

From Tower, Minnesota To Grand Rapids: [specimens] 10688-10724. No. 55 October 1886

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], October 1886

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

No. 23.

October, 1886.

From Tower, Minn., to Grand
Rapide
W. S. Bayley.

10688 - 10724

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

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left hand page place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. In all cases where there is the least doubt about the true bedding directions, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue line as 100 paces, and twenty of these spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left hand side of the page.

2. On the right hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section, and the dip and strike when observable, for instance: 4025 | 250 N., 300 W., *Strike, N. 6° E., Dip, 50° E.* Then follow with as full a description of the ledge as possible.

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

4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with a note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples, trimmed to a uniform size of $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$ 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 § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. All specimens are to have numbers painted on them, in white on a black background, in the field.

5. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc., etc.

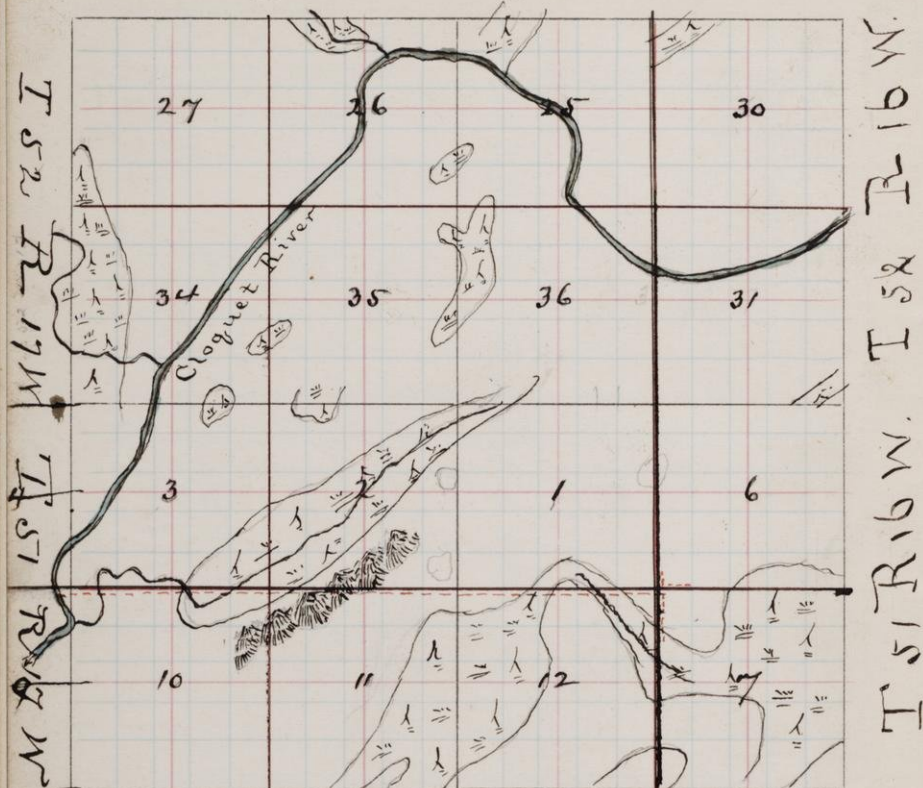
6. Forward this note book, as soon as filled, as registered mail matter, to R. D. IRVING, U. S. Geologist, Madison, Wis.

R.D.
22/10/18
4898/

55

T.

R.



Map illustrating trip up the
Cloquet

Oct 1, 1886.

1

Trip to Sec. 7, T. 51, R. 16 W.

The purpose of this trip was to discover and obtain specimen of ledge of rock, reported in the field notes of the survey as occurring in Sec 7 T 51 R. 16 W at 75-80 chains north of the S. W. corner of this section.

At Knife Falls took the road and trail leading north along the St. Louis river past the Grand Rapids. There took canoe and went up the St. Louis to mouth of the Cloquet, where portaged around the rapids. Followed the Cloquet to the E + W line between sections 4 and 9 in T 51 R 17. Here left the river and followed this east to the corner post between Secs. 1 + 12 in T. 51 R. 17 and 6 + 7 in T 51 R. 16.

From here went south 125 paces to where the rock ledge is supposed to occur.

This region is covered by a cedar

swamp which extends some distance south and slightly to the east of the corner. Found no ledge.

Then went some little distance north of the same corner and turned west, following compass to river.

The entire area traversed during the day is covered by drift. No rock was noticed in place.

The rock most abundant in the drift is a coarsely granular dark rock resembling in appearance ^{some of} the Duluth gabbros.

In addition to these there were also a few granite boulders - rather fine grained and red.

To the north and south of the corner 1, 6, 12, 7. This drift constituted ridges trending in a north-easterly direction.

Many of these ridges were crossed in following the section line east. When cut by the river they were seen to consist of sand and boulders of various sizes.

None of the country seen, showed
any evidence of rock in situ.

Oct 1st 1886.

10688 Part of boulder in vicinity of corner
1, 6, 7 + 12. It appears to be a very
coarse porphyry or at least for
phyritic rock with a fine grained
reddish brown groundmass, in
which are scattered lath shaped
crystals of an almost glassy feld-
spar in carlsbad twins.

10689 Part of boulder just west of same
corner.

Olivine Sabre - W. S. P.

T 58 R 16. T 59. R

16 W.

T 59 R. 15 W.

T 59 R 14 W.



T. T. 58. R. 14

Trip along the Mesabi

Took freight train from Tower ^{Oct 5}
to Station No 47 - 47 miles from
Two Harbors.

At this place Sec 28(?) T 59
R 114 a road* goes in to the south
west, and gradually turns west-
ward, finally crossing Coune
Lake at the dam at the nar-
row portion of this lake, a little
south of the range town line
between 58 & 59.

Up to this point no rocks were
seen "in situ". Large ridges of drift
were crossed in which the predom-
inant boulders are of a red coarse
granite, like that of the Mesabi
range. These boulders mixed with
sand form all of the ridges.

Two short trips were made south
of the road to determine if possible,
whether the auriferous rocks were
to be found. The first was in
the trail to Partridge Lake and

cf. A. H. Chester. ^{Geology} 11th Ann. Rep. Minn. 1882.
p. 156.

The second a few miles west of that place. In both cases no rocks were seen except boulders. Several of these ridges were followed to the river, where their cross section could be tolerably well ~~seen~~ ^{shown}. Here also nothing but boulders and sand could be detected.

At Stone Lake made a short trip up the old Vermilion road as far north as the stream indicated on map as flowing into the Lake in Sec 19 T. 59 R. 16.

The main ridge plotted on map in the S. E. part of T. 59 R. 16 and the S. W. of 59 T. R. 15 consists of a schistose greenstone in part, associated with masses of massive greenstone and occasionally intersected by greenish gray dyke like rocks. In most cases these rocks seem to be metamorphosed sediments. The general strike of the entire series is to the S. W.

This ridge, as well as all others in the vicinity, is covered with immense boulders of red granite.

Streams cut through boulders only and the lake shore contains no jutting ledges. The high ridges which slope down to the lake expose no rocks 'in place'.

To the west of the lake on the old Vermillion road two ledges of rock were seen

10690 T 59 R 15. Sec. 30. about 250 paces S. E. of quarter post on range line.
 i. e. 750 paces N and 250 E of S. W. corner. Strike 25 E of N. Dip 80°-90° S
 Dark gray schistose rock

10691 On Vermilion road. T 59. R 15. Sec. 31.
 1150 paces N of town line. (1150 paces N and 1500 E of S. W. corner of section)
 Strike N. E. Dip. 75° N
 Grayish green rocks, so well bedded that was at first supposed to be Animikie. High dip however opposes this view.

West of the road the greenstone (?) forms high bare bluffs with very steep slopes, in many places quite perpendicular. This is the case especially on their southern edge.

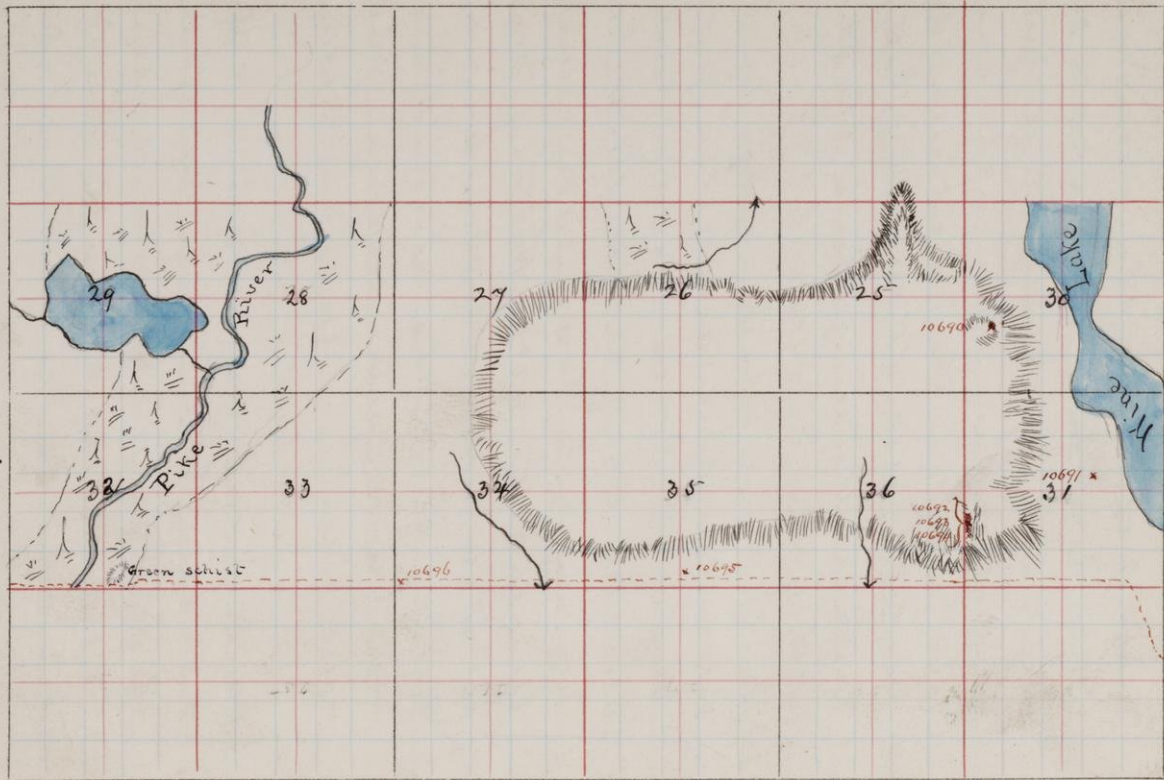
10692 Massive rock - T 59 R 15. Sec. 31. Very near the range line 668 paces north of the S. W. corner.

10693 From same place. Schistose rock either conglomeratic or else porphyritic. Covers quite a large area on top of the bluffs.

10694 Massive rock looking very much like a dyke with parting parallel to its sides. It stands out boldly from the surrounding rocks with perpendicular parallel sides. From same place

On Saturday Oct. crossed to the east side of Wine Lake and followed the old Vermillion road south along Embarras Lake to Squagamau Lake. Found meander corner ^{on} of this lake between sections 34 & 35 in T 58 R. 16.

T 59 R 16



T. 59 R. 15

On this trip no rocks were found in place. The ridges were entirely composed of sand and boulders, as could easily be seen where Embarras cuts them. As proceeded southward granite boulders became more and more scarce and considerably smaller. Probabilities are that Mesabi Range is north of greenstone ridge.

Sent Dave Cariboo ten miles north on road. He reported seeing no granite in place.

On Sunday Oct. started western trail from Wine Lake along the town line. On the north of this trail was a continuous bluff of greenstone. Exposures however could be found in but few cases. The most part was covered with granite and gneiss boulders. The character of these differed slightly from that of those farther east. Instead of massive red granite, veins of this rock were seen penetrating gneiss and crystalline schists,

and in one case a contact of granite and greenstone was visible. Many of the gneiss boulders contained lenses of red granite - apparently like augen-gneiss.

- 10695 Massive light green rock, fine grained, with seams of calcite and some epidote. T 59 R 16. Sec 35. Near quarter post, a few paces north of town line between T 58 and 59.
- 10696 Schistose greenstone, near corner between Sections 33 & 34 very close to town line. Strike 40 E of N Dip. 70 N.

At night camped on rise of ground in swamp very near the quarter post in Sec. 32. T 59 R 16. In the neighborhood were a few ledges of very soft greenstone, much decomposed.

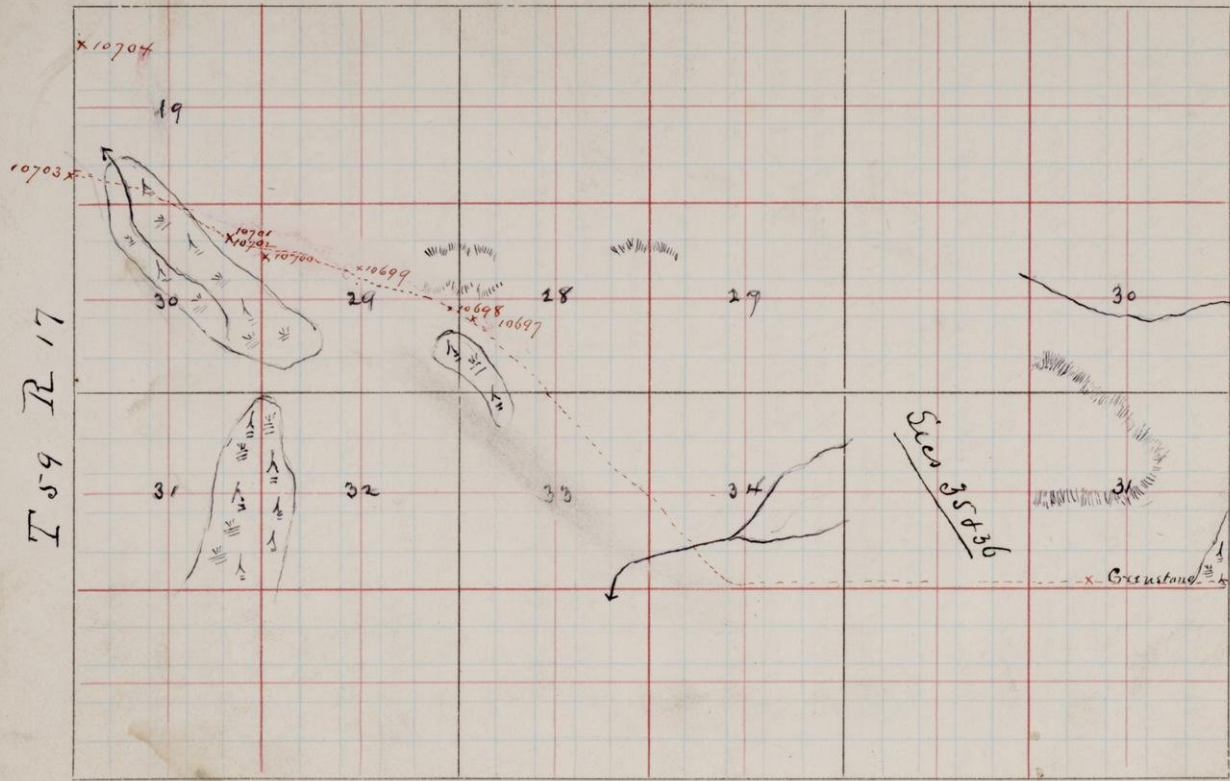
On Tuesday afternoon continued to west on same trail.

Greenstone ledge (schistose) 400 paces west of quarter post in Sec. 31 T 59. 16 R.

T 59 R 17

59 T.

R. 16



On Wednesday and Thursday continued west on trail. From this point (Sec. 31. T 59 R. 16. to the creek in Sec. 33. T 59 R. 17 - greenstone ledges were occasionally noted, similar in character to most of those further east.

West of creek the hills were rounded, covered with hard timber, and to judge from their surface, seemed to be made ^{up} of immense boulders. The red granite boulders were very seldom seen. Greenstone boulders slightly more common. The larger proportion consist of gneiss, both coarse and fine grained. Some are of immense size.

Just before reaching the creek the trail goes off to the northwest as indicated in accompanying map, crossing the west range line of ^{T. 59. R. 17.} 272 paces N of the corner between
secs 19 & 30.

10697

Point

Was taken from very near the trail 615 paces from what was supposed to be the 40 line in S. W. ^{quarter} corner of Sec 28,

∴ not far from the quarter post between Secs. 28 and 29.

Great difficulty was experienced in locating specimens from this neighborhood on account of roughness of the country and especially the vile-ness of the survey. In many cases towns are not subdivided and corners on town lines not marked.

10698
Granite

was from an outcrop 135 paces W and 110 N of 10697.

Both 10697 and 10698 are coarse grain-
ed granite, containing both red and
white feldspars, green hornblende
and some epidote.

10699
Granite

West of these outcrops the trail
runs along the foot of bluffs of red
granite, which in places becomes
gneissoid with a strike 10 S of W.
Specimen of gneissoid granite on
trail near center of Sec. 29 T 59.
R. 17 - just west of center line.

As proceeded west the character of
the rocks changed gradually from
a granite to those like the Ver-
million Series, i.e. gneisses and crys-
talline schists cut by dykes and

streamers of granitic material.

The country along here is very rough and broken, hilly and rocky. The trail crosses very high hills and steep bluffs.

10700 is a light gneiss from trail near the line between Sec. 29 and 30 - about 500 paces S. of N.W. corner of 29. Strike 10 S of W.

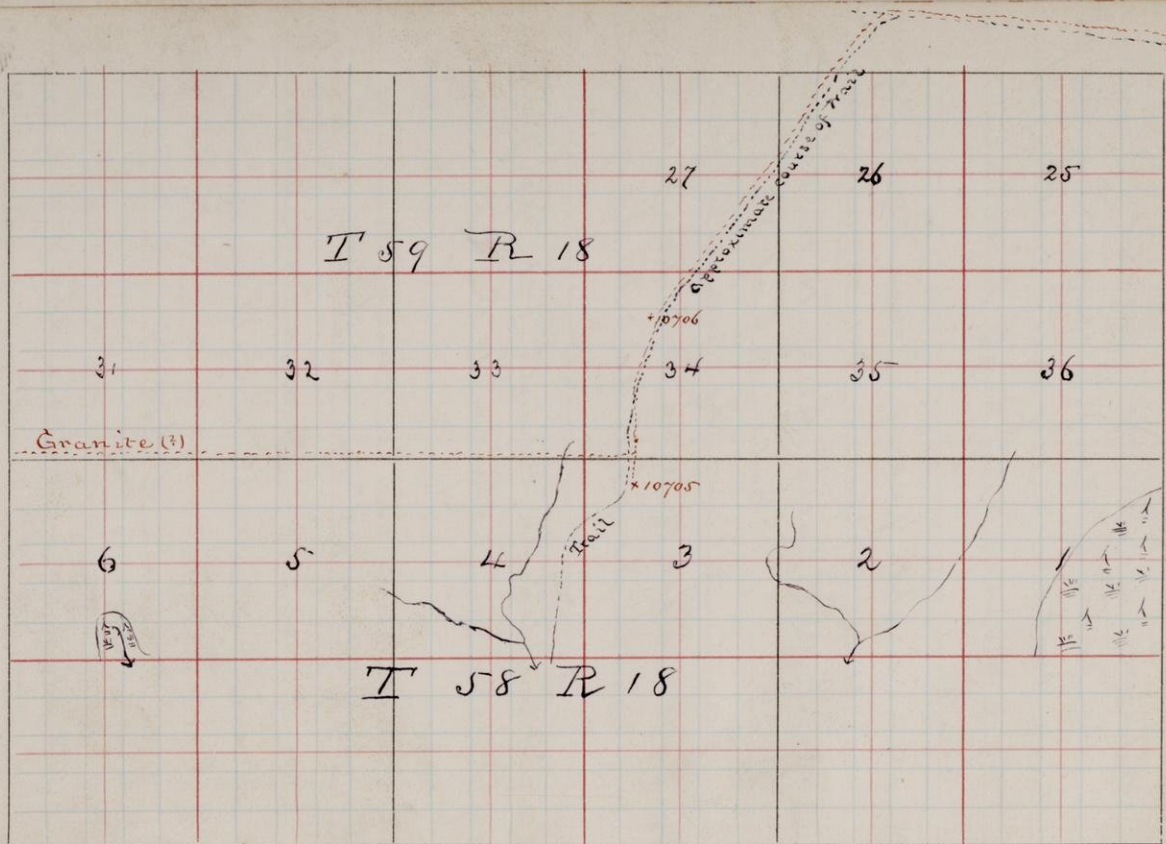
Further along the trail a few paces west of 10700 is a large outcrop of mixed Hornblende schists, gneisses and granite.

10701 } Hornblende schists cut by granite
10702 } dykes. Strike 10 S of W.

10703 From trail on W range line of T 59 R 17 at 272 paces N of S.W. corner of Sec. 19. Gneiss with strike from S.W. to 10° S of W.

10704 From same range line 312 paces S of N.W. corner of Sec. 19.

At this range line the trail turned slightly to the south, running W.N.W. Followed this till struck indian trail



T.

R.

at 80 rods N of the quarter post
between Sections 23 & 26 in T 59 R. 18
Went south on this till reached town
line between T 58 and 59 R. 18.

The rocks along this trail are for
the most part covered with drift.

10705 is a schistose rock 236 paces south
of the town line on trail in Sec. 3
T 58 R. 18. It occurs in the side
of a hill so that strike and dip
could not be determined.

Ferruginous
chert.

10705 b looks like gaspery rock in-
terbedded with seams stained with
iron, so as to look like banded
iron ones.

10706 Friday - Day being Sunday re-
mained in camp till afternoon,
when made a short trip back a-
long trail. About one mile north
of the ^{Town} range line and 100 paces
W of trail found a ridge of rock
running S.W. ^{Local} Attraction strong, so
could not determine positively the
exact trend as dial compass was
not at hand.

Ferru-
chert.
Assm.

Saturday Started W on Town line
between T 59 R 18 and T 58 R 18.
Light snow, cold, travelling bad.

10707
Granite

Struck first granite ledge from
which took 10707 at 90 paces East
of corner between Secs. 35 & 36 in
in T 59 R 19 about 50 paces N of
line.

410 paces west of 10707 in same
line was another outcrop of granite
differing from former only in color.

All along the town line between
Sec. 31 in T 59 R 18 and Sec 32 in
T 59 R 19 the ground rises in smoothly
rolling hills, covered with a dense
growth of birch and maple and con-
taining numerous boulders of gran-
ite. In other words the same char-
acteristics which mark the occur-
rence of granite below the surface
in other places, are easily recogniz-
able here. It is probable therefore
that the same granite forms these
ridges as it does there elsewhere.
The general strike of the gneisses

T.

R.

T 59 R 19

31

32

33

34

35

36

Granite (1)

Granite (1)

Amish Creek 19707



4

5

2

1

(8)

T 58 R 19.

Through R 20 into R 21.

associated with the granite further east (10 S. of W. - magnetic - uncorrected) would further tend to confirm this view.

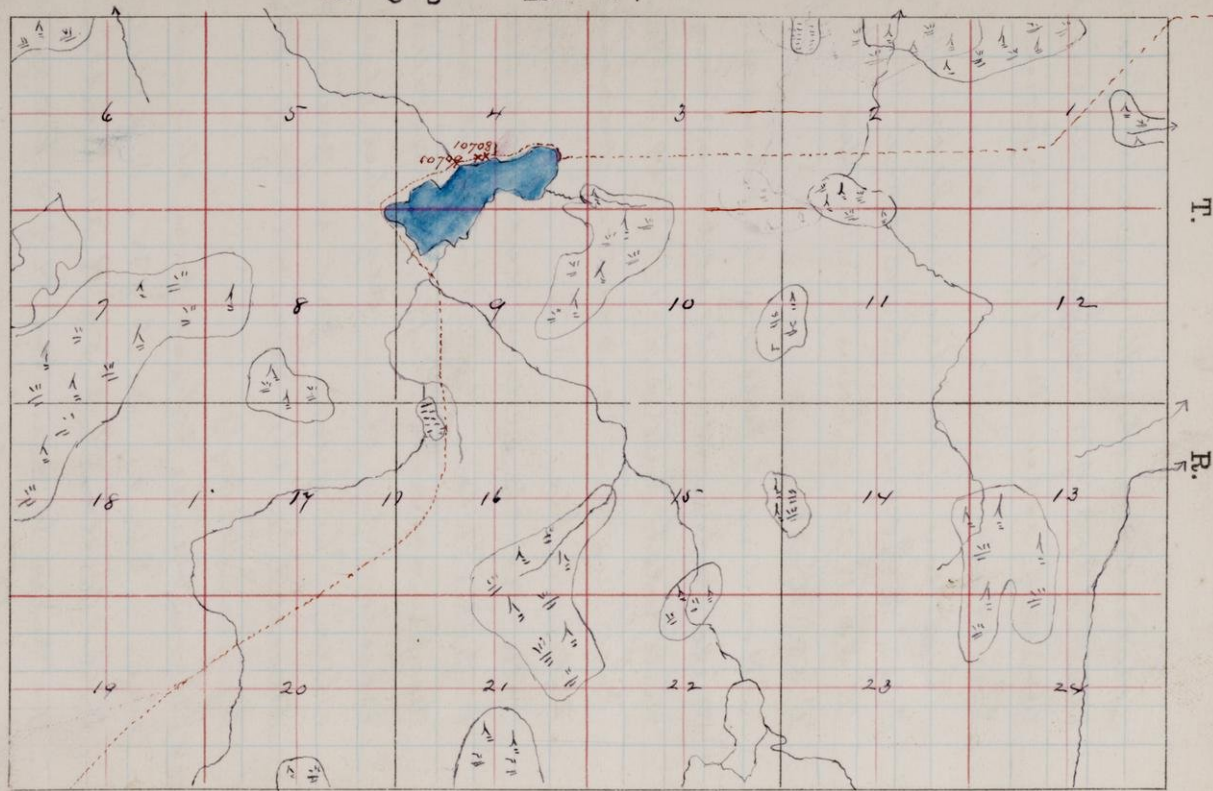
Sunday - all day in Swamp. Tried to follow N town line of T 58 R 20. Camped in Sec. 6. T 58 R 20.

Monday - Went S. W about a mile, when struck old road running west into Sec. 4 T 58. R 21. Followed this road until came to lake in Sec. 4.

On north side of lake opposite to point where road comes out are perpendicular cliffs of crystalline schists like those described elsewhere. The greater part is gneiss intersected in the direction of its strike by granite dykes.

10408 Hornblende schist from this exposure. Strike 30° S of W. Dip little to the north. T 58 R 21 Sec. 4. 900 paces W and 600 N of S. E corner

I 58 R 21



10709 Schistose granite dyke 100 paces west of above.

Camped somewhere near the S. W. corner of town.

Bad lines, almost impossible to follow.

Tuesday continued travelling in south westerly direction through swamps and what were supposed to be the outlying ridges of what ~~were supposed to be the Mesabi.~~

Camped in S. W. corner of Sec. I. T 57 R. 22.

Started on Wednesday and travelled S. W. into T 57 R. 23.

Again crossed ridges of what was supposed to be Mesabi granite. Hills not so high as those further west. Trend S. of W.

On Friday Thursday went west (following compass) till struck Prairie River (which forded) and continuing west, finally reached Prairie river road.

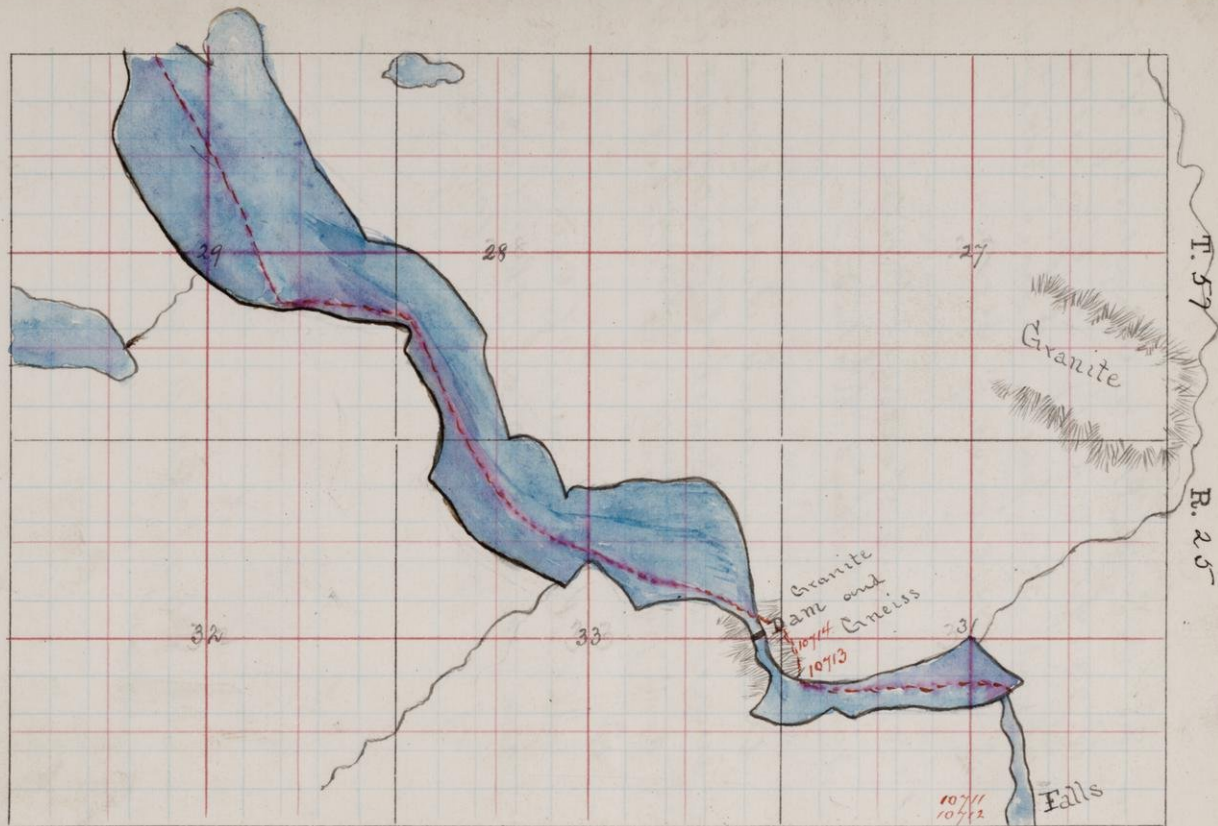
10710 In Sec. 30 (N. W. Quarter) of T. 57
R. 23 found ledge of granite -
about 500 paces E and 300 paces
S of N.W. corner of section.

On Friday followed Prairie river
road to Grand Rapids.

All strikes and directions
were taken with magnetic
compass, and are uncorrected.

The direction of courses
was corrected on the basis
of a variation of 6° .

See later page.



Trip up Prairie River

Left Grand Rapids, Monday Oct. 24
Took teams to Prairie Lake as
the river was not navigable in
consequence of the shutting off of
the dams.

Paddled across the lake to the dam,
portaged here and again paddled
across smaller lake south of Prairie.

The Falls of Prairie are formed by
a ledge of quartzite which, crossing
the river, with a dip of 5° to 15° S. E.,
produces an incline down which
the water rolls.

10711 From Barrier rock, coarse pink
quartzite.

10712 Same place - reddish brown.

Where the dam has been con-
structed the lake is contracted by
granite walls. In places this granite
contains small patches of a horn-
blende schist, or gneiss, which alters
into a chlorite schist.

10713 From E. bank of lake near por-
tage trail.

10714 From same locality

Tuesday paddled up Prairie River. ^{quartz} Banks low. Where high composed of sand.

On Wednesday left Prairie river at little creek running into it from the south in S.W. quarter of Sec. 32. T 57. R. 24.

Spent the day in cutting trail into lakes in T 56 R. 24.

Thursday - started early and portaged into lakes in N.W. corner of T 56. R. 25.

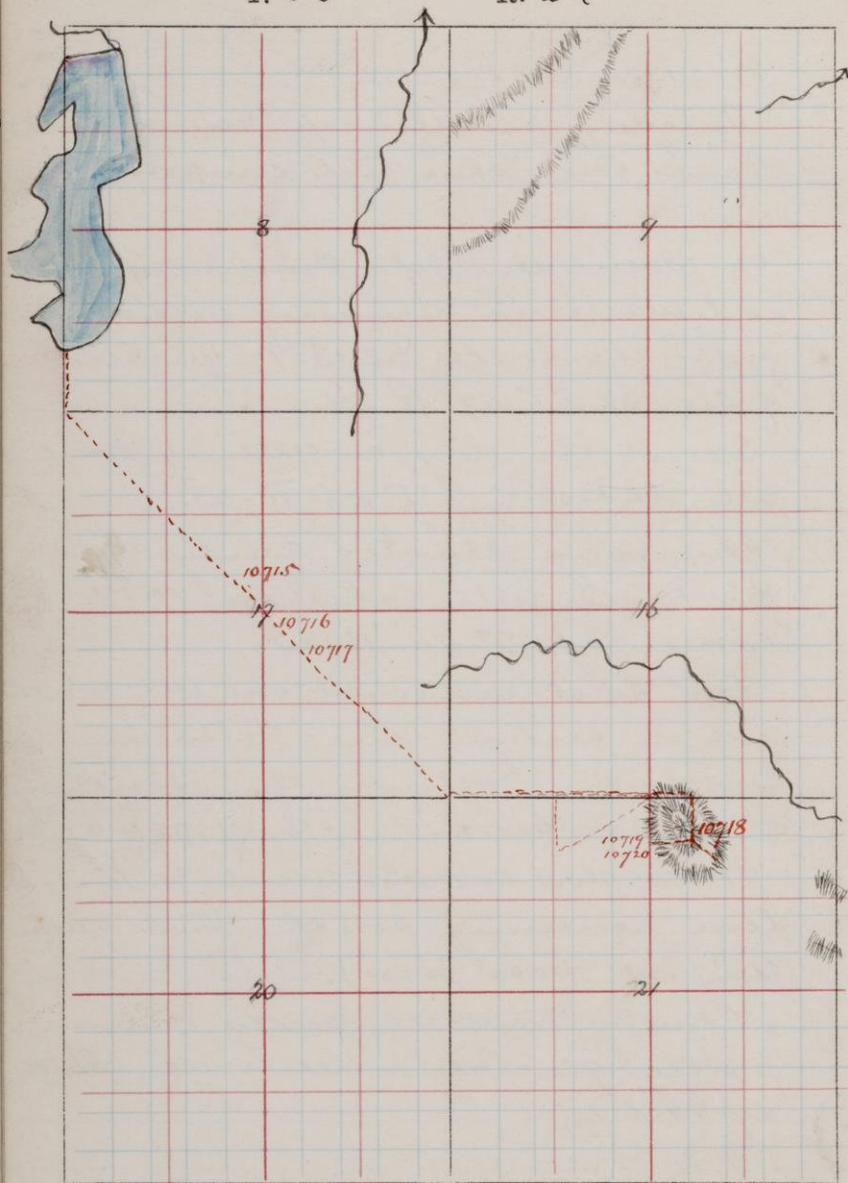
Left southernmost one at south end on section line between Secs. 7 & 8. Followed this south ^{8, 7, 18, 17, then SE to cor. between} to corner between ^{16, 17, 20 & 21.}

From this corner went E. to line running south from quarter post (1000 paces).

Country traversed gently rolling, partly glacial or alluvial, partly rocky.

T. 56

R. 24



10715 Sec. 17 T 56 R. 24. on top of a hill about 1200 paces S. E. of corner between 7, 8, 17, 18 occurs an outcrop of a coarsely crystalline gray rock looking very much like fresh olivine gabbro.

10716 250 paces south east of 10715, apparently further down the side of the same hill. Fine grained red granite.

10717 150 paces south east of 10716. Fine grained crystalline (?) green stone.

In Sec. 21 in the neighborhood of quarter post on the north line is a very high steep hill, which extends north into Sec. 16.

The rise on all sides is very abrupt and the slopes all covered with boulders.

The main body of the hill, so judge from the boulders is a medium grained gray granite.

10718 From ledge on top of hill.

10719 Boulder from W. slope of hill
about half way to top.

10720

Friday - canoed down Prairie
river to Wabano. Portaged across
into small lake just south of
Wabano lake ($1\frac{1}{2}$ mi). Crossed
this lake and by a quarter
mile portage reached Wabano Lake.

Crossed this to stream running
into it from west side. Paddled
up stream to small lake, which
crossed and passed by another
small stream into Trout Lake.

Saturday and Sunday -

From Trout lake passed north by
portage into Spider lake, from
there portaged into Long lake, then
into Grave lake (3. of long) then
into Crooked lake, then west into
a long lake. From here went
into Deer lake.

Monday - left Deer lake, passed
through Bass, into the Mississippi
River. Paddled up this into Pokeg-

ama lake where camped.

To west of this lake is a hill which is marked on the State map. Upon examination it was found to be composed of boulders and sand, like all other hills noted on trip.

At the south end of the lake, over toward the west is a range of hills marked on plat as "Range Hills". These were not visited, but from their contours and general appearance they seem to be of same character as the hill noted above.

Tuesday left Pokegama, paddled down the Mississippi. At Pokegama Falls in Sec. T 55. R. 25 is a range of quartzite bluffs, bearing 55° S of W. Light colored, and red quartzites mixed, and mingled up in all sorts of ways are here well exposed. Dip not observable with accuracy, though the rocks are flat lying.

10721 Light colored quartzite

10722 Red quartzite.

- 10723 From the Affleck Bros? Silver mine
10724 North of Grand Rapids T 601.7 R 24.7
See.

T. 52

R. 23

* 10710
Granite

30

29

28

* 9805
Granite

31

32

33

* 9804
Granite

Country East of Pokegama

Bailey Willis' specimens

9800 Quartzite Sec 13. T 55 R 26

9801 " " "

9802 " " "

all from Pokegama Falls

9803 Dec 34. T 56 R 25

750 W. 750 N. S. E. Cor.

Red Quartzite

9804 Dec 33. T 57 R 23

1980 W. 200 N. S. E. Cor.

Granite

9805 Dec. 28. T 57 R. 23

1600 W. 600 N. S. E. Cor.

Granite

9806 Dec. 36. T 57. R. 23

250 W. 50 N. S. E. Cor.

Quartzite and iron ore.

T. 57

R. 23

25-

26

27

36

35

34

x 9807
Quartzite
x 9806

9807 Dec 36. T 57 R 23
50 W. 250 N. of D. E. corner.
Specular iron ore

9808 Dec 34. T 56 R 25.
750 W. 600 N of D. E. Cor.
Specular iron ore

9809 Dec 33 T 57 R. 23
1980 W. 200 N D. E. Cor.
Granite

9810 Pokegama Falls.
Quartzite



