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Pigeon Point, Minnesota, No. 1: [specimens] 11200-11334. No. 42 1885-07-29/1885-08-07

Williams, George Huntington, 1856-1894

[s.l.]: [s.n.], 1885-07-29/1885-08-07

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Pigeon
July 29

U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

No. 42.

July 29 - Aug. 7, 1885.

Pigeon Point, Minnesota.

G. H. Williams.

11200 - 11334

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 hand 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.

SUMMER OF 1885.

GEO. H. WILLIAMS.

Field Notes taken on Pigeon Pt.,
Minn.July 28th - Aug. 24th '85.No. 1.

Left Duluth at 5 P.M. on Tuesday
July 28th 1885 with Mr. W. S. Bayley,
Airt on board Cooley & La Vague's
tugboat "Rambler".

Reached Grand Marais at 6:30
A.M. on Wednesday, July 29th -
where we took aboard the boatman
John Morrison (halfbreed) and
Jacob cook (Indian)

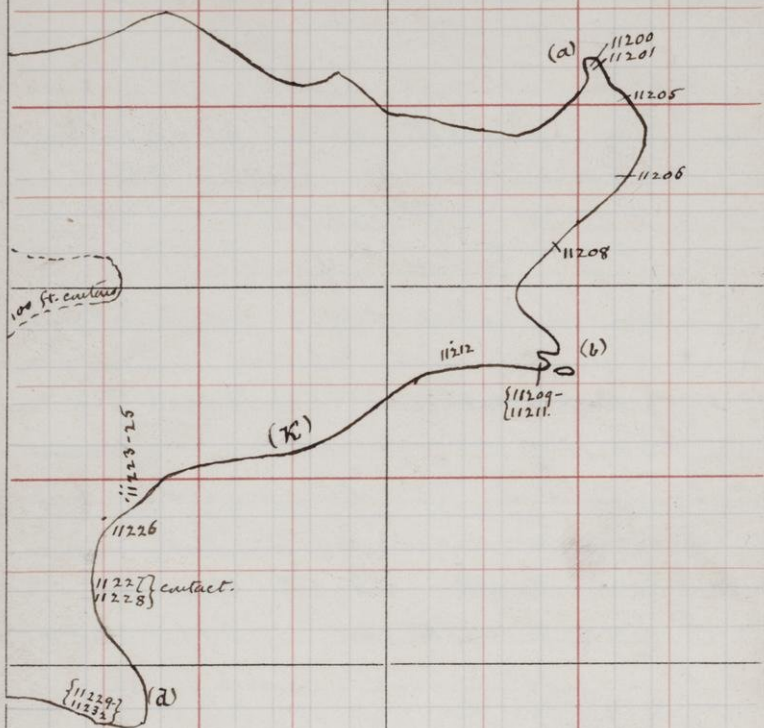
Were landed at the narrow neck
one mile west of the end of
Pigeon Point at 12 M.

Spent the afternoon of the 29th
in settling our camp.

MAP I.

T.

R.

Extreme Eastern End of Pigeon Point

Scale 1:4,000

1 in. = $333\frac{1}{3}$ ft.

Thursday, July 30th. Left Camp at 7 A.M. and rowed to the extreme end of the point one mile distant.

The rock here is the medium grained, light gray Olivine-Gabbro, which forms the main mass of the Point and all of its northern shore.

A small prominence extends slightly to the north at the extreme end. (a) The rock here is light gray, apparently not very fresh and contains black, acicular crystals.

11,200

It is porphyritic with only very occasional crystals of an almost glassy feldspar which becomes much more abundant a few yards farther south.

11,202

Irregular patches of a grayish green aphanitic rock are common here. They look almost like a light colored trap but are probably only finer grained varieties of the surrounding mass, since nothing in their structure indicates an intrusive nature.

11,201

A few steps further south the rock slightly changes its character - It is much freer, its grain is coarser and more even and the black acicular crystals disappear.

11.203

These masses are perfectly continuous. They are equally jointed into huge square blocks. They weather spheroidally from the joints inward - This process goes on in some places much more rapidly than in others. The rock finally turns a light brownish yellow and



disintegrates into sand - Specimen No. 11.204 from one of the cores left in a weathered mass.

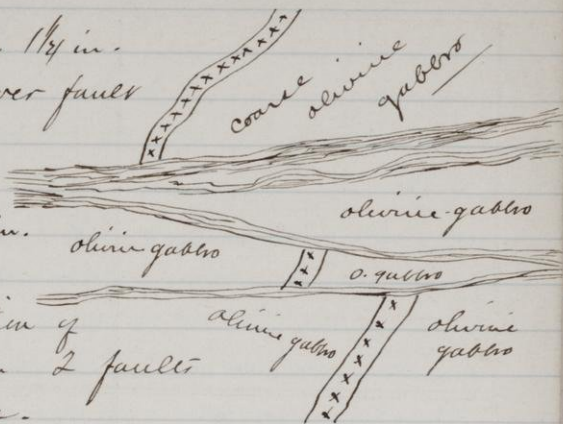
11.204.

At the southern end of the small point (a) is a reddish schistose vein filled with calcite. This ^{thin} ~~mass~~ N. S. and its schistose structure was produced by shearing as is shown by an intersecting narrow dyke of trap which was twice faulted by the vein:

Width of dyke $1\frac{1}{4}$ in.
 Thickness of lower fault
 4 inches

Do of upper
 fault 22 in.

Length of
 middle portion of
 dyke between 2 faults
 5 inches.



11.205 No. 11.205 from this narrow dyke.

The surrounding gabbro has here become decidedly porphyritic which gives it a blotched appearance when weathered. Near this dyke it was too much weathered to afford good specimens.

11.206

Just beyond this dyke the shore is covered with huge boulders of gabbro and some ledge in situ - Exposed surfaces which have been furnished & hence superficially weathered are yellow and covered with many large white blotches. These at first glance resemble porphyritic crystals; but in reality have no connection with

JULY 30.

44

the structure of the rock.

Continuing along the southern shore the next thing is a coarse shingle beach composed of boulders of a dark-blue coarsely mottled rock. This the same as the alvina gabbro above mentioned. Its feldspar is however much more abundant and is dark blue in color. Fresh fractured surfaces do not show the true structure of this rock but look like those of Nos. 11200 + 11203. These surfaces however which are weathered or have long been exposed to the water's action are nodular through the exposure of large rounded feldspar crystals wh. weather out as the rock disintegrates. These are so full of inclusions of the other constituents that a fresh fracture looks quite corn grained and homogeneous.

This rock often contains other large porphyritic crystals of a glassy feldspar quite free from inclusions. These are all shapes and sizes - sometimes lath-shaped

2. 11207

anal.
11.208.

JULY 30.

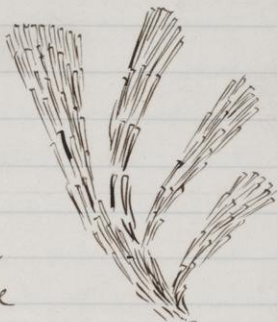
5

(square); some are tabular, others are Carlsbad twins.

The next ledge which appears beyond this broader beach is composed of a different massive rock belonging to the red acid series. Coarse and fine grained varieties are indiscriminately mixed.

11.209

Coarsest variety No 11.209. A base of red feldspar crystals in which the bi-silicate is imbedded. This is in long acicular crystals which are arranged in arborescent forms. This mineral has one buzzy looking cleavage surface.



This rock is generally much decomposed and readily crumbles under the hammer.

It alternates very rapidly and irregularly with the fine grained varieties. There sometimes appear in veins but more often as irregular patches. There is no quartz visible in this rock and

JULY 30.

6.

it may perhaps be provisionally
designated in the field as
RED SYENITE.

Assaly

11.210

Intermediate variety of Red Syenite -
Finegrained than the preceding.
Abrascent forms not so noticeable
Titanic iron abundant in thin
plates, in cross-section resembling
acicular crystals.

Fine Grained variety.

11.211

Specimen No 11211 contains an unusual
amt. of biciliate and a gray or
white feldspar instead of a red one.
Most of this rock is however red.

The red syenite extends as far
as the point (d) just as at (b)
but more uniform in grain. It forms
however only a narrow belt along
the shore for the morticed olivine-
gabbro is in position only a few steps
inland. A weathered surface of this
which easily scales off in thin
plates showing the porphyritic
crystals is No 11212

11.212

Assaly

[For Thursday P.M. in pg. 16.]

Friday morning - July 31st

11.222 (7)

From (b) to (k) the red syenite maintains its character except that it is finer and more uniform in grain. The red color is not so pronounced. Rock is more gray.

Beyond, west of (k) the rock grows finer in grain and may (?) grade into the felsite which is abundant at (d). At the corner of the small bay bounded by (d) there is a considerable ledge of a more-corroded rock extending into the woods. This rock has a gray or reddish fine-grained base which is curiously speckled with black elongated triclinic crystals.

11.223

11.224

Other varieties are less prominently speckled. All this rock has a glazed appearance as though it were free of infiltrated quartz. This mineral is also everywhere crystallized out on joints. It may be a granophyre (?)!!

In one specimen the same acicular crystals occur which are

JULY 31.

8.

11.225

characteristic of the red syenite at (b). This rock is probably only a local modification of the red syenite and looks as though it might be a connecting link between this and the light gray felsite.

11.226

Below this ledge toward (c) the rock grades into the fine grained red syenite of a brick-red color - generally more or less porous and drusy and closely resembling some of Rambusch's Vorges "Granophyres."

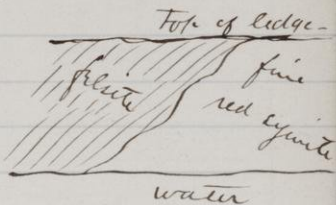
This contains occasional patches of a coarser dark rock resembling 11222 but is otherwise quite constant in character. It forms the lower portion of all the high abrupt shores running around the bay and has a decided tendency to joint into thin horizontal plates !!!

Examined from the boat this is seen to be most abundant below and to extend even under the yellowish felsite. The darker rock mottled with red feldspar crystals occurs as irregular

JULY 31.

9.

patches in it. At one point on the bay where the shore runs N.S. there is a tolerably clear contact running in a wavy line up the ledge.



11227

Is found this contact.

11228

Is a typical specimen of the darker felsitic rock.

Along the east-west. shore of this bay these two rocks occur in much more complicated relations. They are irregularly spotted; each one occurring as an apparent inclusion in the other. The darker shows every possible shade and grades into the red one.

Q. Could these darker patches be due to the more or less complete solution of slate inclusions by the liquid magma of the red rock before solidifying?

The line between the two seems always to be a sharp one.

JULY 31.

10.

In all their structure the dark and red rocks are identical. Both show an equal tendency to part into thin horizontal plates often closely resembling slates or layers of very thin bricks.



Section of the shore showing the tendency of the red rock to joint into horizontal plates.

At the point (2) (map pg 1) the rocks occur in exceedingly complicated relations. At the edge of the woods, some 100 ft from the shore, we have a soft, slaty, much weathered rock resembling No. 11221. This is full of small sharp slate inclusions and is apparently a continuation of the dark rock which overlies the fine red granite in the bay. (11223)

Below this there are cryptocyp-

11.229

Talcine felcites of a light gray color with others brown, yellowish and pink. Most intimately associated with these are fine and coarse grained red syenites which are generally drusy with crystals of red orthoclase and quartz. Then there are irregular patches of the porphyritic gray rock (olivine gabbro) and very numerous schist or slate inclusions. Some of these appear to have been wholly dissolved; others partially; and others not at all. The red drusy syenites penetrate all the other rocks in every direction. Nothing here decisively indicates the relative age of these eruptives but it looks as though the apparent ~~eruptives~~ felcites were a modification of the same magma from which the syenite crystallized and that this had included all the others.

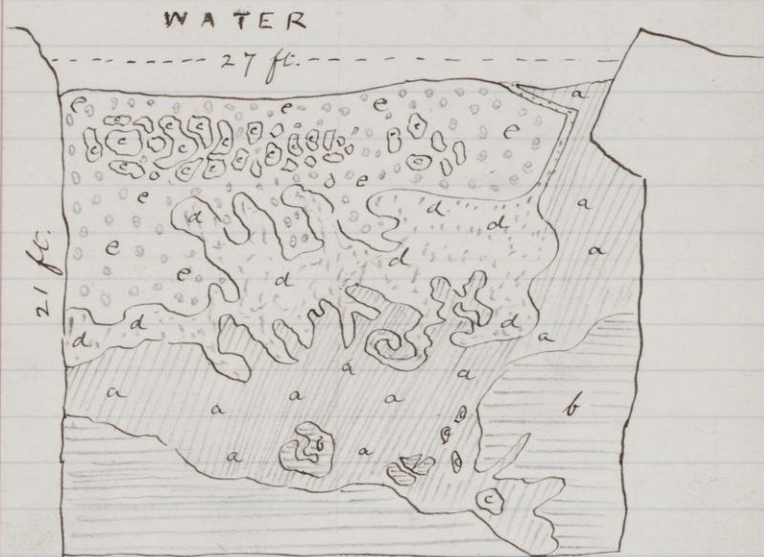
The porphyritic gray rock however may be youngest and intrusive in all the others, since it includes both felcites and schist

JULY 31

12

while the red rock includes only schist. This gray rock has a red feldspar in such portions as approach nearest to the red granite and the latter has hornblende (?) largely developed near the contact so that the two appear to grade into each other.

11.230 Contact of the gray rock with No 11.229 is No 11.230.



a. coarse porph. gray rock.

b. felsite

c. schist inclusions

d. fine red granite

e. mottled red granite

are b + e the same?

T.

R.

// 2 3 /

JULY 31

13.

11.231

Some slate inclusions in the fine-grained red syenite here have a fringe of lath-shaped white feldspar crystals around them, outside of which there is a ring of dark hornblende (?) (11.231)



This is even more true of the slate inclusions in the gray rock. These are all surrounded by a feldspar fringe. One, where only three small fragments of the slate remain undissolved, has a radial arrangement of the feldspar around its edge and an irregular arrangement of them in its center.



The felsite inclusions in this gray rock often have a red syenite border which is dense?

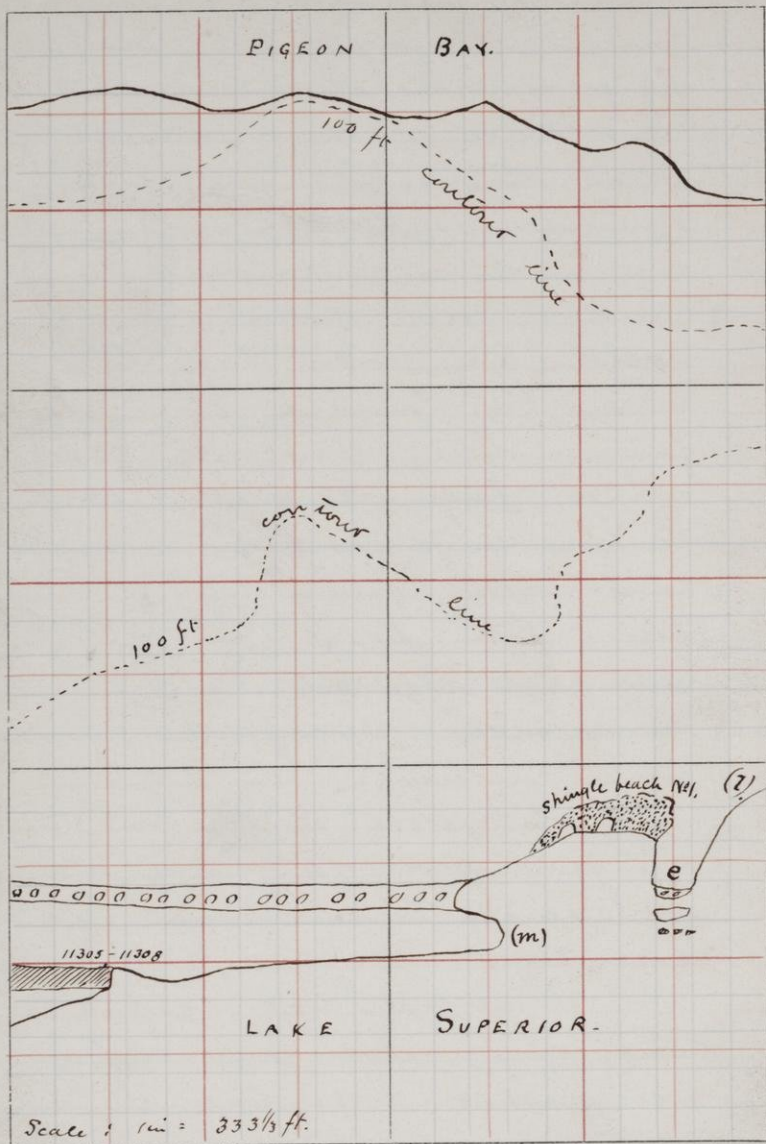
11.232

A mottled rock occurs here. Round darker spots cover the surface of what looks like the red syenite except that it is darker than usual. This rock con-

MAP II.

T.

R.



JULY 31

14

tains extremely sharp schist inclusions and hence does not probably owe its darker color, as was at first supposed, to schist having been dissolved in the magma. This was supposed to be true because of a patch of this rock occurring in the porphyritic gray rock among numerous slate inclusions, some of them now, some less discolored.

The normal red syenite occurs well developed in the shown at (1) (see map II opposite page). This superbly exhibits the effects of slate inclusions which are here very abundant.

11.233 Some of these are very sharp and apparently little altered

Others are partially dissolved and show concentric darker layers around them produced by the action of the slate on the composition of the magma.

JULY 31

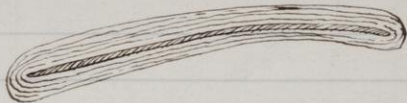
15,

The sections
of these in-
clusions are
finely shown
on the wea-
thered sur-
faces of the
red rock.

11234

(cf. the fig-
ures.)

But they do
not yield good specimens.



11235

When the inclusion is wholly
dissolved a fine grained mottled
rock results

11236

When very large inclusions have
been dissolved a coarsely mottled
rock is formed

Very fine exposure for the study of
these schist inclusions in the red rock!

Afternoon of Thursday, July 30th.
(con. from pg. 6.)

The Point **e** (map II) is composed principally of fine grained red syenite. Its extreme outer edge however is made up of typical porphyritic gray rock (olivine-gabbro). This is the nodular variety composed of large feldspars full of inclusions and others from from them wh. are porphyritically disseminated through the mass. The contact of this rock with the red syenite is a sharp line running E. W. (map) near the shore.

Just opposite the end of this point, separated from it by a narrow strip of water, is a small island composed of compact gray felsite. (11.213) This is cut by very regular parallel joints which run N. S. These are often filled with vein quartz, sometimes amethystine, sometimes rose colored at the center.

Toward its east end there is a vein filled with the red drusy rock covered with crystals of red

JULY 30.

17.

11214.

feldspar and quartz (11214) This vein is very narrow and is not eruptive. Strange however is the fact that the felsite adjoining the vein is worked with

11215

small red feldspar crystals (11215) There are seen especially distinctly when the rock is wet.

The contact between this felsite and the porphyritic gray rock above mentioned lies under the water. This narrow strait is here 15 ft. wide; the felsite island 30 ft.

The contact between the gray rock & the red syenite is very sharp & marks the shore line for some distance.

11216.

The former (gray) is No 11216

11217.

" later (red) " " 11217

The red rock contains many dark aphanitic veins running nearly E.W. In it are also irregular patches of a dark compact rock. One of these is triangular in shape & so fine as to resemble a schist or slate in-
clusion somewhat altered.

11218.

JULY 30.

18

Another is darker and has no trace of bedding. Still then exactly resembles the light felsite of the island.

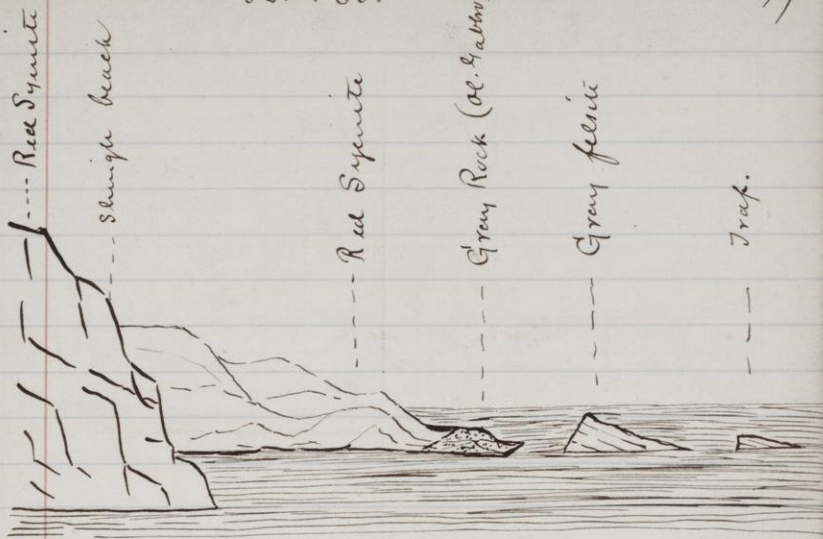
This red syenite at Pt. C (No. 11217) contains numerous druses of the same quartz + orthoclase crystals as were found in the vein 11214. Perhaps this is a dyke in the older felsite.

Behind the red syenite, 58 ft. back from the shore at Pt. C, is a nearly vertical E-W fissure extending nearly to the water level. At its base the rock is dark, fine grained and somewhat schistose. This may have been a thrust-plane as it is much slickensided.

Outside of the felsite island off Pt. C is another even smaller composed of a hard black rock looking like trap.

JULY 30.

19

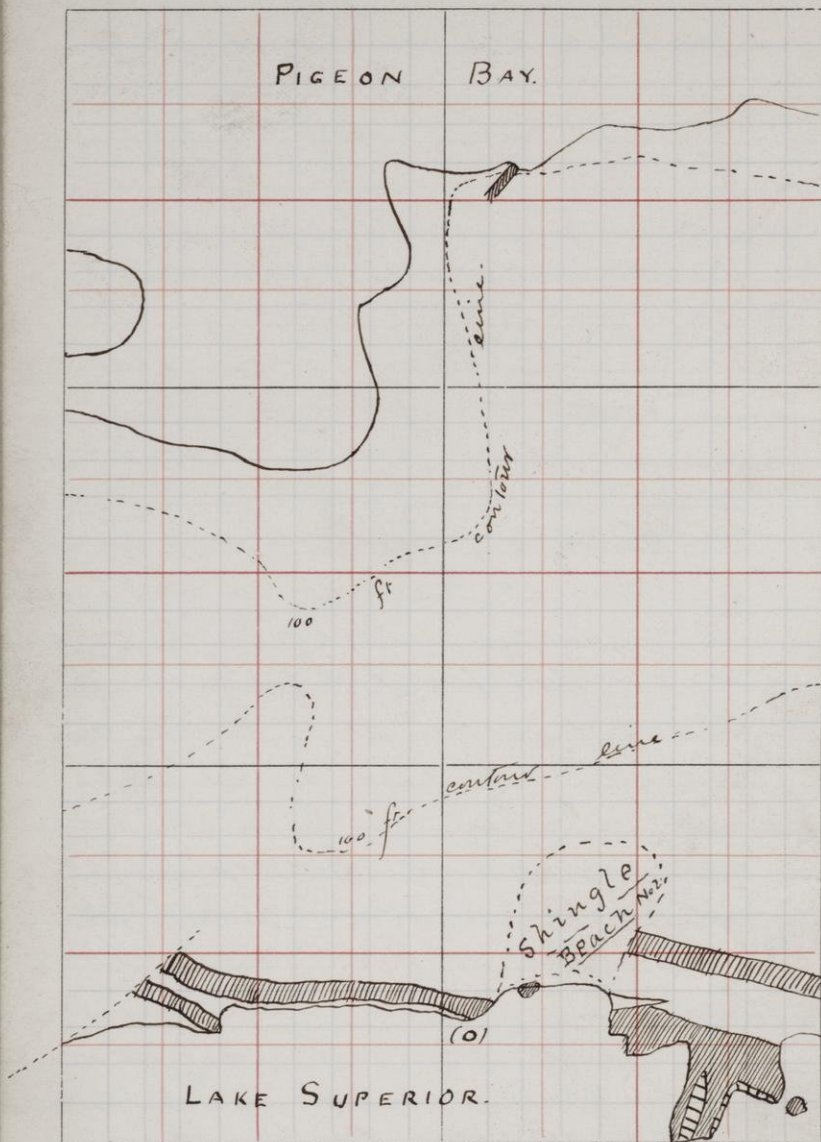


POINT "e", MAP II p. 14.

Just west of Point e is the first shingle beach. Out of this protrude very hard gray rocks with an apparently distinct bedding parallel to that in the felsite Island. Str E W dip 15° S. They at first glance look like slates but are parted into thin plates tho' quite massive. is the most massive variety with but little parting. 11221 felsite from either parting or flow structure

11220

11221



Friday July 31st (Nos. 11222-11236)
 Sept. 7-15.

Saturday), Aug 1st 1885.

The specimens collected on Saturday morning at the great trap dyke "n", (map IV) Nos. 11237-11245 incl., will be enumerated in connection with the work done here Monday afternoon Aug 3^d (p. 29.)

Mr. Bayley with the boatman John Morrison blazed two N.S. lines across the point 333 ft apart. The first of these follows the left hand edge of Map II (p. 14) and the second the first red line from the left. These gave two sections across the point as follows:

1. Section 1. S. to N.

1. Gray felsite on the lake shore.
2. Pink or brown felsite.
3. High ridge of dark red syenite enclosing large black crystals.
4. Round knoll of same coarser grained.

AUG 1.

21

5. High ridge of Gray Rock (ol. gabbro)
 6. Small area of fine grained do.
 7. Coarse grained porphyritic gray gabbro extending to the water.
- The gray gabbro occupies $\frac{3}{4}$ of this whole Section.

Section 2. N to S.

1. Porphyritic gray gabbro.
2. Little of the fine gr. do.
3. Mixed gray and red rock.
4. Slaty felsite
5. Pink felsite
6. Very little red pyrite - boulder (?)
7. Mottled gray felsite.

A magnetic variation of 95° was found in the second (east) section, 50 ft south of the bay! Varied from 20° E to 95° W !!

Saturday Afternoon we rowed along the lake shore of the Point as far west as Susie Island in order to obtain an idea of the character of the shore. Rocks found

to be mostly the hard jointed fel-
sites with some slates with rip-
ple marks.

Sunday, Aug 2nd 1885-

In the afternoon we moved
to the Falls of the Pigeon River.
The slates here are nearly horizon-
tal and but little altered. The
course of the river immediately
below the Falls follows the
~~downward dip~~ ~~downward~~ contact be-
tween these slates and the me-
dium grained gabbro, for some
little distance. This gray rock
appears to form the core of
the Mt Josephine Ridge and
is the barrier rock at the Falls.

Monday, August 3^d 1885.

Started at (m) (in map II 1914) to follow westward the course of the porphyritic gray gabbro band which forms the channel at Pt. e. This rock weathers readily and has so formed a core behind the harder felsites at "m". The narrow band of it runs through the woods nearly parallel to the shore line and forms a hollow, bounded on the south by a ridge of felsite (Lake Shore) and on the north by a high ridge of red syenite. This band runs E & W.

At the south end of the blazed line No 1 the porphyritic gabbro band is very narrow. It is 160 ft from the shore; the first exposure of the red syenite being at 187 ft.

About 50 ft east of this point in the hollow is a curious looking green rock with glimmering green fibrous crystals. (11247) This seems locally to replace the

11246

11247

porphyritic gabbro. A little further west a huge block of it is quite coarse and porphyritic. This block looked as tho' its composition was about intermediate between 11246 & 11247 but was too much decomposed to afford a good specimen.

Between the points "m" and "n" (Maps II & III) the shore is composed of a great mass of regularly but coarsely bedded, compact, hard, siliceous rocks, flinty and brittle. They strike with the shore line, nearly E & W (comp) and dip 17° S. They present great evenly sloping surfaces which dip under the water. In color they vary from nearly black⁽¹¹²⁴⁸⁾ to light gray⁽¹¹²⁴⁹⁾. They are cut by very even parallel joint planes which run N-S and stand nearly vertical.

These rocks have locally developed in them. often in irregular groups & patches but

AUG. 3.

25.

also scattered over them more or less abundantly, curious sphaerulitic bodies varying from $\frac{1}{4}$ in to over an inch in diameter. These

11.250

appear most distinctly on weathered surfaces. Here they look like round plates, sometimes uniform in appearance, sometimes with a reddish rim surrounding a gray interior. The distribution

of these bodies is very irregular. In places they are crowded together very thickly, so much so at times as to present the appearance of large yellow patches on the darker brown rock. In other considerable areas they seem to be altogether lacking.

These felites weather dark gray, bluish gray, pink and brown.

In some places they have a rough surface looking

like a sandstone. They may be highly altered (indurated) sandstone beds.

11251

These beds in many places contain accumulations of rounded white quartzite pebbles, proving their sedimentary origin. Farther west their sandstone nature is very apparent. There are thin beds of different color, some of them so unaltered that the rounded shape of the separate quartz grains may still be seen in them. Quartz, epidote & pyrite are found crystallized out on the joint planes.

11252

Still farther west the round spots once more become abundantly developed. 11252. These are only present where the sandstone is not altered.

About midway between "n" & "n", in the center of this great exposure, is a great break along a N.S. vertical joint plane, where the beddings, false stratification

AUG. 3.

27

Ebb & flow structure, &c., in the sandstones is more apparent than usual. Near this joint on the lower (west) side of the break is a small trap dyke only an inch wide which runs across the joints slightly north of east, dipping to the south of east
11253.

A short distance west of here, the sandstones grow more slaty and are filled with stringers & veins of drusy granitic material (quartz & orthoclase).

At this point curious and irregular patches of a much lighter rock are interspersed which becomes the prevailing rock further to the west. The contrast is most prominent on weathered surfaces when it appears very sharp. On fresh fractures it can also be seen but only indistinctly (11254.)

Both light and dark rocks are rich in spots and in quartz pebbles. (11255)

11256.

The lighter of these two rocks were then pinkish or light gray but does not seem to differ in its general character from the darker one. Both look like indurated sandstones having a glazed appearance. Some of them show an irregular & indistinct mottling of red and green. (11256.)

At one point near the water these nitreous sandstones are underlaid by argillaceous slates and contain inclusions of these looking like those at "L" (pg. 15.)

The very constant incrustation of the joint planes with quartz & epidote would favor the supposition that these felsites are indurated quartz-sandstones.

Just before the great trap dyke at "n" is reached a large surface of slates is met with overlying the sandstones just described. Interstratified

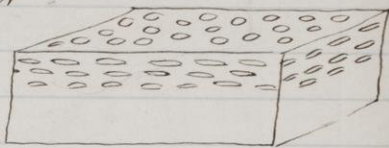
R.

Hand-drawn geological map of the western end of the island. The map is divided into three main sections: the western arm, the central area, and the eastern arm. The western arm is labeled "water" and "TRAP". The central area is labeled "TRAP" and "central". The eastern arm is labeled "TRAP" and "slate". A grid is drawn in the central area, with various numbers and letters (e.g., 11245, 11244, 11243, 11242, 11241, 11240, 11239, 11238, 11237, 11236, 11235, 11234, 11233, 11232, 11231, 11230, 11229, 11228, 11227, 11226, 11225, 11224, 11223, 11222, 11221, 11220, 11219, 11218, 11217, 11216, 11215, 11214, 11213, 11212, 11211, 11210, 11209, 11208, 11207, 11206, 11205, 11204, 11203, 11202, 11201, 11200, 11199, 11198, 11197, 11196, 11195, 11194, 11193, 11192, 11191, 11190, 11189, 11188, 11187, 11186, 11185, 11184, 11183, 11182, 11181, 11180, 11179, 11178, 11177, 11176, 11175, 11174, 11173, 11172, 11171, 11170, 11169, 11168, 11167, 11166, 11165, 11164, 11163, 11162, 11161, 11160, 11159, 11158, 11157, 11156, 11155, 11154, 11153, 11152, 11151, 11150, 11149, 11148, 11147, 11146, 11145, 11144, 11143, 11142, 11141, 11140, 11139, 11138, 11137, 11136, 11135, 11134, 11133, 11132, 11131, 11130, 11129, 11128, 11127, 11126, 11125, 11124, 11123, 11122, 11121, 11120, 11119, 11118, 11117, 11116, 11115, 11114, 11113, 11112, 11111, 11110, 11109, 11108, 11107, 11106, 11105, 11104, 11103, 11102, 11101, 11100, 11099, 11098, 11097, 11096, 11095, 11094, 11093, 11092, 11091, 11090, 11089, 11088, 11087, 11086, 11085, 11084, 11083, 11082, 11081, 11080, 11079, 11078, 11077, 11076, 11075, 11074, 11073, 11072, 11071, 11070, 11069, 11068, 11067, 11066, 11065, 11064, 11063, 11062, 11061, 11060, 11059, 11058, 11057, 11056, 11055, 11054, 11053, 11052, 11051, 11050, 11049, 11048, 11047, 11046, 11045, 11044, 11043, 11042, 11041, 11040, 11039, 11038, 11037, 11036, 11035, 11034, 11033, 11032, 11031, 11030, 11029, 11028, 11027, 11026, 11025, 11024, 11023, 11022, 11021, 11020, 11019, 11018, 11017, 11016, 11015, 11014, 11013, 11012, 11011, 11010, 11009, 11008, 11007, 11006, 11005, 11004, 11003, 11002, 11001, 11000, 10999, 10998, 10997, 10996, 10995, 10994, 10993, 10992, 10991, 10990, 10989, 10988, 10987, 10986, 10985, 10984, 10983, 10982, 10981, 10980, 10979, 10978, 10977, 10976, 10975, 10974, 10973, 10972, 10971, 10970, 10969, 10968, 10967, 10966, 10965, 10964, 10963, 10962, 10961, 10960, 10959, 10958, 10957, 10956, 10955, 10954, 10953, 10952, 10951, 10950, 10949, 10948, 10947, 10946, 10945, 10944, 10943, 10942, 10941, 10940, 10939, 10938, 10937, 10936, 10935, 10934, 10933, 10932, 10931, 10930, 10929, 10928, 10927, 10926, 10925, 10924, 10923, 10922, 10921, 10920, 10919, 10918, 10917, 10916, 10915, 10914, 10913, 10912, 10911, 10910, 10909, 10908, 10907, 10906, 10905, 10904, 10903, 10902, 10901, 10900, 10899, 10898, 10897, 10896, 10895, 10894, 10893, 10892, 10891, 10890, 10889, 10888, 10887, 10886, 10885, 10884, 10883, 10882, 10881, 10880, 10879, 10878, 10877, 10876, 10875, 10874, 10873, 10872, 10871, 10870, 10869, 10868, 10867, 10866, 10865, 10864, 10863, 10862, 10861, 10860, 10859, 10858, 10857, 10856, 10855, 10854, 10853, 10852, 10851, 10850, 10849, 10848, 10847, 10846, 10845, 10844, 10843, 10842, 10841, 10840, 10839, 10838, 10837, 10836, 10835, 10834, 10833, 10832, 10831, 10830, 10829, 10828, 10827, 10826, 10825, 10824, 10823, 10822, 10821, 10820, 10819, 10818, 10817, 10816, 10815, 10814, 10813, 10812, 10811, 10810, 10809, 10808, 10807, 10806, 10805, 10804, 10803, 10802, 10801, 10800, 10799, 10798, 10797, 10796, 10795, 10794, 10793, 10792, 10791, 10790, 10789, 10788, 10787, 10786, 10785, 10784, 10783, 10782, 10781, 10780, 10779, 10778, 10777, 10776, 10775, 10774, 10773, 10772, 10771, 10770, 10769, 10768, 10767, 10766, 10765, 10764, 10763, 10762, 10761, 10760, 10759, 10758, 10757, 10756, 10755, 10754, 10753, 10752, 10751, 10750, 10749, 10748, 10747, 10746, 10745, 10744, 10743, 10742, 10741, 10740, 10739, 10738, 10737, 10736, 10735, 10734, 10733, 10732, 10731, 10730, 10729, 10728, 10727, 10726, 10725, 10724, 10723, 10722, 10721, 10720, 10719, 10718, 10717, 10716, 10715, 10714, 10713, 10712, 10711, 10710, 10709, 10708, 10707, 10706, 10705, 10704, 10703, 10702, 10701, 10700, 10699, 10698, 10697, 10696, 10695, 10694, 10693, 10692, 10691, 10690, 10689, 10688, 10687, 10686, 10685,

Aug. 3.

29

in these are sandy layers which show the round spots developed so abundantly as to produce a red or green mottling. Such a layer not over 2 inches thick passes into the normal hard



slate above and below. (11257.)

The appearance of these mottled layers lying in the slate in patches is very curious.

The slates here are fissile, not much altered and covered with distinct ripple marks (11258)

There is a mottled layer like 11257 interstratified in the slates at the base of the east arm of the trap dyke at "n".

Saturday Morning, Aug. 1st - (see p. 20)
At "n"

Splendid exposure of little altered slates enclosed in the center of a big trap dyke.

Contorted, broken, much altered slate in the smaller arm -

trap
11237

- 11238 Trap from the narrow arm near the contact.
- 11239 Light gray, splintery, highly altered slate from the contact with 11238.
- 11240 Fissile, even bedded, little altered slate from the center of the main band.
- 11241 Little altered slate somewhat higher up. These dip here ca 20° S.
- 11242 Rather coarse (diabase) trap top of the eastern arm.
- 11243 Same somewhat finer. Free of pyrite.
- 11244 Very finegrained ^{trap?} slate - (perhaps an altered slate) from the center of the central arm near the top. Typical diabase immediately adjoining it. This may be an incision. Near the upper ^{end} of the central slate band the slates are baked to hard felcites.

The water is shallow between the ~~eastern~~ western and central,

trap arms and may be clearly seen to corrie slates. Near the contact of these with the trap they are baked hard and in one place are filled with round spherulitic bodies with red rims about a green center. Exomorphic contact metamorphism!

Monday, Aug 3^d, 1885 continued from page 29.

The trap capping the west ~~not~~ arm of the great dyke at Pt "u" is very varied in character.

11260 Coarse grained green and white with pyrite from the center.

11261 Coarse grained reddish from near the end.

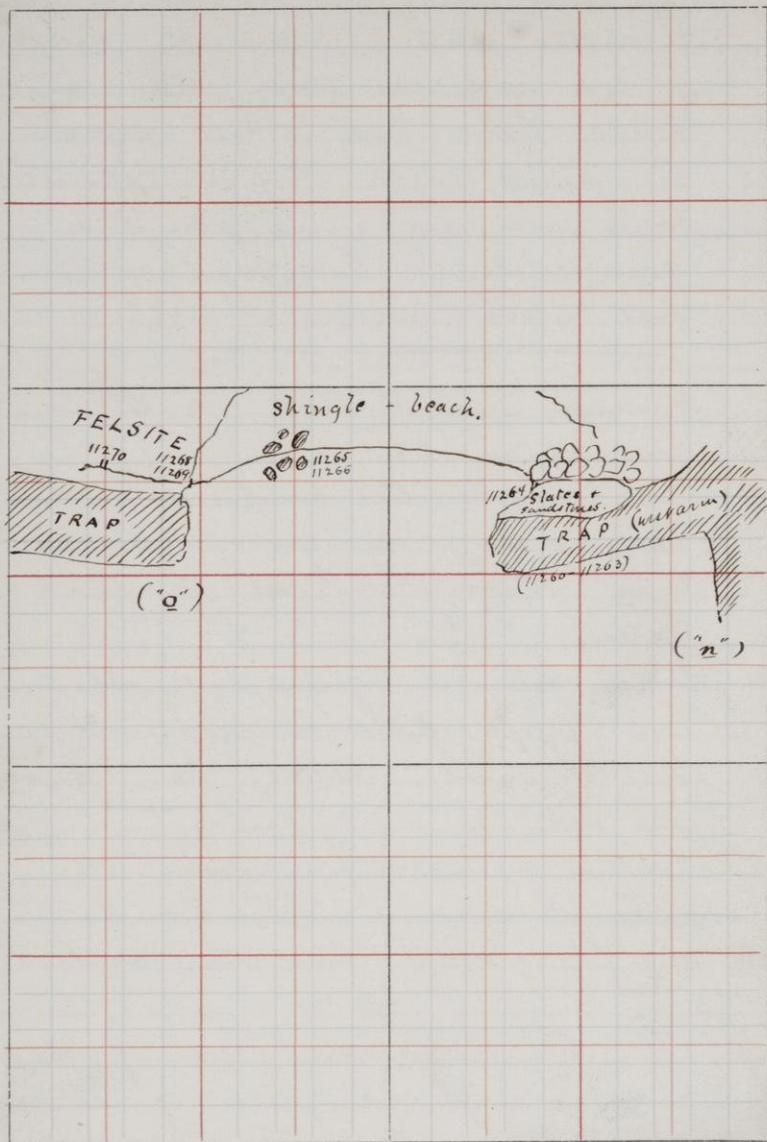
11262 Medium grained from near the south side.

11263 Very fine grained from the contact.

On the northern side of this arm is a small area of altered sandstones. (Animikie slates) wh. are interstratified with but little

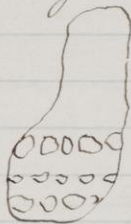
T.

R.



altered slates. The surface is somewhat undulatory and the sandstones appear in irregular patches of a grayish pink color almost resembling intrusions. On the side of the exposure however the two rocks may be clearly seen to be interstratified. Rounded white quartz pebbles occur equally in both rocks. (11264)

One large specimen found on the shingle beach beyond showed these quartz pebbles arranged in horizontal layers like a conglomerate.



Some trap occurring in situ about the middle of this shingle beach exhibits a curious modification. It contains porphyritic crystals of a glassy feldspar which are surrounded by rims of pyrite. (11265)

This rock also holds inclusions of red granite and quartz. (11266)

This shingle beach is full of

11267 pebbles of of altered sandstone containing the round spots in fine development. (11267)

At the west end of this beach ("0") the trap dyke begins again and continues along the shore. It is here in immediate contact with the inclined sandstones (felsite)

11268 a very dark almost black bed (11268)
11269 overlying a light gray one (11269)

At this contact there is a narrow dyke of fine grained red granite (11270) which traverses the felsite but does not extend into the trap, but terminates most abruptly at its edge. The trap is therefore younger than both other rocks.

Tuesday, Aug. 4th 1885. The large trap dyke at "0" extends westward along the shore. It then turns inward and another dyke appears at the water's edge which seems to join the larger one farther west. This may be merely a branch of

the larger dyke but if so the division takes place under the water and cannot be seen.

Light and dark colored felsites lie between the two. South of the smaller dyke there is a compact black felsite (quartzite) which at first glance resembles the trap. They are however glistening and siliceous with a vitreous luster and contain occasional round pebbles of quartz. The contact is a sharp line which is marked by a deposit of calcite and some red granitic vein material.

The trap of the lower dyke (the only one here well exposed) is filled with veins and stringers of the red granitic vein material. At one point this dyke is 24 ft. wide.

11271 Trap from the northern dyke 6 inches from its southern contact with the felsite.

11272 Same from the lower (south) dyke

11273 Contact of this lower arm with

Aug. 4.

35

the slates showing a vein of the granitic vein material.

11274

Altered slate from near the contact with the last arm.

11275

Light colored felsites from between the two trap dykes.

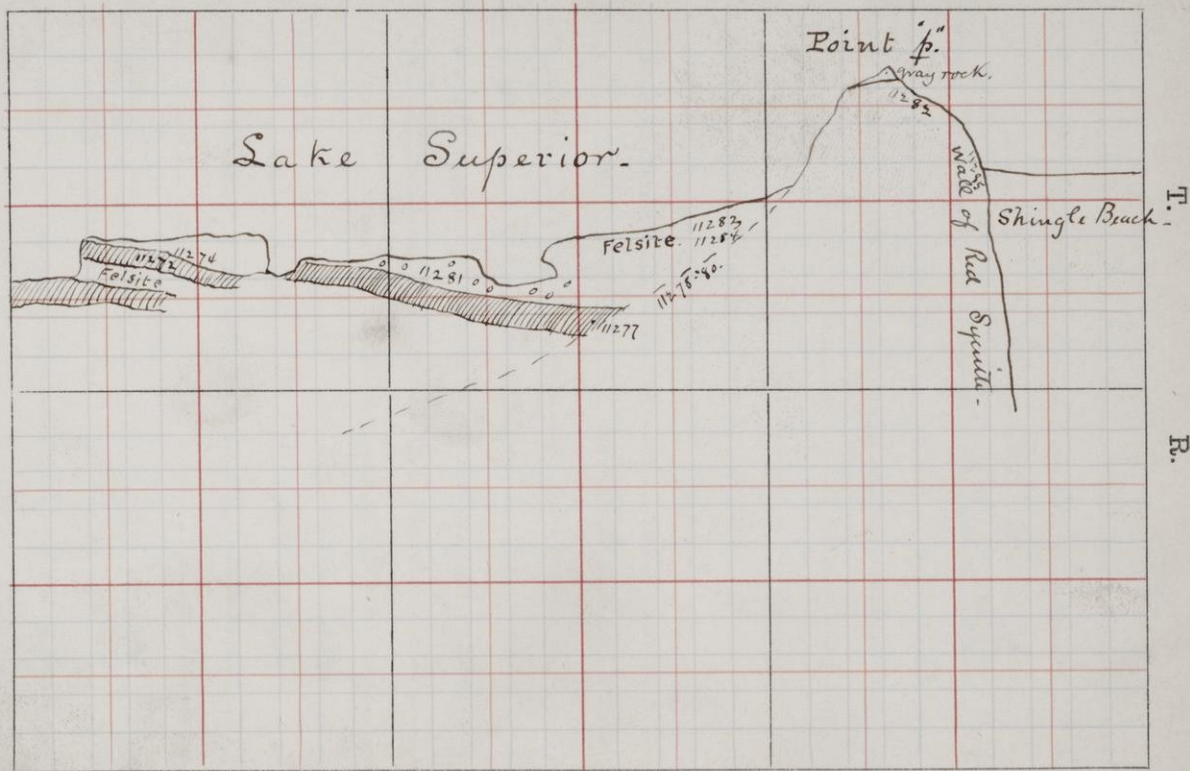
11276

Darker felsite from below the lighter one.

At a point somewhat east of "p" (see map IV. pg. 39.) the rocks are very complicated in their relations. From the point "p", which shows toward the west a high wall of dark red syenite extending northward, this rock extends slightly north of east along the shore until it is apparently cut off by a trap dyke. The rock has here changed to the gray gabbro some of it very coarsely porphyritic.

At the exact point where the syenite abuts upon the trap, thick woods render the deciphering of the exact rela-

Shore east of Pt. "p."



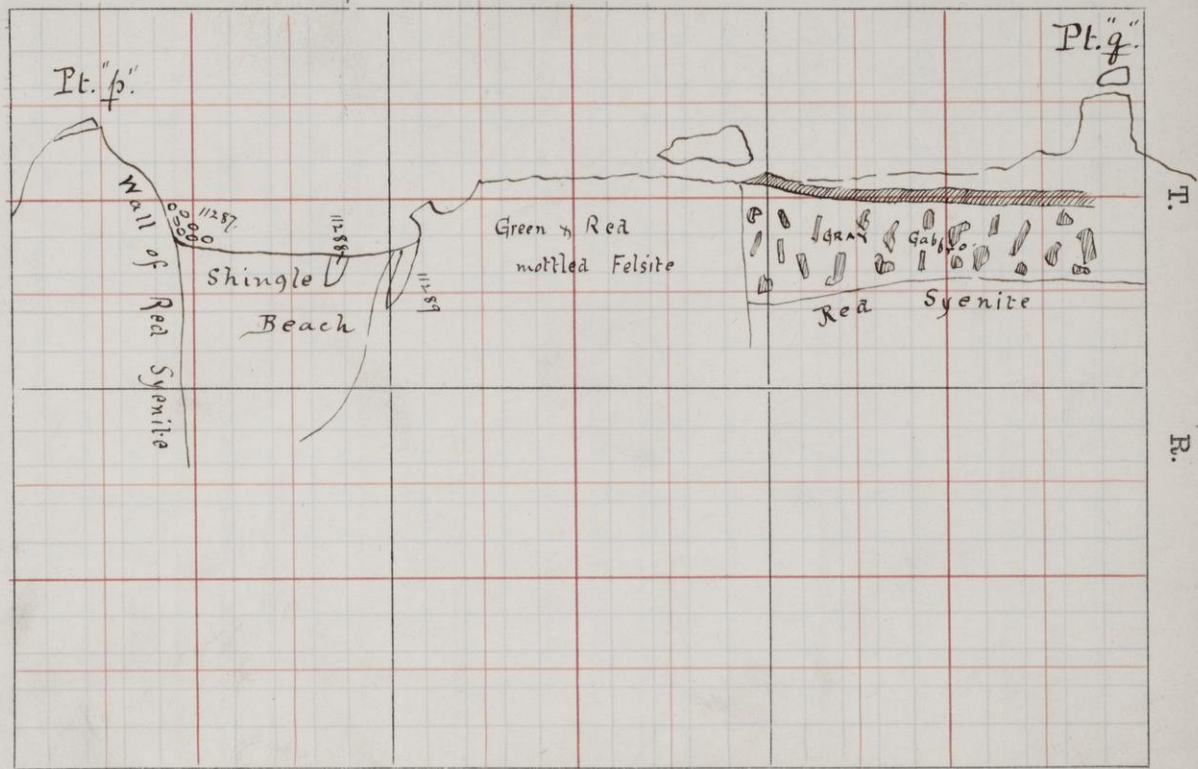
time impossible. Both the red
11278 (11278) and the gray rocks (11279)
11279 become much finer grained and
 do not appear to differ very much
 from the trap. Can there be
 anything like a transition? Some
 of the dark red syenite occurring
 here apparently contains inclusions
11280 of trap!! (11280)

The typical trap from the
 end of this dyke is also cut by
11277 granite dykes (11277)

Outside of the end of this
 trap dyke on the shore the felsites
 are filled with round rhyolite
11281 spots. (11281)

The point "p" is tipped with a
 small amount of the coarsely
 porphyritic gray gabbro as is
 Pt "E". This haven't appears to
 grade insensibly into the red
11282 syenite without any abrupt
 line of contact. (11282) The red
 syenite for some distance from
 the gray rock contains large por-
 phyrific crystals of glassy feldspar.
11283 are red and green mottled felsites
11284

Shore west of Pt. "p."



AUG. 4.

37.

from the shore just east of Point
1/2" below the syenite.

N 11285

Dark red syenite(?) from the wall on the
west side of Pt. 1/2"

11286

Same red syenite very fine grained
from the top of Pt. 1/2"

11287

Among the huge blocks which have
fallen down from this wall is
one which contains what looks like
an inclusion of felsite.

11288

At the west end of the
shingle beach are two projecting
dykes of a lavender color. They
appear to be composed of fine grained
red syenite showing a eutaxitic struc-
ture in the arrangement of the
red (feldspathic) and green (horn-
blende) varieties. There are also
here some coarsegrained patches
which alternate abruptly with the
finer. The two colors often vary in
a strange manner; one appearing
like an inclusion in the other.
Query. Can not the green kind be
due to the solution of slate in-
clusions like No 11236 ??

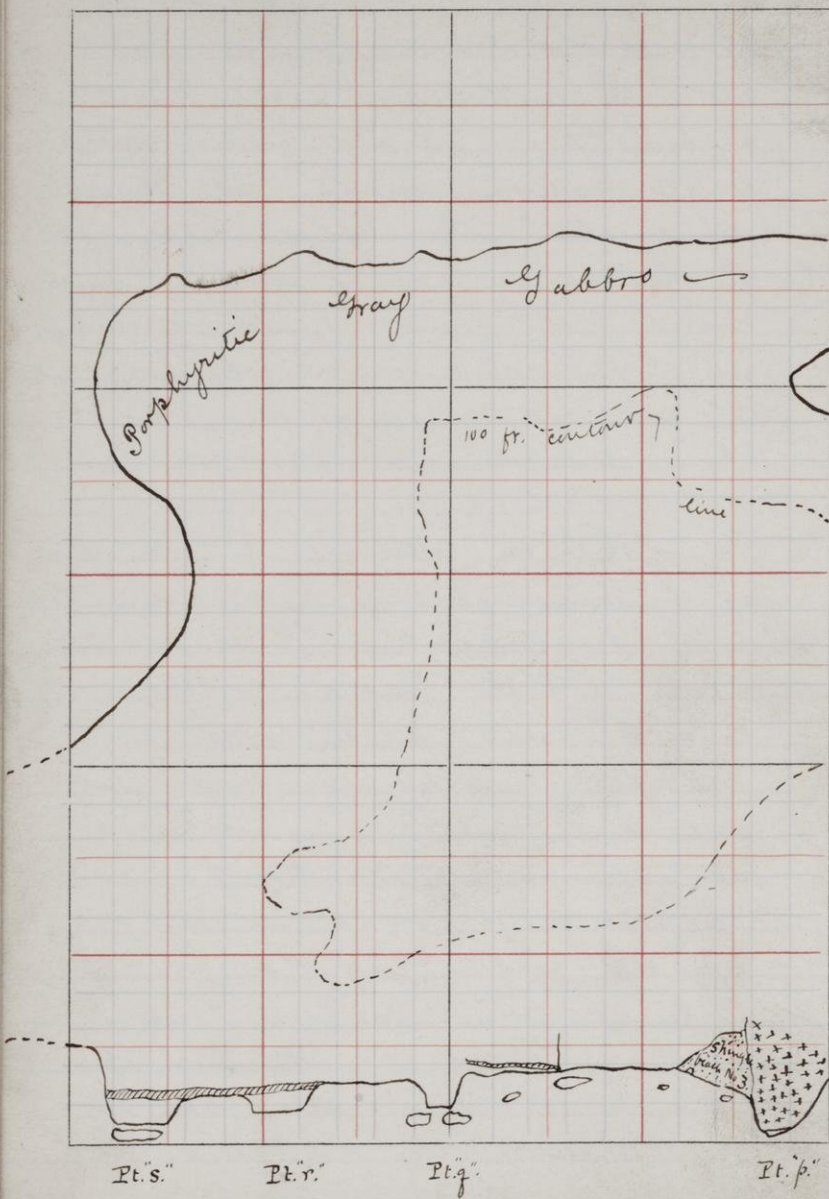
11289

The reddish rock is here sometimes mottled. Over these rocks and evidently continuous with them is a beautiful red and green mottled felsite which breaks all though its structure were sphaerulitic. (i.e. the fracture surface is uneven and covered with round humps corresponding to the round red mottlings.) (11289) This rock extends along the shore for a considerable distance west.

On the little island situated at the eastern end of the narrow trap dyke the rocks are in the most mixed possible condition. There are coarsely mottled felsites alternating with finely mottled ones and with such as are wholly unmottled. These all seem very much broken and crumpled and are abundantly impregnated with infiltrated granitic material. This also often looks as though it was intrusive since it contains some large schist inclusions. All these rocks, especially the brown felsites, con-

MAP IV_{T.}

R.



70
23/50

AUG. 4.

39.

tain rounded white quartz pebbles. It looks like a very rough and crumpled breccia cemented by eruptive granite and the whole subsequently very much indurated and metamorphosed.

Along the shore between the western end of this small island and the River "Z" the explanation of the structure of this whole region seems to be given. Here there is a great amount of the typical gray gabbro - some of it fine grained, some of it very coarse grained & porphyritic - which includes a vast number of felsite inclusions of all fine sizes. (The word "felsite" is here used to designate the hard, quartzy, indurated layers of Ammirikier sandstone)

At the eastern end of this exposure, near the little island, these inclusions are very sharp and put the exact relations of the rocks beyond a doubt. (11290) Further toward the west however these become all distinct and the

11290.

mass gradually merges into one exactly like that at the western end of the single beach No 3.

The coarser grained and green material ~~is~~ is eruptive, while the more compact pinkish portions are the included and cemented felsite fragments. These are sometimes wholly, sometimes partially dissolved.

The inclusions seem to be generally surrounded by bands of the coarser grained granitic material.

The including rock is not always a typical gray gabbro. It is often dark green from the excess of hornblende and as much like the red as the gray rock.

On this shore there is a narrow but very well marked trap dike (11291).

11292

Point "g" projects out beyond the contact belt filled with inclusions and is composed of hard brown felsite (11292) which is locally not.

✓ AUG. 4-5.

41

✓
11.293

that (11293). These felcites have
contain large slate (?) inclusions!
granitic duncy) veins, etc, etc.
The mottling appears here, as in
No 11236, to be due to the solution
of fragments. Perhaps, however,
instead of the felsite having ~~been~~
partially dissolved a dark inclu-
sion, there was a local impreg-
nation of the sandstone with
the darker eruptive rock.

Wednesday, Aug. 5th 1885.

Between points "q" and
"r" (see map IV. p. 39) the
shore is made up of very coarse
porphyritic gray gabbro. The
large feldspar crystals are crowded
close together and are often 3 inches
and more in length. The shore
is composed mostly of boulders
of this rock interspersed with
some of trap, but some of it
also occurs here in situ.

11.294

Where point "r" commences
to round outward there is a

11295

small, of acid felsite. Next to this commences a huge trap dyke, 37 ft wide, which runs due east to the bay. (11296)

11296

It stands out at first as a high ridge, but nearer the bay it weathers out into a hollow between walls of felsite. It has a very coarse, cross columnar parting ("cordwood-structure") at its contact with the felsite. it becomes much finer grained. At its eastern end it is considerably coarser. (11298).

1129711298

Point "r" is formed by a remnant of rather finely bedded slates and sandstones which are enormously bent, crumpled & twisted (11299)

11299

Opposite the center of this point "r" is an inclusion of the felsite in the trap 20 ft long and 7 ft wide, extending SW-NE almost all the way across the dyke.

11300

This rock has a very silicious glassy look but does not appear to have been materially altered by the trap.

11301

In the gray gabbro ledge (No 11294) but nearer this trap dyke is some typical gray rock containing some reddish feldspar.

11302

Just west of the felsite inclusion the dyke of trap measures 46 ft across. North as well as south of it are much contorted hard felsite slates. (11302) At its western extremity on the bay the dyke is 68 ft wide.

The crumpled and contorted slates, especially those forming Pt "r", are like those which at Pt. C, above, I called slaty felsites. They are here more finely banded and much bent, nowhere losing their fissile structure. They are of a dark gray color, and, as Logan says, (Geol. Can. 1863) are sandstones so altered as to resemble trap. They are everywhere cut through by veins of the dusky granitic material which coats their seams and fills their fissures; often being itself filled with little an-

AUG. 5.

44.

gular slate fragments.

These rocks are more highly silicious than the true slates occurring at Point "n" but vastly less so than the normal brown felcites. They do not seem to be much indurated.

The contorted slate north of the great trap dyke extend only a very short distance before passing into the normal hard brown felcites. This forms a high ridge and soon becomes coarsely mottled red and green. A short distance further north in the same ridge this is in contact with the normal gray gabbro. (No. 11303.)

11303

Below and a little to the east of this point the brown felcites is seen to be cut by many narrow dykes or bands of a dark green coarsely crystalline rock which is probably only a modification of the gray-gabbro. (11304.)

11304

In moving eastward toward the end of the Point another trap dyke was noticed in the slates between Pts. "m" and "n", which had before been overlooked. It projects out of the slates and felcites, is from 10 to 20 ft wide and runs due E. W. (parallel to the great dyke at "n") back into the woods. I traced it back to the edge of the shingle beach No 2 where it disappears. (See Maps II & III pp. 14 & 20.)

11.305

Trap from the end of this dyke 6 inches from contact - coarse.

11.306.

Felcite near this contact

11.307

Slate interstratified with this felcite.

11.308

Horred felcite (like N° 11257) from near this contact.

Wednesday afternoon Aug 5th. North
Shore, starting at the camp
at the narrow neck and going
eastward. All the rock is
the normal gray olivine gabbro,
at first very porphyritic. It
has a peculiar nodular struc-
ture which shows on weathering
into lumps as big as walnuts or
larger. This same rock occurs
all along the small bay and
up to the high bluff. The specimens
taken from the great blocks fallen
at the base of the high bluff con-
tain only occasional porphyritic
crystals (11310)

Just east of the small bay
is a band of a lighter green
fine grained rock looking like
a dyke. This runs S.W. (No
11311)

No other sign of an intrusion
nor indeed of any other
kind of rock was observed in
the entire northern shore of
the eastern part of Pigeon Point.
All of it consists of the typical

Aug. 5 & 6.

47.

gray olivine gabbro, sometimes more, sometimes less porphyritic, sometimes with no indications of a porphyritic structure but always more or less nodular, which however only appears on weathering. A large weathered surface, such as appears when a large mass has dislodged and fallen from the face of the bluff, is yellow mottled with large white spots which have no connection with porphyritic feldspar crystals.

Thursday, Aug. 6th 1885. Cold and rainy. I rode with John out to Susie Island, where Mr. Bayley painted the numbers on our collected specimens. I climbed over the top of the high bluff to the west of our camp. This appears to be a large quartz-porphyrus dyke, but needs careful study.

AUG. 6.

48

It contains much apparent felsite.
The rocks exposed at the east end of the bay upon which our camp was situated (lake shore) at Point "S" (Map IV. p. 39.) are: (starting from the south corner "S")

- 1° Crumpled altered slates and bedded felsites.
- 2° Trap dyke 68 ft wide here forming a hollow instead of a ridge.

11.3/2

- 3° Hard pinkish felsites at first glance resembling bedded ones but really fine grained granites some dark gray, some light, some reddish. (also mottled)

11.3/3

- 4° Slightly coarser red syenite.
- 5° A thick layer of the typical coarse gray rock, directly overlying pinkish felsites (fine granites)

11.3/4

- 6° Red and green mottled felsites having a horizontal shaly structure.

11.3/5

- 7° Red syenite. (slaty)

11.3/6

- 8° A good exposure in the shingle beach is a coarse syenite, between

Lake —

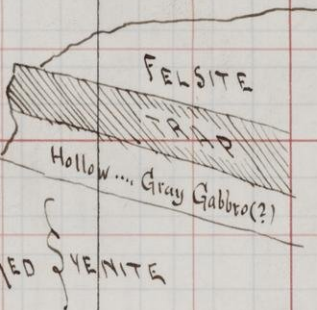
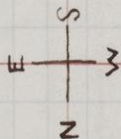
E.

BAY

T.

Shingle Beach

CAMP



FINE RED JEWELITE

Aug. 6 & 7.

49-

the red and gray in color. This contains numerous well defined schist inclusions.

Friday, August 7th 1885-

11.317

The point at the west end of the bay opposite where specimens were last collected yesterday is composed of very fine grained red granite free of what are apparently discolored schist inclusions. Some of it looks like felsite and has a entaxitic structure and is mottled. All weathers like the stratified felsite.

11.318

Next south of this, near the shore comes a narrow hollow and on the lower side of it a small trap dyke 15 ft wide. In this hollow is what looks like gray gabbro, coarse grained & nodular.

11.319

The trap of the dyke apparently encloses the felsites which lie on the south side of it.

AUG. 7.

50.

11,320

Felsite from the north contact of this dyke.

11,321

There is a coarse gray granular looking rock, filled with round spots, and apparently intrusive in the brown felsite (granite?) on the south edge of this dyke.

From this point along the shore at least as far as the high bluff of quartz porphyry, it is impossible to say from a macroscopic examination whether the rocks are hardened sandstones like those further east or granitic felsites. Many of them are finely mottled and others are coarsely mottled; but all of them look more crystalline, less glazed than the indurated sandstones. Nevertheless the bedding, jointing and strike (E-W, dip 15 S.) are like those of the sandstones and slates at Point "m".

In a small cove just west

Aug. 7.

51.

of the dyke are some good ex-
samples

11.322 Fine grained, brown, felsitic -

11.323 Red Syenite. coarsely mottled
with green spots.

11.324 Red Syenite finely mottled with
green spots.

On the rocks at the foot
of the great quartz porphyry
bluff is a good breccia com-
posed apparently of fragments of
the felsite cemented by the
coarser ^{gray} ~~red~~ syenite.

11.325

The prevailing at the
base of the Q.P. bluff is a
red syenite or granite with a
decided tendency to part into
horizontal layers.

In the little cove with
a shingle beach between the Q.P.
bluff and the one next west of
it the rocks are more distinctly
bedded than anywhere west of
Camp Bay to this point.

11.326

Layers of a compact brown
rock looking like an altered
sandstone here alternate with

11.327 a more schistose greenish rock
mottled with red spots.

Just west of these rocks
is a trap dyke running due E.W.
(comp.) and forming a high narrow
ridge for some distance. I followed
it until it seemed to disappear
in the thick woods in the felicit.

11.328

Top of this dyke on the shore in
contact with the felicit

11.329

do 8 inches from contact.

11.330

do from middle of the dyke.

Friday afternoon, Aug. 7th.

Traveled along the north
shore of the Point starting westward
from our camp. On reaching the
most southern point of the first
large bay met, we blazed a
line due S to the lake shore
and found along it

- 1° ca 150' fr of gray gabbro (typical)
- 2° red cyanite.
- 3° trap (?)
- 4° coned area
- 5° brown felicit on the shore.

We blazed a second section

due N, back to Pigeon Bay),
starting at the little shingle beach
between the big trap dyke and
the quartz porphyry bluff.

We found:-

- 1° Brown felsite (Lake shore)
11331. 2° Trap with huge porphyritic crystals
of a glassy feldspar -
11332. 3° Dark felsite.
11333. 4° Quartz porphyry.
- 5° Hollow, curved, with no exposures
(red syenite ??)
- 6° Gray porphyritic gabbro (ridge)
11334. 7° Gray felsite.
- 8° Trap

These sections are not
altogether satisfactory on account
of the ground being covered with
heavy woods - sometimes swamps
(as at 5°). Many blocks covered
with moss are encountered but
there is no proof that they are
always in situ.

Numbers 11200 — 11334 incl.

Gray Olivine-Gabbro 11200. 11201. 11203.
11204. 11205. 11207. 11208. 11212.
11230. 11246. 11279. 11282. 11294.
11301. 11303. 11304. 11309. 11310.
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