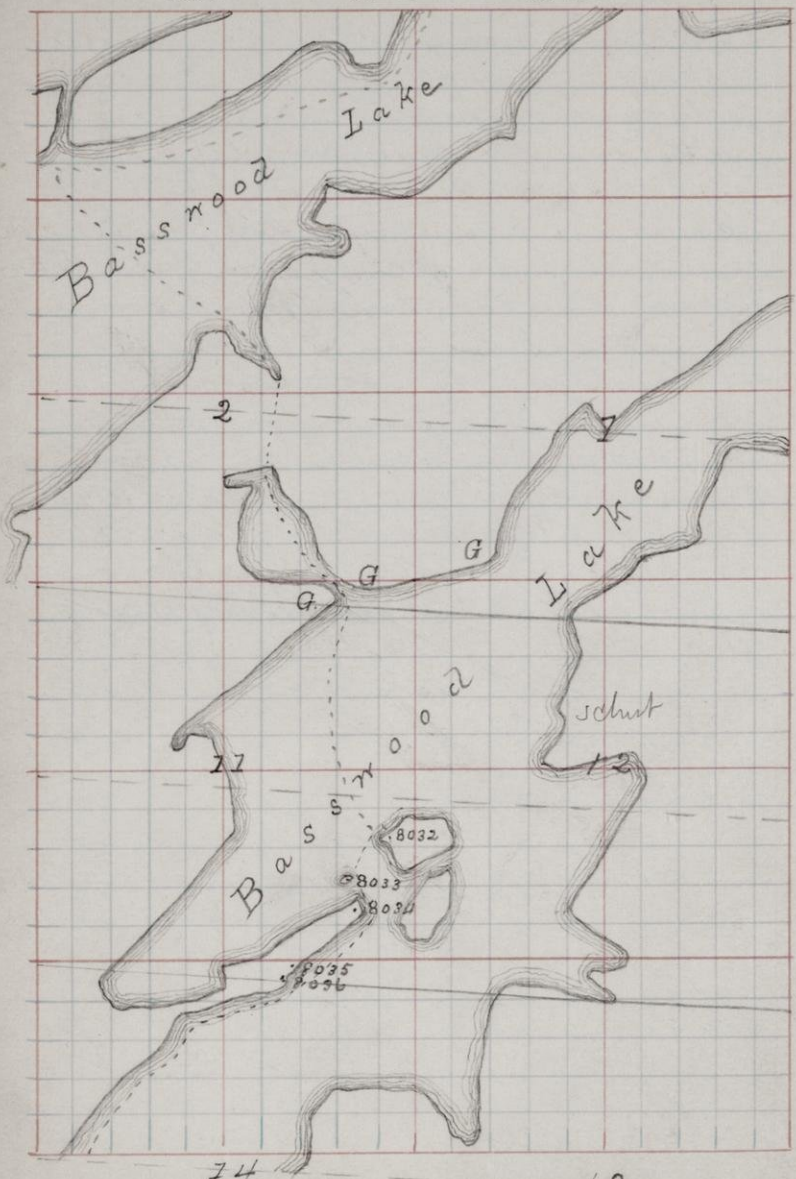
At the west end of Crooked Lake the water falls over granite making a plunge of about 40 feet. Between these falls and Iron Lake, a distance of about 1/4 of a mile the river makes a series of rapids. I went over the portage until I could plainly see Iron Lake and as the country is burnt could see that it lies in the granite, at least the east end.

This point was as far west as we went and we turned back for Basswood returning over nearly the same route we came.

8029 From head of falls at west end of Crooked Lake N. W. corner Sec. 5 - T. 66 - R. 12 W.

(9—891.)

Sec. T. 64 R. 11 W.



From Basswood Lake we went south in the west arm of the lake through Section 3, T. 64, R. 11 W. all the time in the granite. Then crossing to the center of Sec. 2. a portage was made into the east arm of Basswood in S.E. ¼ Sec. 2 - T. 64. R. 11. On both sides of the narrow neck near the south line of Sec. 2 the granite is exposed

Running south from this point the schistose rocks were found on an island between Secs. 11 and 12 in same town, and also on opposite side of arm from granite a little south of east from the granite

8032 Specimen taken from island N.E. ¼ of S.E. ¼ Sec. 11 - T. 64, R. 11 W.

8033 from small island a few hundred yards to the southeast of 8032.

8034 from end of long point in S.E. ¼ of S.E. ¼ of Sec. 11 - T. 64. R. 11 W. about 200 yds south of 8033

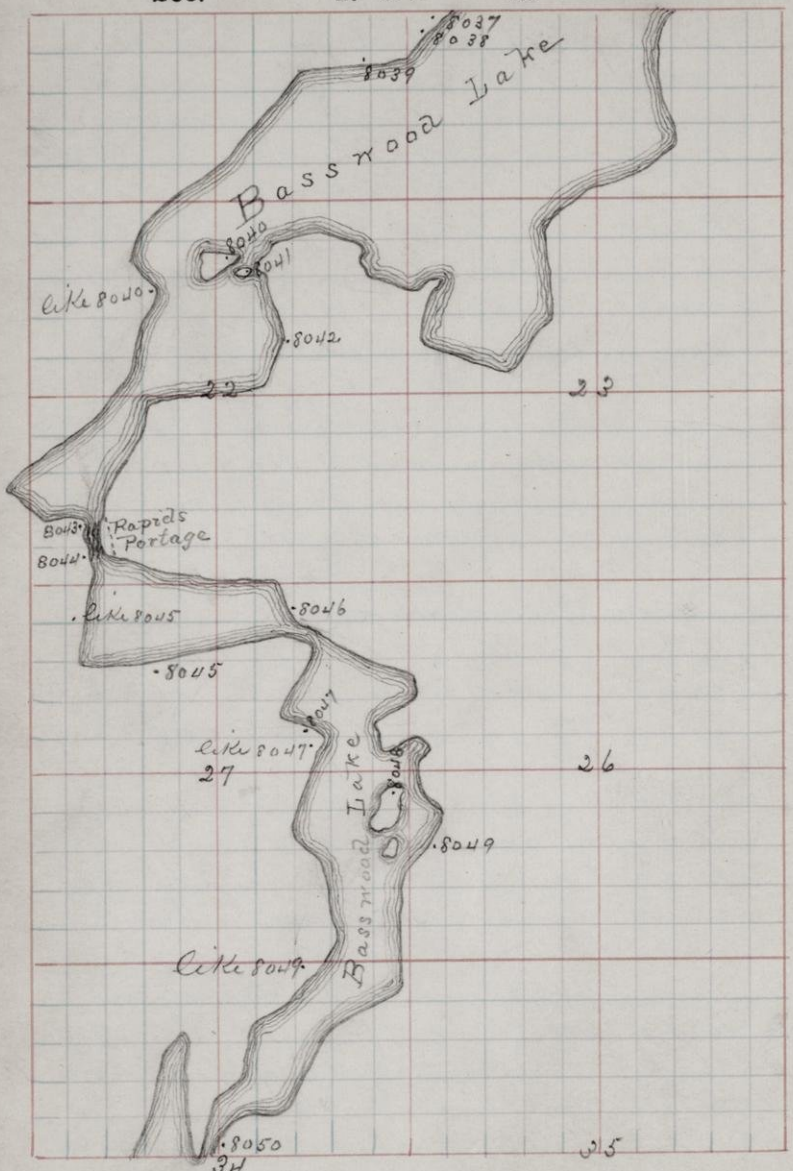
8035 A slightly coarser grained rock near northeast corner between Secs. 11 and 14 on south side of same point

8036 Taken a few feet from 8035 showing the contorted banding these rocks present at times

The strike of these rocks is, I

(9—891.)

Sec. T. 6 N R. 17 W



think about that of the point or nearly northeast and southwest

These rocks vary in coarseness from a very fine to a quite coarse rock though every grade between the two is to be seen

½ mile to the southwest near the east ¼ post Sec. 15, T. 64, R. 11 W. these or similar rocks appear. They are quite highly banded and much contorted

8037 Near Northwest corner of Southwest ¼ Sec 14 - T 64 R. 11 W

8038 About 100 paces S. 2° W of 8037

8039 300 or 1000 fds. S. 2° W. of 8038

The next exposure to the south is across the arm of the lake on an island near north line of Sec. 22 same town. A coarse crystalline rock is here exposed. The glacial markings on this exposure run S. 21° W.

This same rock is seen on a point on the west side of the arm in a southwest direction

8040 Specimen from above island appears to be a layer as it runs about with the strike of these rocks

8041 Another coarse rock from a small island a few yards to the southeast of 8040 The exposure is a small one

8042 | About 400 or 500 yds. south of 8041 on the East side of the arm a fine grained quartzite is exposed
The same rock is also seen in the N.W. ¼ 22-64-11W

8043 | At the foot of the falls a fine grained black slaty rock is seen, it belongs to the same series as 8042 & think
The falls are about 5 ft.

8044 | At head of falls a reddish mottled rock was taken (compare with 8035) could not see how it was trending
A short distance south of 8044 a

8045 | rock similar to 8045 is exposed and to the south of this along the south shore of the lake the layer or ledge from which 8045 was taken
It is a grayish fine grained schist from near center of N.W. ¼ Sec. 27 T. 64, R. 11 W

8046 | A very schistose rock from east side of lake N.W. ¼ of N.E. ¼ Sec. 27, T. 64, R. 11 W.

8047 | A similar schist to 8045 about ½ mile south of 8046 in S.W. ¼ of N.E. ¼ 27-64-11W.
At the north end of the larger of the two islands in the S.E. ¼ Sec. 27 the rock changes to a fine grained quartzite

8048 | From north end of island near N.E.

Sec. T. R.


Basswood L.
Fazis Lake
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8067-70
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lake 8073
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8076
8077
8078-83
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corner of S.E. ¼ Sec. 27 - 64 - 11W

8049 From mainland about ½ mile S.E. of 8048
On the west side of the lake near the north line of Sec. 34 of the same town a quartzite shows similar to 8048

8050 At the narrows near the center of Sec. 34 A porphyritic schist (8050) is exposed in a small exposure a few yards in extent

8051 West side of lake in N.W. ¼ Sec 34, T. 64, R. 11W.
A short distance back from the lake on the west side is quartzite ridge running about N.N.E.

8052 300 or 400 paces S.W. from 8051 taken about 100 paces back from the shore

8053 A few paces north and east of 8052 Apparently the same ridge is found a couple hundred paces west of meander corner between Secs. 33 and 34 T. 64, R. 11W. The main part of the ridge to the west is composed of a

8054 cryptaclinic (?) rock (8054). To the

east of this is a dark grey schistose

8055 rock (8055) the structure varying considerably at times looking like a quartzite

To the east of this schist and apparently forming part of the same layer is a jasper and schist layer or belt. The jasper seems to lie in the schist in places in lense shaped masses similar the quartz masses in schist The quartzite or schist lying next to the jasper carries considerable iron pyrites as does also the jasper itself as shown in the hand specimen

To the east again I think the rock is the same as 8055 though it is not certain as the rock was only in fragments

The part of the belt carrying the jasper is only a foot or so in width so far as could be seen

8056
8057
8058

Taken across the jasper at above point

At a point about 1/4 east of the last named a rock exactly like 8045 is shown in a small exposure

Following the shore about 1/2 mile east of S. W. corner Sec. 28 we come to the river from Falls lake into Basswood a stream about 400 or 500 yds. in length and flowing in a continuous rapid

Crossing to Falls lake on the portage
on the east side of stream, the first
rock in place is a fine grained
8059 gray rock (8059) about 100 paces from
north end of portage
270 paces south of this point rocks
is again found in place on the trail;
8060 it is more schistose than 8059 (8060)
This rock is considerably stained
or mottled with iron oxide
At the south end of portage a phase
of 8060 was taken, it is slightly darker
colored and more mottled with the
iron oxide. The strike of the
schistose structure taken at this
point is N. 48° E. magnetic and
the dip of the schistose bands about
90°
8061 From south end of above portage
8062 About ½ a mile southwest of 8061 a rock
similar to 8061 (8062) is exposed on the
south side of a small island (See map
opposite p. 18)
8063 On the north side of the long narrow
island south of 8062 a finer darker
colored rock 8063 is exposed
Going northeast from last exposure
8064 a grey fine grained rock with a
trace of schistose structure is found
on the west side of point N. 24 ½ Sec
2 Just east of this last on the

east side of same point a rock exactly like 8062 appears

8065 A purplish somewhat coarse rock from a point about ½ mile east of 8064 The exposure of this rock is not very large

8066 Still farther east near N.E. corner of sec. 2 an exposure of rock like 8062 again shows

8067 A fine grey rock (quartzite) a few paces north of meander corner of town line on east side Falls lake; 3 or 4 paces south of this point

8068 the rock becomes more slaty and of a darker color Following this comes a belt 30 or 40 paces

8069 wide of a light grey rock filled with still lighter colored lense shaped masses These masses weather out of the rock and give the surface a very rough appearance On breaking these lense like masses differ from the other rock so far as could be seen only in being a little more compact They will average perhaps 1½ to 2" in length and are very thickly scattered over the surface of the rock

8070 A dark colored rock lying just south of 8069

8071 On the N.E. corner Sec. 2 a few paces

south of 8070; it is like 8062

8072 100 to 150 paces south of 8071 a dark greenish grey fine grained rock (quartzite?) shows

8073 A very fine black to grey slate or slaty quartzite from a point about ¼ of a mile S. W. of 8072; the rock is very fine breaking with a semi-conchoidal fracture

The dip is high 75° to the Southeast

400 or 500 paces S. W. from 8073 is another exposure of exactly the same rock

8074 A fine grey slaty rock from the S. E. ¼ 11-63-11 W. (Hartnaum) an exposure of a similar rock also shows near the mouth of the small creek also in several small exposures between 8074 and the small lake to the south

8075 A slightly darker rock than 8074 but like it in other respects from a small island in the small lake in Sec. 11. also the same rock is exposed on the west side of the lake near the S. E. corner of the section

8076 From the point on south side of same lake near north line of 63-11 a large exposure of a finer more quartzite like rock; it rises in a cliff 50 or 75 feet high facing to the N. E.

8077 A grey slaty rock to the north of the jasper belt in Sec. 14-63-11 I did not find it in direct contact with the jasper but so near that it would seem to be the next rock to the north

8078 to 8083 Jasper from the belt near the center 14-63-11 W. (Hartmann) This belt so far as could be seen is from 20 to 80 paces wide and shows some very fine banding over large surfaces In this belt as in many other places the jasper is in faulted bands and also in broken rectangular pieces through the rock giving it a brecciated appearance
The dip is high to the south I should judge not being able to determine it accurately

8084 A dark grey to greenish schistose rock lying directly south of the jasper

8085 A phase of the whitish schist found farther east on same lake
From north side of Falls lake about 1 mile S. W. of 8062

8086 From south side Falls Lake near N.E. corner Sec 16-63-11 W. a somewhat fine greenish schistose rock

8087 Near center Sec 16-63-11 W. a white

shale rust stained similar to those shales at foot of lake

8088 A greenish schist with a somewhat metallic lustre from S. E. ¼ 17-63-11

8089 Greenstone from north side Falls. Lake Sec. 18-63-11 W.

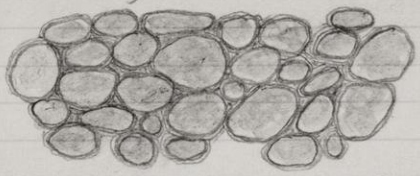
8090 A metallic lustred rock breaking into lense shaped fragments a few paces south of 8089

Just south of 8089 and 90 which form a high ridge on the north side of the west end of Falls lake a white to greenish white shale comes in and follows for some distance directly along the shore; It is like the white shale at the south end of portage from Falls to Basswood lake and other specimens taken at the foot of the lake

Crossing the portage from Falls to Long Lake the same ridge seen on the north side of Falls lake follows along a short distance to the north of the trail and strikes in along the north side of Long lake

8091 A slaty dark colored rock from a small island east end Long lake See map Book I P.

8092 A Greenstone from the ridge on north side of Long Lake it weathers on a smooth surface to show like the following sketch. The only difference



to be seen between the rounded bodies and the surrounding rock is that they appear to be more compact Some of this rock is of uniform color like 8092 and again it is spotted white and green or a light and darker green ditto 8093 the lighter colored

8093 material being in small rounded spots about the size of a pea.

The ridge is very large rising from 200 to 300 feet above the lake at a distance of about 80 rods from the shore and extending northward

	at least ½ of a mile or so far as we could see on account of higher bluffs
8094	A much coarser greenstone from a point about 40 rods south of 8092-3; the exposure is small, lying in a valley between the larger bluffs on the north and smaller ones of shale or slate on the shore of the lake
8095	A shale or slate lying to the south of 8094 on the lake shore
8096	A dike in 8095 about 3 ft. wide where taken
8097	A dark colored slaty rock from the S. ½ of ½ 28-63-12 just east of small island said by Hartmann to be on his iron belt
8098	Very similar to 8097, just south of 8097 also on this iron belt
8099	A dark colored rock from small just north of 8097
8100	A thin shale from island ½ mile north of 8099; this shale is similar to that found on the islands and long point to the southeast
8101	A greenstone(?) from a small island about 60 rods north of 8100
8102	A greenstone from the east side of point S. ½ of ½ 21-63-12

8103 A phase of 8102 from west side of same point in the S.E. ¼ 20-63-12

8104 A few hundred paces north of 8103 This rock is exactly like the mottled rock found further east (No. 8093)

8105 A granstone (?) from a point ½ mile north of 8104

8106 Near ½ line 20-63-12 a fine grained greenish rock

8107 Passing up Burntside river (which flows through a marshy country) it swings around near a small exposure where the range line between 12 and 13 crosses The rock is very much like 8106
Passing up the same river and creek as shown on the map in B.7 p.5 we cross on the trail leading from the creek to Burntside lake a portion of the range seen north of Long lake

8108 From near the south end of this portage A greyish almost quartzite like rock

8109 Some 200 to 300 paces north of 8108; belongs to same range of bluffs; a greyish rock, veined (feldspar?) and carrying iron pyrite so that the rock is considerably iron stained on the weathered surface

8110 A few hundred feet north of 8109 a dark rock of a greenish cast

8111 Near 8110 a phase of 8110 with a portion of a light colored granitic vein These rocks are thoroughly cut up by these veins

8112 Another vein in 8111 As I remember it the vein is a granitic rock of a somewhat reddish color

8113 A banded green and black phase of this rock; within a few feet of 8112

8114 White granite from a small island a few paces north of 8113

8115 Gray granite from south end of island about ½ mile north of 8114

8116 Same granite from north end of above island

8117 Black gneiss showing white vein from north end of island; ¼ mile north of 8116

8118 Gneiss from point in N.E. ¼ 16-68-13 W near center of section

8119 A dark colored, lustered rock showing granitic vein from portage between Burntside and Mud lakes about ½ way across

8120 About 30 paces south of 8119 a banded iron rock

8121 A greenstone from same portage about 200 or 300 paces south of

8120

8122 A finer dark colored rock carrying considerable quartz about 100 paces south of 8121

8123 A greenstone about 100 paces South of 8122 These rocks form quite a ridge near the south end of the portage

8124 A grey slaty quartzite from point in N.E. corner of S.E¼ of N.E¼ Sec. 8-62-14 W. it lies just south of the range above mentioned

8125 A light grey to greenish white crystalline rock from Frazers gold mine in S.W. corner of N.W.¼ Sec. 8-62-14 W.

From here we returned directly to Tower

Sec.

T.

R.

Starting from Tower we followed the shore of Vermillion Lake closely around to the east. For the first mile or so the shores are low and sandy or marshy. There is one small exposure in the S.W. ¼ of S.E.

8126 30-62-15 W. of a grey crystalline rock

The next rock in place on the shore is seen near the northeast corner of Sec 29-62-15

8127 A rock lying just south of slate at this point. I think it is only a coarser layer in a series of fine and coarse slates and sandstones which extends some little distance to the north

8128 A rather coarse grey rock a few feet from 8127 also a phase of the series

8129 A fine grained grey slaty quartzite or greywacke near 8128

8130 Is a fine black slate from end of point, a few paces from 8129. These rocks stand nearly vertical

On the S.W. ¼ 20-62-15 the exposure is made up of parallel bands of a coarse and fine material. One of the widest bands of coarse material seen here is 5 or 6 inches in width; from this these bands vary down

to a fraction of an inch

8131 Slaty quartzite from above point from one of the finer layers

8132 From a very coarse layer 5 or 6 inches wide lying against 8131 The dip here seems to be about 90°

Beginning at the base of the long point in the S.E¼ 20-62-13 and following north, the rock for some distance is much like that just described. being alternating bands of a very fine grained slate with a coarser sandstone and almost up to a conglomerate At places the rock would appear to be entirely a slate again entirely a coarse sandstone; then in a few steps change to an alternation of narrow bands from a fraction of an inch up to 5 or 6 inches in width

The surface where the banding is narrow presents a series of ridges owing to the different degrees of hardness of the bands

The white weathered surface of the sandstone layers present the appearance of a coarse mortar

3133 to 3140 Are taken in order from S. to N. along this point and

show the different phases of the series

Near the north end of this point the rock suddenly changes to a jasper conglomerate or breccia, the pebbles and boulders being almost entirely of angular jasper fragments

One mass of jasper seen was about 40 feet long and lens shaped running in the direction of the strike and is I think part of an iron belt in place

About 100 to 150 feet north across a small valley is a large knob of jasper 40 or 50 feet wide and 150 to 200 feet long The bands of this rock curve in all possible shapes

To the north and in contact with this is a jasper breccia several paces wide.

8141 Conglomerate from first belt about 30 paces from end of point

8142 } From the jasper belt just
8143 } north of 8141
8144 }

8145 A light colored fragmental rock(?) lying to the north and in contact with or including rather the jasper breccia

8146 From this breccia

North of 8145 which is 50 or 60 yds. across is another banded iron bell some 200 feet wide similar to the bell above. North of this a grey somewhat schistose rock looking as though carrying quartz crystals; this extends to the end of the point a few hundred feet

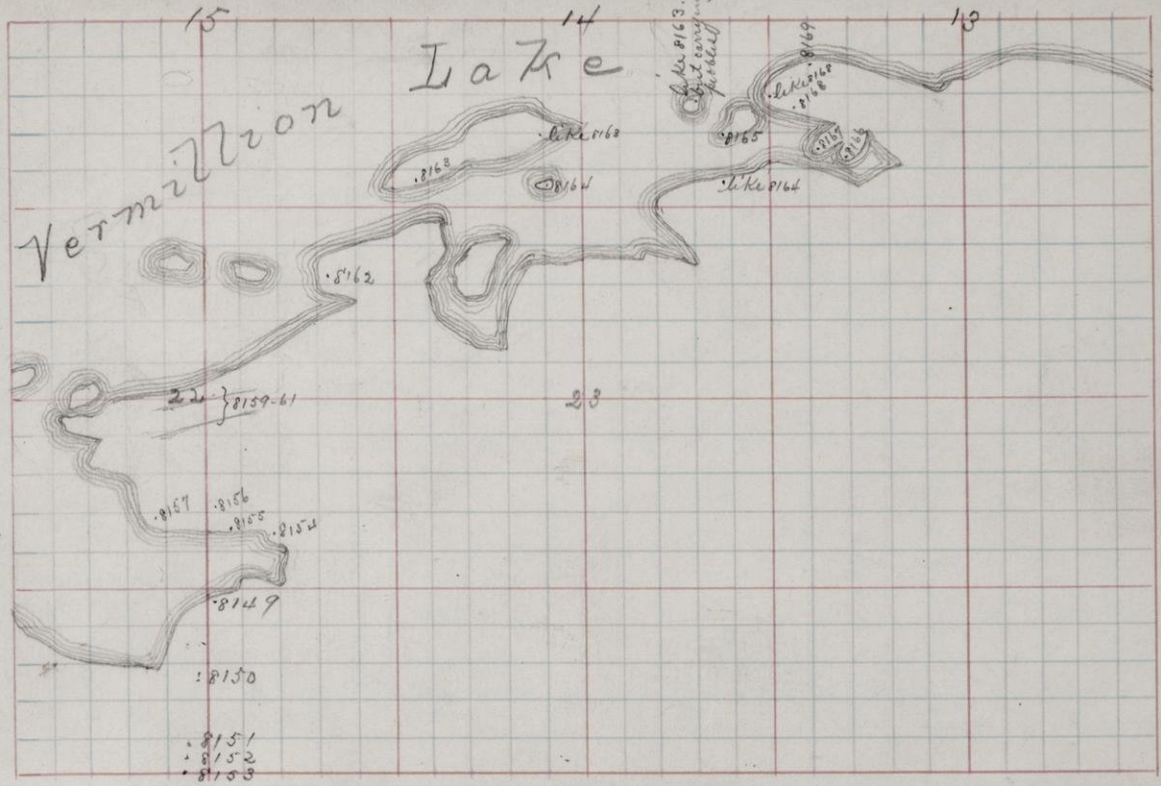
8147 Taken from near the end of the point

The small island north of this point and the north part of the large island in the east ½ sec. 21 are made up of a rock similar to 8147

8148 From a point in the west ½ of S. E. ¼ 21-62-15 a white somewhat coarse sandstone like rock grading into a conglomerate, the pebbles being all of one kind a fine grey quartzite? grey wacke?

From this point we ran about a mile to the east near the meander corner between Secs. 27 and 22. From this corner we walked back to the mines in a S. S. W. direction

8149 A light colored rock (fragmental as I remember it) on the lake shore near the meander corner and running back about 300 paces


15
14
13
Lake
Vermilion
Lake 8163
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Lake 8164
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22
8159-61
23
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8153

Sec. T. R.

(9—891.)

8150 A darker schistose rock about 475 paces south of lake shore and including a band of jasper only a few feet in width

8151 Jasper from a wide belt about 525 paces south of 8150; this belt is 250 or 300 ft wide

8152 70 paces south of the jasper; a graywacke

8153 A grey schistose rock with some quartz crystals; it is 150 paces north of the mine opening and 60 paces south of 8152

8154 Similar to 8149 from lake shore N.E. across across a small bay from 8149

8155 A rock very like 8154 but a little different in texture

8156 Like 8154; a few paces north of 8155. It has however more of a conglomeratic character and is more iron stained

8157 North of 8156 a conglomerate comes in; The pebbles are small and all sampled are of one kind a fine grained grey quartzite

North of 8157 is another narrow belt of rock similar to 8154 and to the north of this again another conglomerate very like 8167

The pebbles were somewhat larger than in 8157 A number were
8158 taken and numbered 8158
Lying north of this conglomerate is an iron belt several hundred
feet at least in width and
rising to quite an elevation
8159 Taken from this belt. The
to 8161 rock is black, banded very pronounced at times; the rock on
the south side of this exposure
is a slate but carrying the
light quartz bands peculiar
to the iron belts Some of the
quartz when broken has the
appearance of sugar
The dip is high to South
8162 Very similar to specimens taken
from above iron belt (a black banded
iron slate) but I am not certain
that it belongs to the same belt
from end of point in N.E 1/4 22-62-
15 W.
8163 From west end of long island
in S W 1/4 Sec. 14-62-15 W. it is
similar to 8154 and appears to
be another belt of this rock lying
to the north of the iron belt
8164 nearly like 8163 and similar to
specimens taken south of the iron
belt; these rocks are at times

times quite massive and again almost a shale

8165 A more massive rock (greenstone?) from west end of island in S. E. ¼ 14-62-15

8166 A very white schist from S. ft. of S. ft. 13-62-15 ft. carrying quartz crystals

8167 A greenstone of few feet wide along the south side of point about 100 yds. north of 8166

8168 A narrow belt of the conglomeratic phase of these white schistose rocks. It follows along the southwest side of the point in the N. ½ of S. ft. ¼ S. 13-62-15 for nearly ½ its length south of it is the typical schist(?) of rock of this series and to the north a more shaly phase comes in, on the north side of the point

8169 From this schist north side of point S. ft. ¼ Sec. 13-62-15 ft.

8170 From small island in N. ft. ¼-13-62-15 A rock very similar (with the exception of being slightly darker) to 8169 South of this island the rock on the mainland for several hundred yards is similar to 8170


Sec.
T.
R.
Vermilion Lake
.8184
.8183
.8185
.8182
.8181
.8180
.8179
.8178
Hhiloschist
.a very fine black slate
.8177
like 8164
like 8164
.8176
.8175
.8174
.8173
.8172
.8171
.8170
like 8170

8171 From the mainland and a little north of 8170 From this point northward the rock becomes more slaty although bands of this same schist run through

8172 A white shale a short distance north of 8171 in the N. E. ¼ of N. W. ¼ - 13 - 62 - 15 W.

8173 A few pacs north of 8172 A more massive phase of this rock and still carrying a few porphyritic crystals of quartz

8174 A conglomeratic phase of this rock near the north line of Sec. 13 on lake shore The pebbles appear to be all of one kind a fine grey quartzite or greywacke and rock as a whole is very like that on the lake further to the west

8175 Only a few feet north of 8174 a fine black slate but a few feet wide

8176 Just north of this slate layer and running north to the end of the point is a coarse grained greenstone the belt is perhaps 200 to 300 yds wide

8177 To the north of 8176 on the north side of same point is a banded rock of finest slate and a coarse sandstone; this gives place again on the north to another belt of black fine slate or perhaps grades into it

8178 porphyritic schist from a small island in the N.W. of N.E. of 12-62-15 This same schist is also exposed on the mainland just south of this island

8179 A gray quartzite from an island a short distance N.W. of 8178

8180 From the mainland N.W. of 8179 a quartzite. N.W. 1/4 12-62-15

8181 230 paces north of 8180 a quartzite

8182 A greenish grey quartzite from N.E. of N.E. 11-62-15 it is a little lighter colored and shows more of a cleavage than 8181 These quartzites form quite a ridge along the northeast shore of Vermillion Lake

8183 A rock very similar to 8181 but carrying a little more quartz from near the S.E. corner 13-62-15

8184 Like 8183 about 1/4 mile

Sec. T. R.

north of 8183

8185 A black very fine grained slate from Knull island in N. Pt. 1/4 10-62-15-