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Vermilion Iron Range: eastern portion: no. 3. No. 312 Summer of 1898

Bayley, William Shirley, 1861-1943

[s.l.]: [s.n.], Summer of 1898

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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 $2 \times 2\frac{1}{2} \times \frac{3}{4}$ 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.

#312

Vermilion

Iron Range

Eastern Portion

Summer of 1898

W. S. Bayley

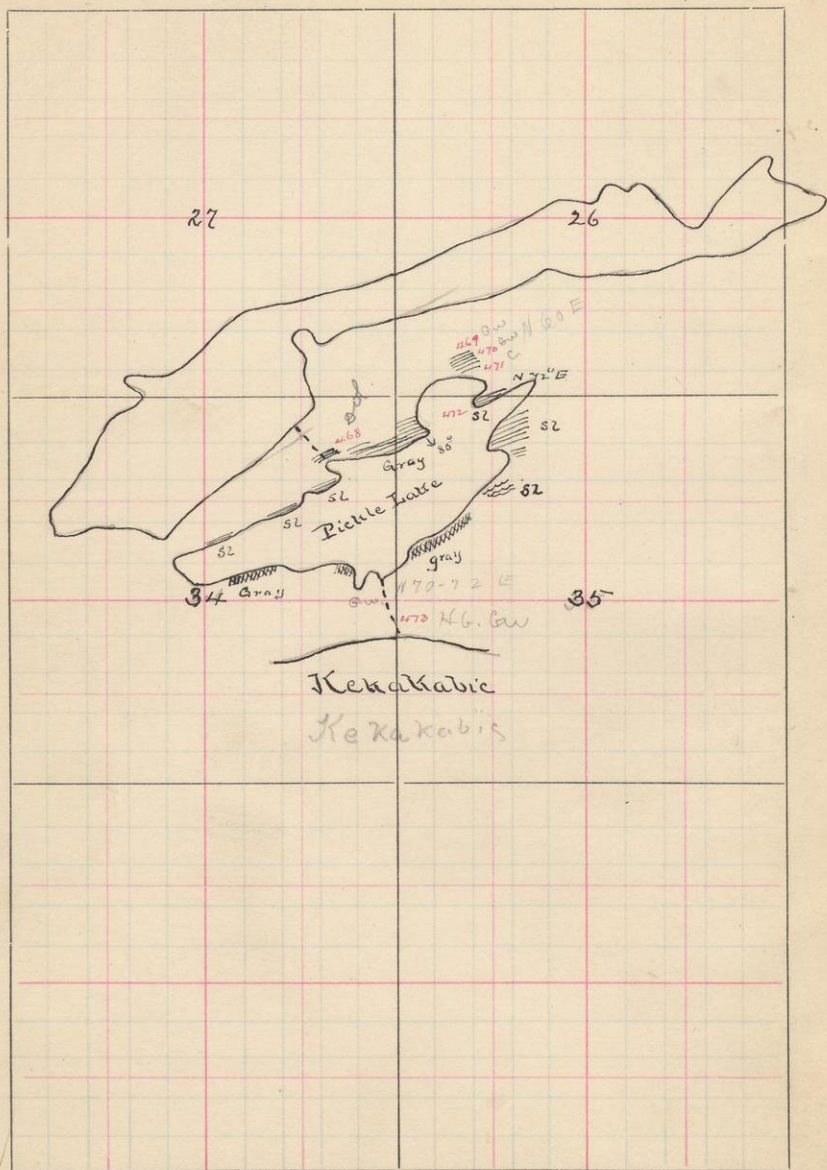
Near J. Weller, carpenterman

No. 3.

S.

T. 65

R. 7



Dol.

28468

Further up in the hill we find a rock weathering like Diabase, but full of garnets? It may be an altered gray wacke.

At the South End of the Passage trail are the usual slates with purple chert bands striking $N. 65^{\circ} E.$ These may be the Extension of the cherts at the S.E. of Pickle Lake.

A little further East the slates in the cliffs along the shore strike $N. 60^{\circ} E.$ and dip about $55^{\circ} S.$ These slates are more distinctly slaty than those to the north, the cleavage dipping vertically, but striking approximately with the bedding.

At the Head of the Little Bay East of Section line the hills to the north are composed of coarse granitic grit and fine grained conglomerates, that get finer as you northward. The rocks are very schistose, with the schistosity striking in the direction of the strike of the beds which is $N. 60^{\circ} E.$ Fine grained gray wacke 125 paces from shore.

NW

28469

See
28470

Coarse grained grit with granitic matrix.

28471

Conglomerate showing red granite pebbles.

56
28472

Some of the conglomerate are slates which in the point East of the bay strike $N. 72^{\circ} E.$ We were at the surface black and white bands cross the ledge as is the case in Knife Lake, but the fresh rock is more like roofing slate than any of the slates seen in Knife Lake.

In the S.E. side of the lake the slate beds are badly crumpled into many small folds, while the more massive graywacke interbedded with the slates possess the normal uniform strike. Tried to get strike and dip of folds but did not altogether succeed. Think strike of axes is parallel to the normal strike of the beds further north and that the pitch is slightly westward - nearly horizontal.

The other rocks around this lake are graywackes.

on the passage trail into Kekakabig
nearly reaching gills cutting. Then
strike when it curved the measures
is N. 70° - 72° E.

Hb. Sw.

28-73

Near Kekakabig the gray wacke
passes into a lamprophyre phase,
which we later learned was iden-
tical with the volcanic ashes of Grant.

Aug 16"

Examined Grant's volcanic
ash, greenstone - schists etc on Ke-
kakabig lake. Found Grant's
map very inferior, and his deter-
mination of rock species very poor.
It was intended to make a rapid
survey of the lake to check his
map, but found it necessary to
make a completely new map.
Good exposures of the ash are to be
seen on the hills crossed by the sec-
tion between Secs 34 and 35, espec-
ially to the east of this line where the
forest has been burned off, leav-
ing hundreds of square feet bare.

of both vermicular and oolitic.

The lites are composed of interlaminated fine and coarse-grained laminae of rocks, often well bedded. The strike is N. 70° E. but the coarse and fine bands interweave in lenticular masses that grade into one another. Even in single beds there is much cross bedding of coarse and fine laminae. The rocks are very much like some of the fine grained greenish conglomerates near Moose Lake. The acid strength to the view that some of these are conglomeratic greenstones.

These ashes or tuffs appear to be members of the slate series since they are not separated from the latter by any observable unconformity, but on the other hand are confirmable in strike and dip with them, and further by the fact that slaty rocks are sometimes found interleaved with the tuffs. The evidence is not strong, but it is supported by other evidence discovered later, and

uniting something to the contrary is
discovered it seems best to regard
the tuffs as contemporaneous with
the slates and gray wackes.

(Hb.) sw. talk
28474

fine grained phase of tuff.

28475

Coarser grained phase of same rock.
On weathered surfaces the coarser
phases are rough and frothy. The
pebbles and boulders, which are
of the same composition as the ma-
trix, stand out boldly above the
general erosion surface.

C
28476

specimen showing weathered sur-
face.

(Hb.) C
28477

The three kinds of pebbles in the
coarsest bed are represented by
28477. Attention is called especial-
ly to the banded one.

C talk
28478

Further west the rock becomes schis-
tose. It is softer and greener than
the tuff represented by the specimens
above described. This is undoubt-
edly Grant's greenstone schist. It
is plainly conglomeratic, with green-
stone pebbles in a green-schist
matrix. Further west as shown is

adm (tuff)

920

28479

a ledge of rock that rings like slate. These two rocks are apparently interbedded with the tuff. For the latter rock again appears west of the slate.

sl?

28480

On the N.E. side of the mouth of the bay in S.E. 1/4 Sec 31 found dense black rock in place where Grant maps porphyry. This rock looks to me like a basalt or a dense gray-wacke. Could not get any relations with other rocks as the ledge soon passes shoreward under verdure or oaks.

tuff

c

28481

Across from this on next little point, where Grant maps fragmentals, is a lumbering rock which in places contains pebbles. It seems to be a tuff. Examined carefully to determine if possible whether the pebble masses were included in the non-pebbly portion or not. Decided that the pebbly rock is a bed in the non-pebbly tuff.

c sc. tuff

28482

The tuff then gets schistose when it presents a very soft, rough, shaggy appearance at the water's edge.

the matrix weathers out much faster than the pebbles and boulders, leaving this projecting as knobs with the dark green chloritic looking matrix.

The entire bay, except as indicated is surrounded by the green-schist agglomerate; being very exposed.

Gr.

28483

The granite on the little point near the center of Sec 3 is a fine grained, purple-pink rock with the features described by Grant. It becomes finer grained at shore side of point.

Gr. P

28484

Granite porphyry - a peripheral form of the granite is shown on the little island N.E. of point. It is a purple rock full of long white and red feldspars. The specimen is from the N.E. side of the island.

1.

C. T. P.

28485

The green schistose agglomerate is again seen, as indicated by Grant, on the north side of the bay, west of the granite point.

All around this bay we see the same rocks, though Grant has mapped here 'gabbro-cutach rocks'. The conglomerates on the South side of the bay are certainly finer grained than those on the North side. At the water's edge, however, they show very clearly the presence in them of large fragments. On the tops of the cliffs they look very much like diabases, but are certainly not 'cutach-rocks'.

C
28486

Specimen greenstone conglomerate from South side of bay.

cf.
28487

Pebbles from this rock further East.

Ran into bay in S.E. corner of lake to search for gabbro cutach. Abandoned search because of rise of the fog, wind storm that threatened to prevent our crossing lake.

cf.
28488

Took two specimens. The rock appeared as green-schist is a conglomerate striking about N. 40° W.

C

28489

cut by gr.

It contains rounded pebbles and is cut by granitic dykes.

Aug 17.

The little island N.E. of large island in northern portion of lake is described by Grant as being composed of a darker rock than the normal granitic which however he is inclined to think it is a phase.

To me the rock appears like a light, that has been impregnated with granitic material. The red granitic forms the northern portion of the island, the darker rock its southern portion. The dark rock is cut by veins, dykes and stringers of the red rock, which divide into finer and finer veins until the whole mass seems saturated with the granitic magma. Whenever the dark rock contains not a few inclusions of green schist.

Int. zone?
S. 91

2849028491

Specimens of impregnated rock

Took another specimen from island east of 28490. It shows the granitic in its typical peripheral form.

Ab. 7m

The rock is porphyritic and it encloses areas of green chlorite. That appears like nodules, is cut by veins of chlorite, and is spotted with large crystals of some biotite or other dark mica sparsely scattered through it. In its most porphyritic facies it resembles a granite porphyry.

28492

At East end of Stacy's island, which is composed principally of graywacke the shore is strewn with large blocks of conglomerate containing pebbles of Jasper and some of greenstone.

The Ke Kakaia's conglomerate is distributed as indicated by Grant. It appears quite different from the conglomerate seen to the west, but is remarkably like the Agishke conglomerate.

28493
28494

fine grained phase.
Four kinds of the most prominent pebbles excluding the jaspers which is abundant.

28495

Specimen containing two pebbles

Examined carefully the cliff on the bay east of the narrows. Climbed all over the side to discover if possible whether the conglomerate grades into the graywacke or whether it is unconformably upon the latter.

Found the pebbles becoming less and less plentiful as pass south until typical graywackes are found. The little lake near the E 1/2 post Sec 36 is in slates according to Grant.

My examination of the country around the lake would indicate that the rock is a graywacke rather than a slate.

Nov
28496

Close search through the ledges N.E. of lake discovered in them here and there Jasper pebbles and an occasional bed of conglomerate. Think the conglomerate unquestionably grades into these graywackes. The relations of the graywackes to the slates of rock could not be determined. Of course it is possible that the conglomerate is at the base of the Animikee and that

The slates and gray wackes are higher portions of this series. But these same gray wackes are so like those of the Knife Lake series that are of the opinion that they are members of this series with the Conglomerate at the base.

The Knife Lake series would then appear younger than the green schist series, since there is no possibility, so far as known, for the gabbro pebbles to have come from any set of rocks but these.

The strike of the schistosity of the gray wackes south of the Conglomerates is N. 25° W. and this I believe is also the strike of the bedding. The dip is 60° - 70° .

The shore beyond the bay is composed of Hornblende granite - a basic phase of the Angite granite to the west.

Hb. Dr.

28497

Specimen from near the line Sec 31.

Like the Angite granite, the Hornblende

phase appears to be filled with chlorite nodules derived by accumulation from some basic component, or perhaps from some inclusion.

C
28498

The north shore of the lake in the west portion of Sec 31 consists of a greenstone-schist - probably greenstone tuff, striking $N. 65^{\circ} E$ (dip vertical), slates and graywackes. The ledges occur indiscriminately, almost alternating, a fact that indicates interbedding. We could have nowhere seen sharp contacts between slates and graywackes on the one hand and the greenstone tuff on the other.

Feb. 10.

28499

Here and there along this shore good exposures of porphyry are found. Near the range line is one that was studied very closely. The porphyry can be seen intruding in the schist, which here as elsewhere is conglomeratic.

Aug 18.

Ran South from S.E. bay of Kekaha-
big to gabbro, then East and North
to N.E. cor Sec 11, then S. and E.
to point 400 E of West line of Sec 12
and North base.

The first 150 paces from lake shore
was over granite and the next
150 over greenstone-schist or con-
glomerate. South of the schist is a
dike and South of this low ledge
of a banded rock striking E and W
and dipping $70-75^{\circ}$ N. This rock I
think is a gabbro-contact rock, i.e.
a graywacke that has been meta-
morphosed in contact with the gabbro.
Specimen banded gabbro-contact-
rock from 700 S. and 1370 W of N.E.
Cor. Sec 11. T. 64 N. R. 7.

At 500 S. found the fine grained
silicified gabbro, and beyond this
to the South ledges of the normal gab-
bro.

Followed course indicated by dotted
red line, keeping as nearly as pos-
sible in the contact rock.

At 500 S. 750 W. of N.E. cor. Sec 11

In contact

29400

unconformity

29830

~~29400~~

29401

29401

find again the banded gabbro contact rock, striking N. 60° E and dipping 75° S. E. The rock looks like the greenstone-schists saturated with gabbro material.

Specimens are chips.

Contact
Sec?

29402

unmarked

At 500 S. of N.W. cor Sec 12 is a ledge of fine grained gabbro that is devoid of all appearance of banding, but a little East of this point is another ledge with distinct bands striking 10° S of E. and at 600 S. 400 E of corner are other ledges of similar rocks. Here the banding is not as definite as it is in the banded gabbro further west. It is more gneissic, with alternations of fine and coarse grains. Specimen of coarser band, 500 S. 400 E of N.W. cor Sec 12.

Contact
Sec

29403

unmarked

The strike varies from N. 50° E to N. 70° E. Dip nearly vertical.

The country in Sect. 1 is covered with a scrubby growth, underlain by granite, with here and there a ledge of granite & porphyry like the porphyry found in the shales and

S.

T.

R.

location of plate with respect to shore is cor-
rect. All the country between the
South line of Decr and a point 400
or 450 S. of shore is underlain by
granite?

the islands of the lake.

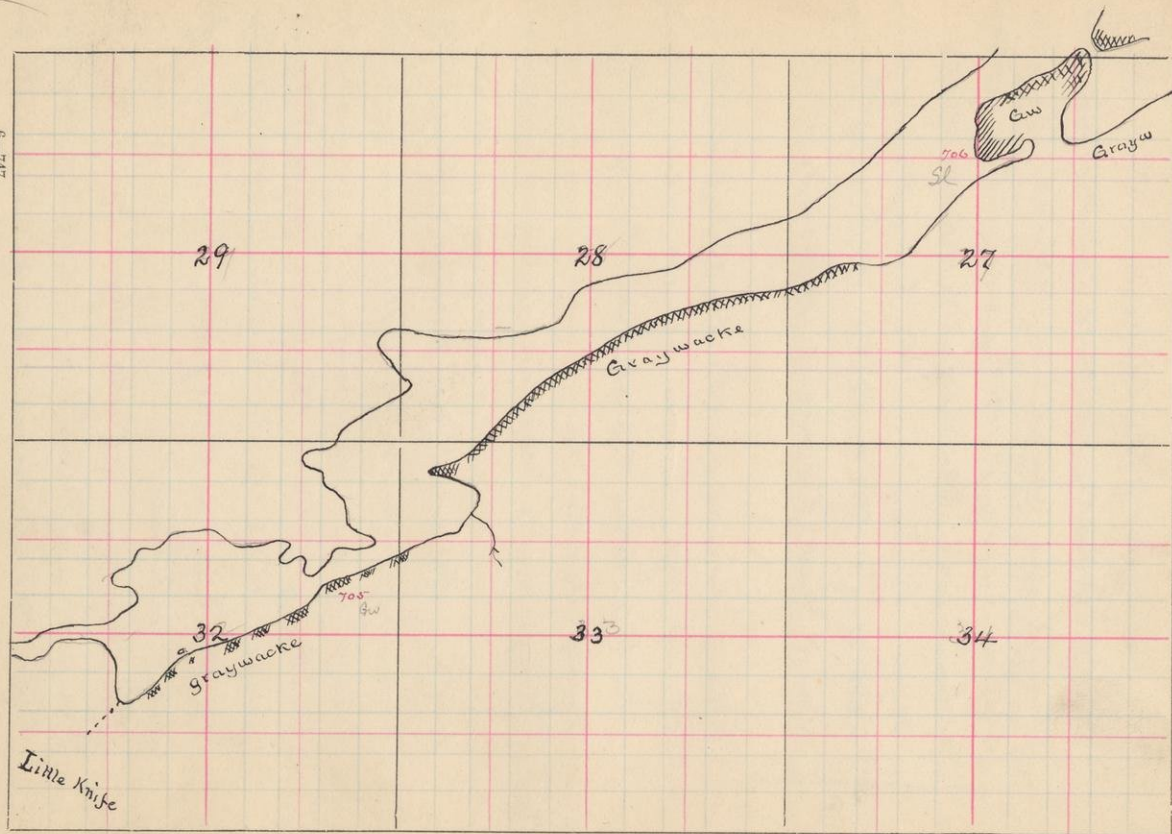
The porphyry is not in dykes, but comprises areas in which the granite is more porphyritic than elsewhere. On the side of some of the cliffs traversed the porphyry was actually discovered grading downward into typical granite?

When reached the lake climbed the conglomerate bluffs and found the top beds composed largely of graywacke.

29704 Graywacke matrix of conglomerate?

4. B. - It will be noticed that Grant has indicated the presence of a greenish band running E-W and extending across the East line of Sec 11 just S. of the N.E. cor. We examined this area carefully but could find any granite?

The position of lake shore as found by us and as indicated on plat is different. Prob. plat more nearly right. If so Sec 1 is possibly short. At any rate the



Aug 19.

Made rapid run north through
Oates Track to Swamp Lake and
into Tasaganaga to see whether or
not it would be necessary to examine
country in detail. Only a few speci-
mens were taken.

The rocks on the South shore of Oates
Track are slates and graywackes
belonging to the Knife Lake series.
Just east of postage into Oates Track
the slates are fine grained black
rocks, which being without cleavage
may be more properly be classed
as fine grained graywackes.

See (Table)

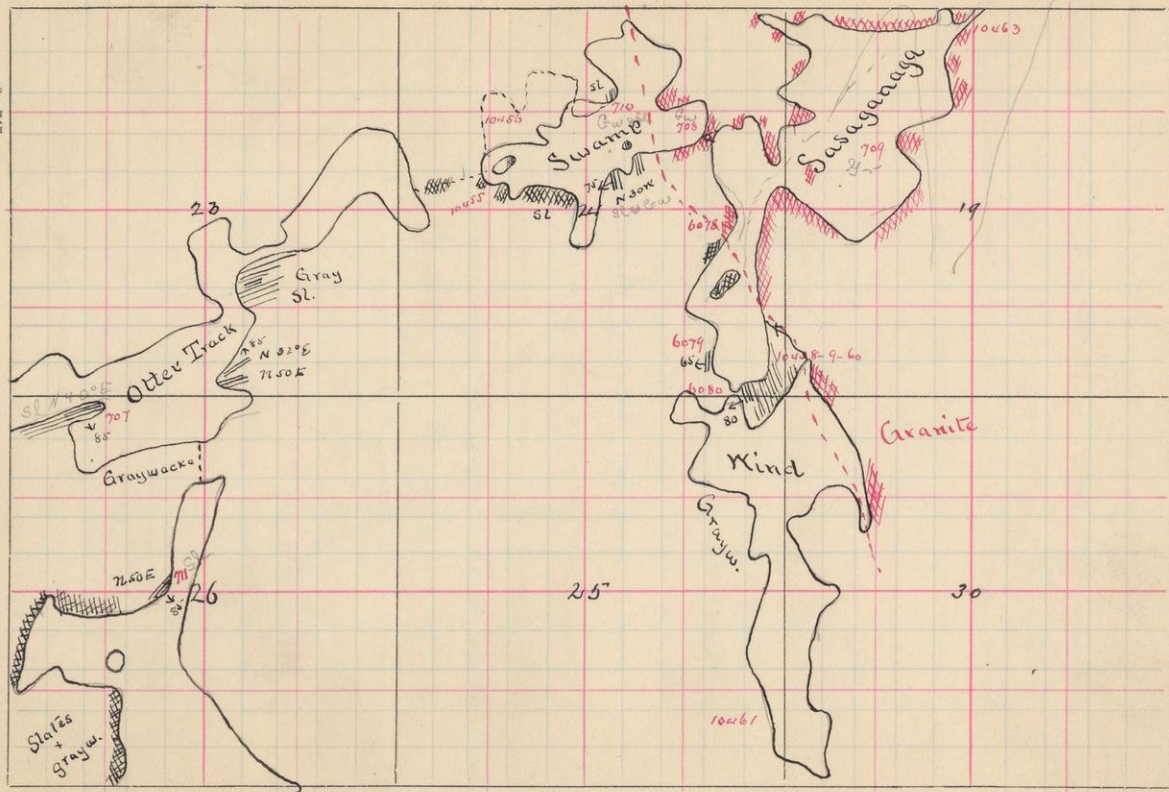
29405

Fine grained graywacke, just west
of meander cr. Secs 32 and 33.

All the way east along the South shore
of the lake the same rocks occur. No
bedding was observed in Eastern
half of lake, but jointing is well devel-
oped. The principal joints run more or
less parallel to the long axis of the lake.

Sl 29406

At the point near N. 1/4 post Sec 27,
the rock is as massive as elsewhere,
but here and there it contains Olis-
tine bands some of which are lighter



S.

T. 64

R. 6, 5

colored than the mass of the rock.
If these bands represent bedding,
as is probably, the strike is N.E.
The rock is cut by quartz veins and
is broken by joints?

sl
29707

Around the point, further East the
gray wacke is seen. The strike here
is N. 40° E and dip about 85° S.

From this point East the lake is sur-
rounded by gray wacke, which at several
places exhibits strikes and dips. The
predominant strike appears to be
parallel to the lake's long axis.

At the East end of Swamp or Oak Lake
we find the same rocks. They have
been specimens of Westman (10455,
10456) so did not take specimens.

Near the center of Sec 24 the slates
and gray wackes strike N. 30° W. and
dip 45°-50° W. The banding is finely
developed. There can be no doubt
that it represents bedding.

The ledges around the Eastern neck
bay of the lake are of a white, or pink,
fine grained rock speckled with
quartz grains. It is either a granite or

2.E. a fine grained crushed granite?
 or a recrystallized granite? In the
 former case it is a member of the
 graywacke - conglomerate series - ~~is~~
 the other case a portion of the Sasaga-
 ganaga granite? Cannot draw
 line between this 'granite' and
 the undoubted granite. The line
 on the map is drawn on the assump-
 tion that the rock is part of the gran-
 ite. The undoubted granite is a few
 hundred paces further East.

Granite or granite? grit. from west
 side of Portage trail from Swamp
 Lake into Sasaganaga.

Went over into Sasaganaga and
 examined carefully the shores of the
 Eastern Bay, searching for the slate
 formation represented by the mica
 touching its northern side. Could
 find nothing but the coarse, pink,
 Sasaganaga granite? filled with
 round eyes of quartz. Its features
 are well described by Grant in his
 article on 'Granite Areas'. On the western
 side of the Bay the granite is very

29

29408

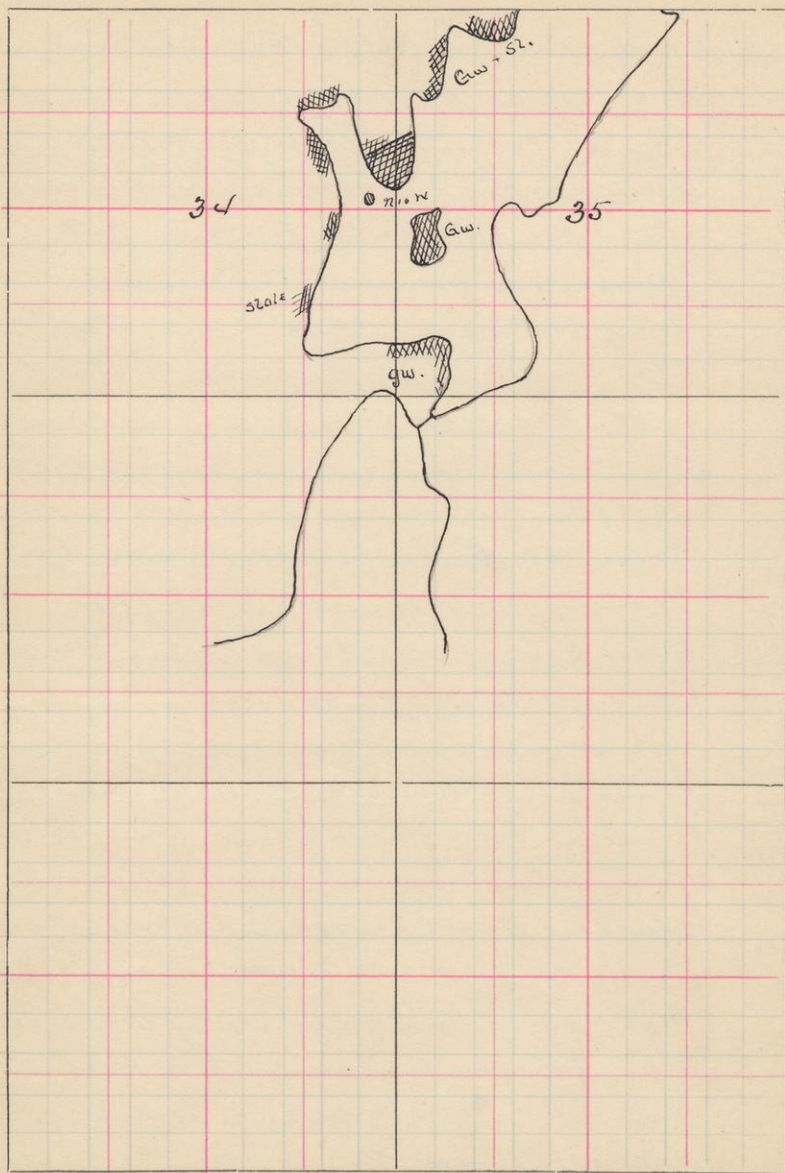
also:
recrystallized

Photomicrograph

S.

T. ⁶⁶64

R. 6



W.

29709

platy with a distinct strike a little
W of N and a high dip, the granite
on the East side is massive.

Specimen of massive, typical granite,
from near Center N.W. Sec 19.

Returning through Swamp Lake
glueed with Shere, finding
granite on East side of N.E. Bay
and slates, graywackes on west
side.

W. & Sh.

29710

Chips of light colored graywacke
from East side of Northern Bay, at
point reaching out into lake.

On return from field at end of
Season examined this East Bay
of Tasaganaga again and went
into lake point, where found limits
of granite as indicated on map. The
strike of the graywacke is approximate-
ly parallel to the boundary of the gran-
ite and dips away from it.

Aug 20

From camp in Otter Track went across
 Porage Trail to Lake where Northern
 and is in center. Dec 26 and coarse
 sand west side of this lake

29411

At first point, near center of Dec 26,
 took specimen graywacke cut by
 veins of quartz and epidote. Strike
 N. 50° E.

The rocks south of this are graywackes
 and slates with the latter predomin-
 ating. The ledges are cut by joints
 along which the rock weathers produc-
 ing high perpendicular cliffs like
 those in Otter Track

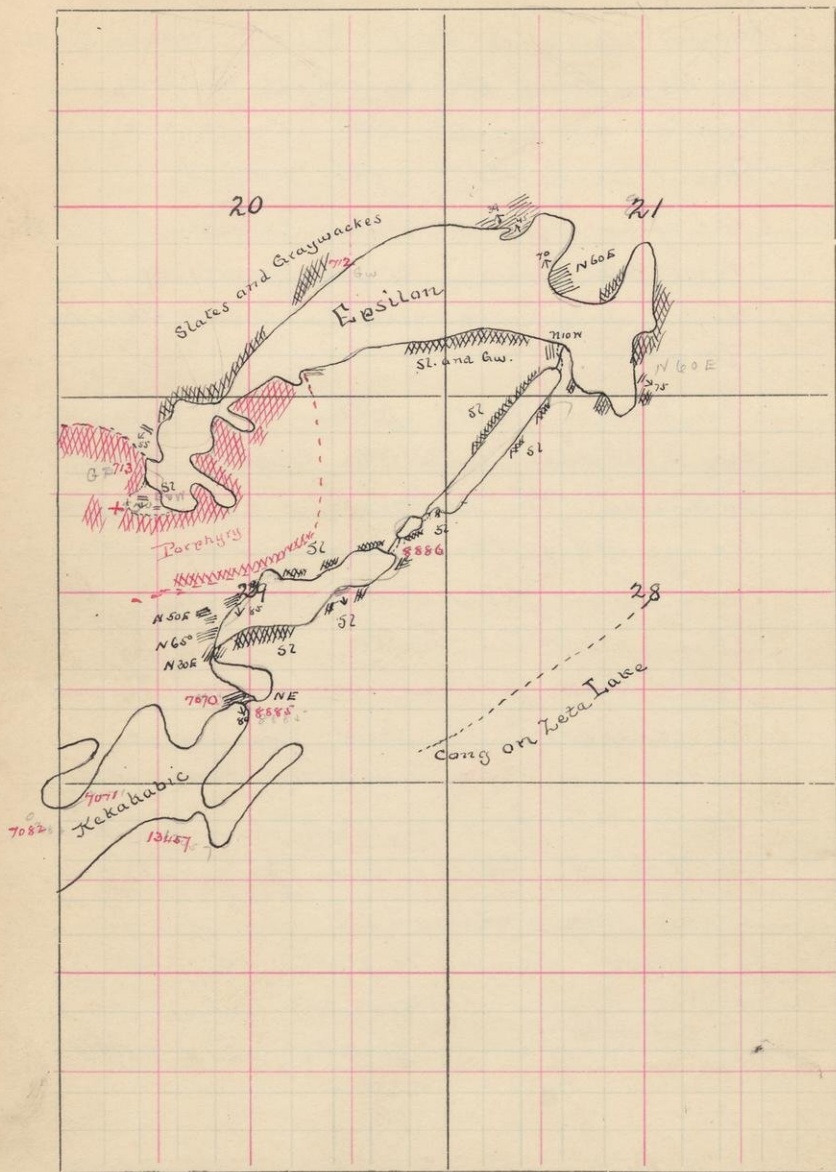
At a few places my curved bedding
 is detected. The best example is in
 little island in Dec 35. There the
 strike is N. 10° W, but this undoubt-
 edly is local. Three sets of joint cracks
 cross the island:

- 1" with strike N. 25° E. Dip 30° N. W.
- 2" " " " N. 10° W, along bedding
- 3" Dip 85° E. " " N. 60° E. Dip 85° S. E.

S.

T. 65

R. 6



Aug 21.

Sunday. Rested

Aug 22.

Visited Alpha, Beta, gamma, Delta and Epsilon lakes between Knife and the East end of Kekakabis, all in the slates and graywackes.

29712

The ridge on the N.W. side of Epsilon lake consists of schistose graywacke in which are great quantities of granitic detritus. It breaks up, when fractured, into schistose blocks.

Graywackes of various kinds make the shore all the way to the west end of the lake, where a dark igneous rock, the Humboldt porphyry, replaces it.

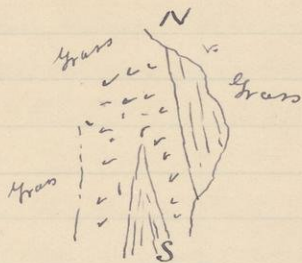
Climbed the hill to examine the porphyry and learn its relations to the graywackes.

29713

The rock is massive. It consists of a fine grained matrix and phenocrysts of hornblende & feldspar. On its edge it can be seen the intruding in the graywackes.

At the + marked on map the

relations as is indicated in sketch



There is no question but that the porphyritic form is intruding in the slate and gray wackes.

The slates and the porphyry remain almost unaltered at the contact. For an inch from the actual contact the slate appears to have been hardened. In attempting to get specimens Lammes broke so was compelled to come away without me.

Between the edge of the porphyry and the lake shore the strike of the sedimentaries is about E-W and dip 65° S.

On the north side of the porphyry are some gentle folds with axes pitching 55°-60° S.W. The strike of the northern limb of these folds is E. 10° S. and that of southern limb E. 30° S.

The limits of the porphyry in the lake are indicated in map. It is evident that there are numerous gentle folds in the sedimentary series by the variation in strike observed.

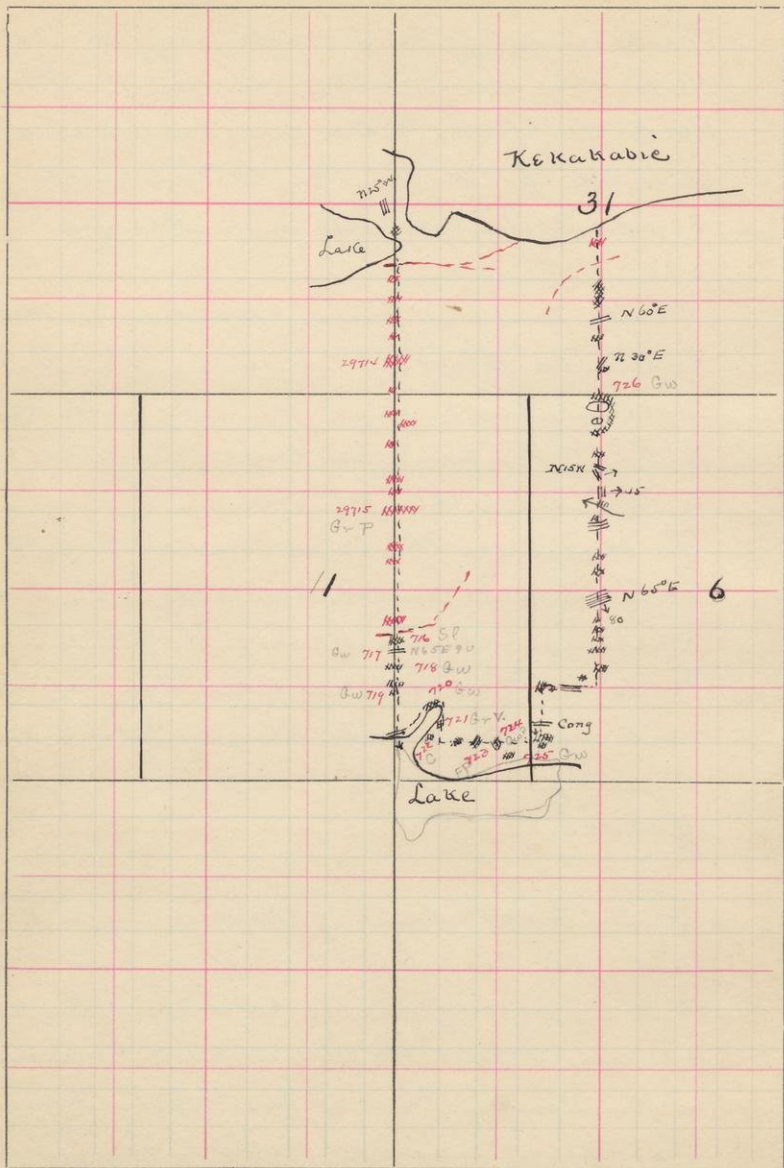
On the postage from Epsilon in Delta Lake the strike is $N. 10^{\circ} W.$, at the S.E. corner of lake it is $N. 60^{\circ} E.$, with dip $75^{\circ} S.E.$ and on N.W. side of lake it is $N. 60^{\circ} E.$ with dip $70^{\circ} N.W.$

The slates in the little lakes South of Epsilon are much contorted, the prevailing strikes being $N. 10^{\circ} E.$ and $N. 70^{\circ} E.$ The dips are always nearly vertical. The series here is plainly squeezed, closely compressed and folded.

On the north side of Epsilon lake first East of Sec. line Alex Winchester has described an unconformity - between two series of slates. Found the place and examined it carefully. There is no unconformity. The phenomenon is simply one of interbedding of slates and gray wackes.

T. 64. 65

R. 76



Aug 23

Made a run south from Lake Ke-
Kakabig on west line of Sec 31 to Little
Lake on S. line Sec 6 then East $\frac{1}{4}$
mile and North.

on run south found graywacke near
W. $\frac{1}{4}$ Sec 31, then at 400 S. of this point
ran into the argill^d granite? kept
in this a mile. The granite forms a
high hill on whose sides large num-
bers of ledges are exposed.

In

29714

At 900 S of W. $\frac{1}{4}$ Sec 31 took a speci-
men. This is a light colored granite?
from lots of hill. This particular varie-
ty is more common here than the
pink variety - observed on the island
in the lake; but ledges of the pink
variety are not uncommon.

In P

29715

At 612 S. of N. line Sec 1. is the north
side of Little Lake, where we find ledges
of granite? porphyry.

Sl

29716

At 1300 S of the line we pass from
granite? into banded rocks look-
ing somewhat like the banded gab-
bro, and yet like the graywacke.

X. H.

29717

At 1350 S. a strike of N. 65° E. and a
vertical dip were obtained. Here the

rock is cut by veins of granite?

As pass further south the ledges
 approach ^{more nearly} the appearance the banded
 gabbro - or gabbro - contact rock, but
 was not sure that this was their
 character, so took quite a few speci-
 mens.

no

29718

no

29719

West side

1400 S. U. line Sect. May be quartzites

1500 S. Coarse pink phase
 of graywacke?!

no

29720

Pink fine grained phase from U.W. side
 of U.E. arm flat. The exposures here
 are magnificent and yet could not
 determine character of rock. Think it
 unquestionably sedimentary, but whether
 it has been affected by gabbro or not can-
 not tell.

no

29721

Granite? vein cutting rock like 29720

c

29722

In the East shore of the U.E. arm of lake,
 a little back from water line are
 fairly large ledges of a rock which
 on close inspection is found to be full
 of pebbles. These are however quite ob-
 scure, but among them were recog-
 nized pebbles of red granite

This conglomerate is cut by granite veins, it extends eastward 200 or 300 paces, and is apparently interbedded with graywackes at 1720 S. and about 75 W of U.E. Cr Sect. is a small ledge of porphyry in the midst of graywacke ledges.

F.P.

29723

hw?

29724

This specimen represents the rock associated with the porphyry. Common to the field wherever it is a sedimentary rock or a fine grained phase of 29723. It differs in that many of the other Douboufue rocks collected today are igneous.

On our march passed over graywackes to within 200 or 225 paces of Lake Shing. These constitute the great hills south of the lake.

hw

29725

1900 S. of U.E. Cr Sect. This rock is very similar to 29720. It forms a cliff 50 ft. high facing south.

hw

29726

Graywacke from S. 1/2 post Sec 31. Representative of all the rock passed over on our march.

At 400 N. of this 1/2 post is the bottom of the high, rough graywacke hill south of Keka Kabis. Between the

base of this hill and the shore of the lake is a small rise in which granite occurs.

The strikes and dips of the graywacke ledges vary quite a great deal. They are indicated in the map.

on

Aug 24.

Stratified Carefully Zeta and Zeta
lakes.

The large N.W. bay of Zeta lake is
surrounded by graywackes striking
N.E. and dipping vertically.

On the little point at about center of
N.E. $\frac{1}{4}$ Sec 28 the graywackes give
place to coarser rock which we shall

see
29727?

call grits? These contain large grains
of white-quartz in a matrix that is
plainly granitic in composition.

A little to the East of this the grit is found
to enclose an occasional border of
red granite, and the beds are speckled
with red areas, that are supposed to
be little masses of recrystallized gran-
ite?

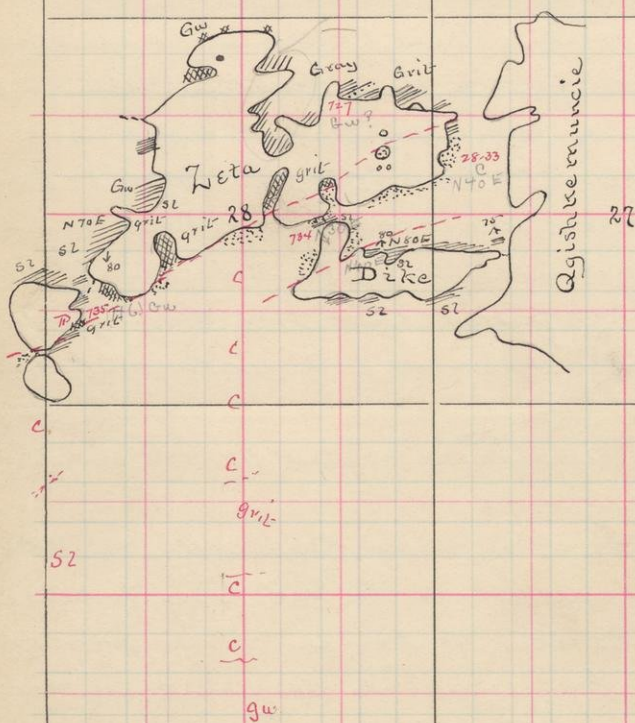
Grits continuing around north and East
sides of lake.

On the S.E. side, however, at about
the place where the Sec. line between
Secs 27 and 28 crosses is a promon-
tory of conglomerate denuding an
strange of the Kakakabig Conglomerate.
The conglomerate has a gritty matrix.
Its pebbles measure 3 or 4 inches in

S.

T. 65

R. 6



Diameters, and are very distinct.
 Granite pebbles predominate, but
 jasper pebbles are also common
 as are also acid porphyries. Among
 the granite pebbles are many of the
 Sasaganaga granite. Think the
 strike of the rock is about $N. 40^{\circ} E.$
 Pebbles from Conglomerate.

- 29728^{1/2} Sasaganaga granite
 29729 Other granites
 29730 Predominant granite
 29731 Porphyries
 29732 Jasper
 29733 Green schist.

The same conglomerate is found forming
 the shores of bays and re-entrants
 in the South shore of Jeta lake, the
 grit forming the salients.

Evidently the conglomerate and grit
 are members of the same series.

On the postage trail into Lake Lake
 are scales and grits striking about
 $N. 30^{\circ} E.$ and dipping S.E. At one
 place there is a 2 in band of what
 looks like jasper in the weathered
 surface, but which in the fresh frac-

sl
 29734

ture looks more like a chert or quartz band.

As pass along shore of Lake back to the N.E. find conglomerates, then slates with a general strike $N. 60^{\circ} E.$ These slates are folded in sharp, short anticlines and synclines with axes pitching almost perpendicularly. Further East the strike is $N. 80^{\circ} E.$ and the dip $80^{\circ} N.$

Aug 25.

Rain.

Cut portage trail from Jeta Lake into little lake near O.W. Cr Dec 27 and went into this lake.

On the portage trail are gray wackes striking N.E. and dipping nearly vertically.

At about the middle of the East side of the little lake is a rock ledge that looks very much like porphyry, but on south side of lake the same rock is banded like gneiss. It contains large quartz grains that are evidently frog-metals.

(H6) gws
29735
Voldash?

on postage between this lake and the little one south are conglomerates striking N.E. This conglomerate is full of granite pebbles, but it contains no others so far as can determine, except, of course, the much present porphyry pebbles.

C

29736

Specimen conglomerate

The absence of gneiss pebbles from this conglomerate may indicate that it is older than the Kekakabig and Ogishka conglomerates. Think however that it is continuous with these two conglomerates uniting them. We have traced this conglomerate between half a mile of Kekakabig but have not yet traced it into Kekakabig conglomerate.

A little more work should be done between this lake and the East End of Kekakabig lake.

Aug 27

Rain

Aug 28

Moved to Ogishole Marquette

In afternoon made an examination of conglomerate on little island in N.W. 1/4 Sec 26 and in cliffs to the north.

The Conglomerate as seen in the little island in the N.W. of the N.W. 1/4 Sec 26 strikes N. 65° E. and dips nearly vertically. It contains great numbers of boulders of the Osagean granite, other granites, green schists and black cherts like those interbedded with the Knipps slates. It would seem an improbable supposition to regard the slates and gneisses south of the conglomerate as younger than this bed (i.e. as higher members of the same series) and the Knipps slates to the north as older (upper members of a lower series) because all strike and dip conformably. If there is any distinction to make between these rocks it would seem most natural to

place the Conglomerates with the Knife
slates and the sedimentaries to the
South with an overlying series. There
is some evidence for this view as we
shall see later.

Cannot get account for the black chert
pebbles in the conglomerate, provided
they are portions of the Knife Lake series.
It is peculiar that the green-schists are
older than the conglomerates in spite
of the conformity in strike and dip in
both. The strike of the green-schists,
however, is the strike of their schis-
tosity, which naturally should be par-
allel to the strike of the beds of the sedimen-
tary rocks contiguous to them, since
in all probability this schistosity was
produced at the same time that the
sediments were compressed.

The evidence for declassing the green-
schists older than the Knife slates is:

- 1" Presence of pebbles in conglomerates
- 2" Intrusion of Sasaganaga granite
in schists, and presence of pebbles
of same rock in conglomerate.

The question as to whether the scales and conglomerates are Archaean or not cannot yet be answered.

Ran north over hills in Dec 20 for about $3\frac{1}{4}$ mile, expecting to cross the conglomerate belt. The rock is intersected with fine grained bands striking N. 60° - 75° E. To the north it appears that the Jasper pebbles become more abundant than they are at the shore.

29737 represents fine grained bands

The predominant pebbles in the conglomerate of the hills are: greenstone schists and Sasagawaga granite, the latter approaching as pass northward.

29738 Black chert pebbles from conglomerate

29739 Coarse greenstone (4 pieces)

29740 Quartz or quartzite

29741 White weathering felsite or chert.

29742

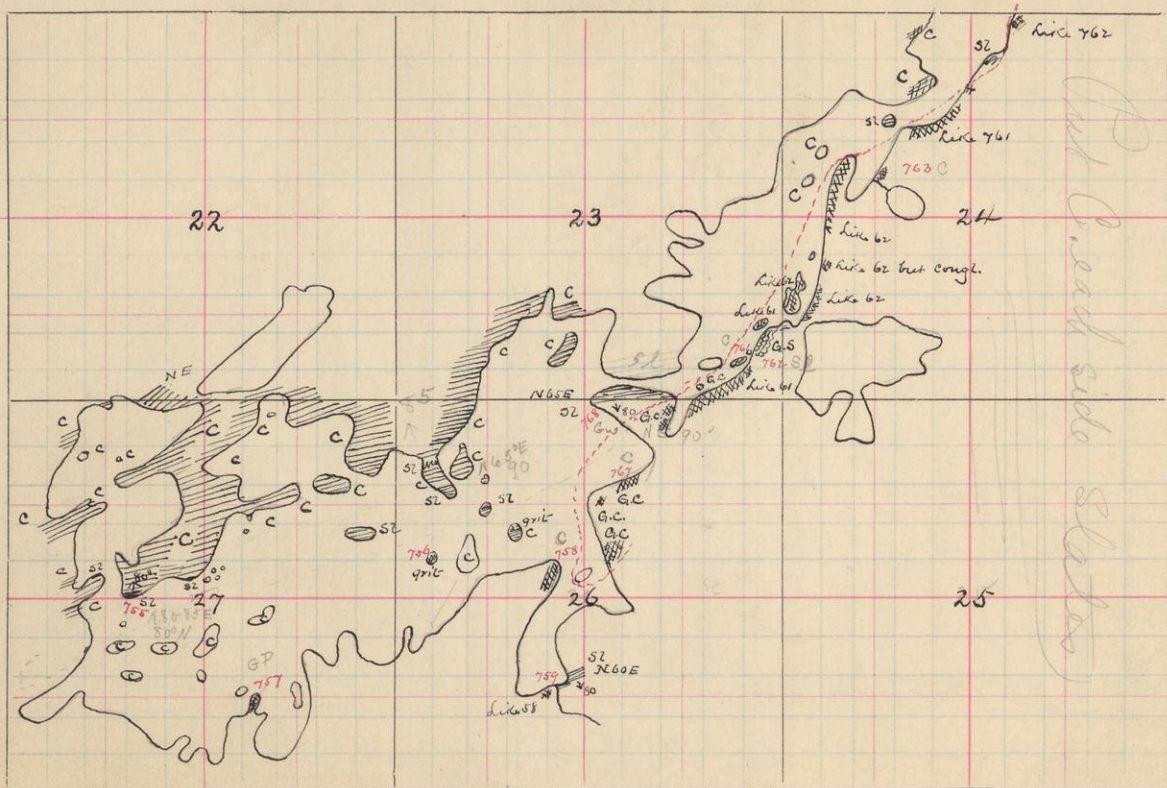
after 29768. p. 41

S.

T. 65

R. 6

Red Lead side Slopes



Aug 30

Visited shores of Ogishke Muncie lake paddling west along north shore to west end lake, then east from center of south shore to east end lake.

Found the north shore bordered by the conglomerate except at one or two points where slates are found.

On the point in N.W. of N.W. Sec 26. Slates form the extremity. They occur south of the conglomerate. The contact of the two rocks, as seen in the hill forming back bone of point, is a conformable contact of two interbedded sediments. Their strike is $N. 60^{\circ} E$ and dip $85^{\circ} N$. The slate near the contact contains narrow bands of recrystallized granite. These decrease in number as contact is departed from.

sl

29455

The slate again appears with a strike $N. 80^{\circ} - 85^{\circ} E$ and dip about $80^{\circ} N$. Skirting shore at East Entrance of N.W. Bay. Again the contact with the conglomerate is seen. It possesses the same features as those described above. In the slate near the water's

edges are bands of harder and softer material. The softer bands are cleaved parallel to bedding, while the harder ones are cross-jointed like a cooled dyke.



The islands at west end of lake are all conglomerate except those marked otherwise in map.

SW
29756 The little one nearest the W. 1/4 10th Sec 26 is a grit or green graywacke.

G.P.
29757 On a point somewhere near that marked 757 in map is a high knob of green-rock that looks bedded, but which in fresh fracture looks as though it contained phenocrysts. Dr Clements worked this shore so did not study more carefully.

~~fracture~~
29758 Point west of river bay, southern portion Sec 26. May be graywacke or greenstone. Cannot determine as did not realize the importance of doing so until had remapped this area later. Then high wind prevented

pebbles
chiefly quartzite

52
29759

At the East Side of mouth of stream
are ledges of black slate striking
N. 60° E and dipping 50° S.

Suppose this slate belongs with the
Lake Series. Area traversed by Leitch.

From this point East examined
shores very carefully, as it seems
we have along them members of
the green-schist series. No contacts
of the rocks with the conglomerates
were found, but found among the
greenstones themselves a large
quantity of greenstone-conglomer-
ate.

On west side of little bay 500 ^E of
N. 1/4. post Sec 26, for instance, is a
conglomerate that looks very dif-
ferent from the conglomerate of the
North shore. It strikes N. E. and is
vertical. Its matrix is green-schist,
and it contains a few pebbles of
granite and greenstone.

This greenstone conglomerate contin-
ues East for some distance.

C
29760

29461

The little island near the shore in the S.E. 1/4 Sec 23 is a gneiss, rough, green-schist, or possibly a graywacke. It varies from other graywackes in the north in being more schistose. Am inclined to regard it as a green-schist in the shore opposite the island is

29462

also a schistose rock. This weathers yellow, is very much decomposed. It looks as though it were a very schistose form of 29461. Am persuaded that both rocks are tuffs.

29463

Conglomerate from near mouth of stream near Center Sec 24. This conglomerate looks more like greenish conglomerate than like quartzite.

Rocks like 29461 and 29462 continue north and east to N. line Sec 25 being replaced here and there by black slates.

29464

Green-schist, from shore about 200 paces N. of meander cr. in S. line Sec 13.

29465

About 200 paces north of this black slate occurs near water's edge

The slate appears to be heavily bedded, with a strike N. 65° W. Am not sure that this is a true strike, since the apparent bedding may be due to parting along shearing planes.

C

cyl.

29466

Another ledge of greenstone, this time of a different type is found on South side of bay from which postage trail to Town Line Lake runs.

C

29467

Greenstone tuff and conglomerate on S. side of bay in N.E. 1/4 Sec 26. It contains pebbles of a fine grained porphyry, but of no other kind. They are not unlike the pebbles in the conglomerate between Moose and Pine Lakes.

At the point near N.W. 1/4 post Sec 26 are black slates interbedded with gray wackes. The schistosity and bedding strike N. 65° E and dip 80°-85° S.

NW

29468

Graywacke from this place.

29469

after 29454

Aug 29

Ran south from NW cor Sec 33 in
half mile block, then East 500 paces,
South a mile, then East 200 and
North block.

The entire run except extreme south-
ern portion was over grits, scales and
conglomerates.

NW
29442

At the NW cor of Sec 33 find grit with
occasional pebbles of granite forming
South shore of little lake

South of this are conglomerates striking
N. 25° E and South of these grits and
scales.

NW
29443

White grit from 500 S. of NW cor Sec 33.
Strike? N. 10°-15° E.

NW
29444

Green gray wacke from 400 S. same
corner. In places the rock looks
amygdaloidal, because of weathering
of little holes, and is solution of channels
marces.

NW
29445

Granite grit. 900 S of same corner

At 45 E of W 1/4 post Sec 33 the bed-
ded rocks strike N. 20° W and dip 80° N.E.

At 1250 S. 400 E of NW cor Sec 33

the scales are striking N.E. with small

face or pitching N.W.

Other strikes are indicated on the map.

29746

Just north place - at 1400 S. 750 E of
New Car Sec 33. is a great ledge of rock
that looks very much like a porphyry
or felsite? It is probably a dense quartz-
itic graywacke.

sl

29747

met. by S.

Purple graywacke 200 S. 200 W of S
1st part Sec 33. Its schistosity & strikes
N. 70° E. The bedding is apparently E.W.
and dip 45° N.

mountain
S. 49

29748

At 200 S of the S. line Sec 33 begins the
ascent of a high hill of dense slates
that resemble those of Kniff lake.
It is represented by Specimen 29748.
The rock is massing, only occasional
evidences of bedding being seen in
it. Here and there, where the slates are
contorted sharp fragments of chert
are imbedded in it. These are pro-
duced by the fracturing of chert bed.
Basis sampling in contact with slates
at 860 S. of line.

S. 51

29749

From this point south for 400 paces
the top of the hill is composed of well
exposed ledges of the black massing

R. 6



cupling. This rock appears with smooth surfaces sloping northward and steep cliffs facing south. It looks very much like flows of basaltic lava in a series dipping north. It is however not a series of flows since there are no interbedded fragments at bases of the cliffs.

From study of the contact of the igneous rock with the gneiss on top of the hill it seems that the latter are hardened, silicified or otherwise altered at their immediate contact. The basaltic rock unquestionably intrudes them.

From survey of country from tops of hill it would appear that the basaltic rock constitutes the Twin Peaks and the highest portions of the range of hills south of Ogishke. These hills lie in an almost straight E-W. line. Hence it may be that the intruding is a great dyke.

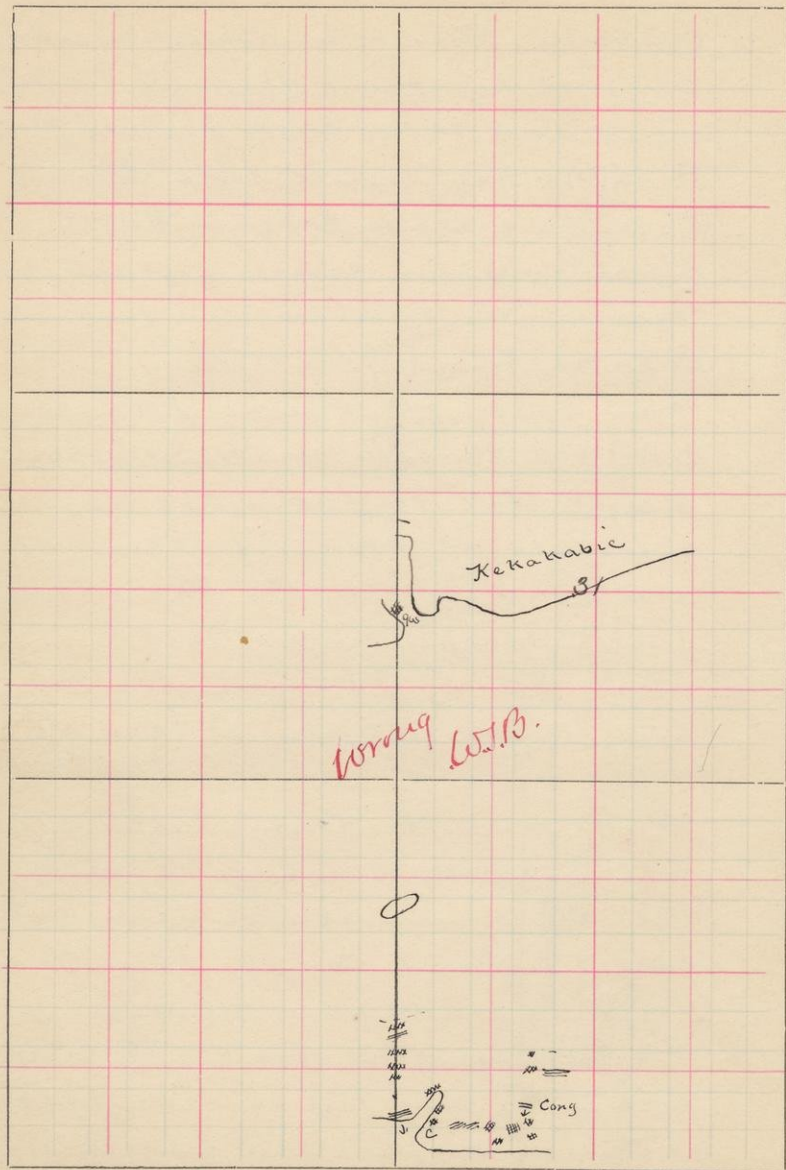
The intruding at 1000 ft of the line of declivity is very much like gabbro. It is coarse grained and lustre revealed like the gabbro near its periphery.

Det. p. 21
29750

S.

T.

R.



G. St
29751

As pass south, however, a dense
 honey black crumpling appears. This
 is well exposed at 1200 S of Ling.

When made run thought was in the
 gabbro because of character of 29750
 To the south could see gabbro in low
 lying ledges.

Leitch however reported scales south
 of basic rock in his run two miles
 east, so perhaps another search for
 gabbro should be made here.

G. St
 29752

Another specimen of interesting fine
 top of this ~~rock~~

G. St
 29753

Scale, 200 S. of 1st post Dec 30.

Bot.

29754

Ridge of dark rock just north of same
 1st post. May be a graywacke.

The conglomerates in this run north
 form a much wider belt than the
 same rocks in run south, i.e. half
 a mile west.

It is noticed that those in the southern
 portion of the belt are more schistose
 than those in the northern portion,
 and that they contain less Jasper

29755

after No. 29751.

Sept 1.

Made a careful examination of the W. $\frac{1}{2}$ of U.E. $\frac{1}{4}$ Sec 26. in Ogishke Lake as suspect unconformity here between slates and greenstones.

Ran 100 W. on N. line Sec 26, then S. 700 paces over greenstone conglomerates, tuffs and graywackes that appear to be interbedded.

C
29769

Greenstone tuff. 650 W. 300 S. of U.E. Cor Sec 26.

Cyl.
29770

Tril. 650 W. 600 S. of U.E. Cor Sec 26.

At 650 S. found black slates striking N.W. and dipping 75° S.W. This slate appears to be interbedded with the graywacke which in turn is interbedded with the greenstone.

Followed slate N.W. on strike until it runs into valley. In bottom of valley found small ledge of same rock striking N. 30 W. and a little further west a white rock of unknown character. This is on the lower side of the conglomerate's greenstone hill that

Sed.
Cobbles
sl29771

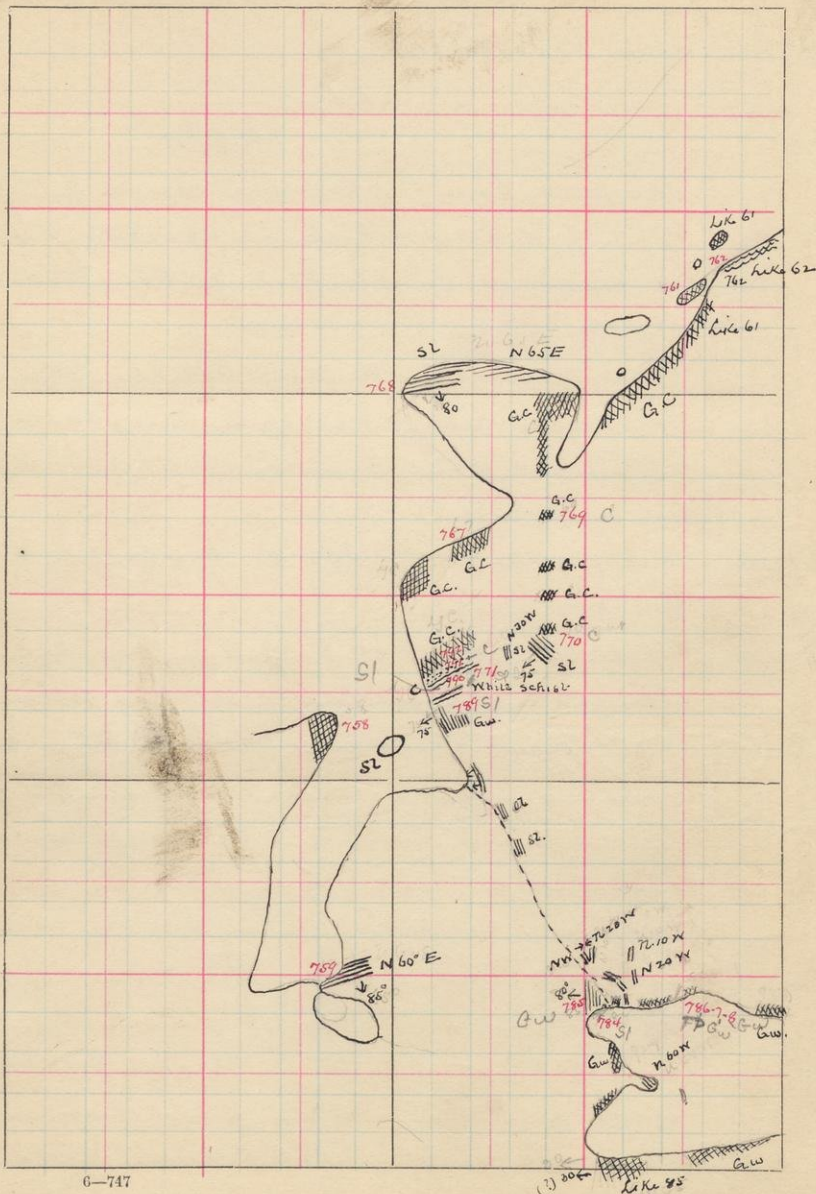
Confirmation

S. 26

T. 65

R. 6

297



G-747

29

C
29772

after 29792

miss O.W. Blake.

The slate appears like slate No. 29468, but its strike would carry it into the greenstone conglomerates.

This means either that the slate is present here in a fold, or that the two slates are different and that 29741 belongs to a series unconformably overlying the greenstones.

Rain and high winds prevented study of lake shores, so that could not trace relations.

A few days later made a second attempt to unravel the problem, but on this day too the wind was so high that could do but little. Rain and wind hindered the work around this lake very greatly. It is quite certain that more work will have to be undertaken here.

58
29784

On the shore and along the passage trail into Fox Lake the rocks are dense cherty black slates, that are generally massive, but which on the hill to of the lake are marked by bedding lines. Examined this hill very carefully

and took a large number of strata

These are indicated in the map.

On the west side of the passage trail
the slate is interbedded with a gray-

29785^{2w}

wacke striking about N 15 and on
the east side by a Jasper bearing

29786

after

29792

gray wacke striking N. 20° W and dip-
ping westward

Near the north end of the passage trail
seams striking N.W., or rather N. 30° W
are found and along the shore oppo-
site the little island.

sl. 29787

29789

A little N.E. of the island the graywacke
is schistose, with a strike N.W. and dip
75° S.W.

sl

29790
conglomerate

Then north of this is a white weathering
schist like 29771.

29791

29791

On south side of the "greenstone-conglom-
erate hill" immediately north of 29790

found beds of fragmental, sedimentary
conglomerate, but could get no
strike. It appears to run N 60° E
like the hill itself.

29792

29792

of hand spec.

Further up in hill the rock looks
more like a greenstone-tuff.

It may be that 29767 and 29769 are really Redmercury, in which case the geology is plain enough. 29761 and 29762 must be studied microscopically.

Made a futile attempt to reach little island in bay but did not succeed. It looks as though it were slate.

N.B. The rocks to the south of Ogishke are regarded by Winchell as Animikie. If this is so we have here an unconformity. It is true that from this point south, around Fox and Gabamichigamaux lakes the strikes are prevailing N.W. while those around Ogishke are N. 60° E. but it may be that this difference may be due to a fold. It is true that cannot trace this fold, but the supposed Animikie rocks are so like those north of Ogishke that some stronger evidence should be obtained, than that now in our possession, before we assume the existence here of an unconformity. Even if an uncon-

family is present, it may be one between the greenstones and the slates and graywackes, with the graywackes U and S of the greenstones of the same age. The fragmental conglomerate on South side of greenstone is an indication that we may have the unconformity represented here, but the conformity in strike between the greenstones and the slates and conglomerates to the west may be thought to indicate that the greenstones and the graywackes are of same age.

It was hoped that a more carefully examination of these various theories might be possible, before leaving Ogishko, but rains and winds made work so costly, the point of view that it was thought best not to delay the entire camp for the settlement of this problem, since the lake can be so easily reached from Gen Flint.

It was thought also that work to the East might unravel the diffi-

cully.

All the rocks in Fox Lake south of Ogishke, as far as seen, are gray-wackes and dense slates except that of the Seneca ledge from which 29486-8 were taken. At this place is what we regard as a dyke of coarse orthoclase porphyry cutting gray wacke, though could not prove this due the rise from the contact.

F. P.

29486

Coarse Porphyry

W 29487

Graywacke near contact.

W 29488

Graywacke 3 or 4 ft. from contact.

Dips and strikes, where observed, are as indicated.

29489

after 29485.

Sept 2.

Examined country between Ogishke and Crab Lake with view to selecting route for portage trail. Then went into Saddle-bags Lake, South of Tumbling and Hodge's Shire. This lake, so far as could determine from inspection of ledges, is surrounded entirely by greenstone schists, most of which are conglomerates and tuffs.

U. B. - It is barely possible that these greenstone conglomerates and those South of Ogishke are actually fragmental conglomerates belonging with the Jasper conglomerates, i.e. the Tumbul sedimentary Ogishke conglomerate. Though do not believe this to be the case. If it is the case, the greenstone conglomerate is the basal portion of the Jasper conglomerate and owes its character to the nature of the basement in which it was deposited. The absence of Sasagawaga granite pebbles and of Jasper from the greenstone conglomerate makes against the view that these are sedimentary.

cf.?

29772

Untilled, purplish greenstone associa-
 ted with greenstone conglomerate or
 tuff, from E. end Postage into Saddle-
 bags Lake.

C

29773

Greenstone conglomerate from end of
 point running north and separating
 S.E. from SW bay of Saddle bags Lake

SW

29774

Greenstone schist, N.W. corner Saddle-
 bags Lake.

