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Vermilion Lake district and Port Arthur, Canada: [specimens] 6925-6962. No. 21 1884-08

Irving, Roland Duer, 1847-1888

[s.l.]: [s.n.], 1884-08

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U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 10

August 1881

Vermilion Lake District

and Port Arthur, Canada

6925-6962

R. C. Irving

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

INSTRUCTIONS.

1. Devote at least two pages of this note book to one section. On the left hand page place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the smaller spaces as 100 paces, each of the spaces between the red lines as 500 paces, and four of these large spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the first red line above the bottom of the page and at the right hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up or down one space, or the map may be turned around and the north placed at the left hand side of the page.

2. On the right hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, after which give in order the position of the ledges as reckoned in paces from the southeast corner of the section, and the dip and strike when observable, for instance: 4025; 250 N., 300 W.; *Strike*, N. 6° E.; *Dip*, 50° E. Then follow with as full a description of the exposure as possible. Very often the notes for one section will cover more than one page in which case pass to the next right hand page, *repeating the map on each left hand page* as long as the notes, with regard to one section, continue.

3. Collect a specimen from each separate ledge of rock, or whenever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with the note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples will be allowed, but in all other cases *large sized trimmed specimens*, with chips for slicing, must be selected in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. All specimens are to have numbers painted on them, in white on a black background, in camp.

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

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

#21

R.D. Irving

August 1884.

Kermilow Lake District - + Port Carleton
Canada.

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1
Aug 9th 1884

Railroad from Two Harbors (Agate Bay)
to Torres, Minn.

There are but few cuts on this road the
first part of the way from Two Harbors -
a few near Agate Bay through the ordinary
New. diabase.

From Agate Bay the r.o. rises rapidly,
reaching the first summit at only a
short distance from the Lake - say three
miles at most.

Then, after passing a long stretch without
exposure, fragments of coarse grey gabbro
become very numerous. Then, not long
after crossing the St. Louis, the main stream,
low exp. of the same are made in cuttings,
and further large natural exp. are seen on
the sides of the track. There continues a
Cong. dirt. of the last noted over somewhere
abt Sec 21, T 59, R. 14 W. [Fraser's location
from the cars]

Before reaching this pt. slate
fragments had become very plenty
indeed and the dirt used in grading
the road is chiefly made up of such
fragments, so that it certainly looks

as if some at least of this gabbro were interbedded with the slates. Indeed so as far as what we have seen is concerned, such an interstratification may continue well to the southward of the first point at which the gabbro was seen coming north.

6925 Magnetitic slate exposed in a low cutting on the R.R. a short distance south of the Mesabi range. There are several such cuttings along this part of the rail road some showing slate a blackish slate some the a ferruginous variety like the sample and still others a ~~very~~ bright red material the iron being thoroughly per-oxidized.

6926 Represents one of the rock zone of the gabbro cuttings a short distance north of the St Louis River.

Consider carefully in this connection the relations to one another of the gabbros of the Duluth group and of the Annickie series. Were they not probably all formed at once, some having been injected, ~~and others~~ within the Annickie slates whilst others were erupted above them whilst all were

but the beginning of the Keewenawan eruptions? If this supposition is a correct one we would thus explain the absence from the folded Huronian to the north of the great gabbro flows of the Animikie series.

Where the Mesabi range is crossed by the R. R. (Sec. 759 R. 14 W. according to Frazier) the exposures of granite are on a large scale a gray granite prevailing to the south, a red to the north. The granite belt is plainly a wide one.

Further north to Tower there are frequent cuttings through quartzites and slates.

Aug. 9. 1884

4

Lia Mine, Tower, Minn.

Here are banded ~~jasp~~ chalcedonic and jaspery rocks which are exceedingly interesting. Much of the siliceous material is white and chalcedonic whilst ^{whilst} and at the same time some of it is white and arenaceous, at least in appearance. Jasper and specular iron both occur as part of the banded rock but also traversing it in the most singular and striking manner.

Two belts of banded ore and jasper and three of schist light colored schist were made out at this place.

5

Aug. 10. 1884

Breitung Mine, N.E. $\frac{1}{4}$ Sec. 28, T. 6 N,
R. 15 W. Minn.

Handsomely preserved glacial
striae show on the surface of the
ore and jasper at this place on
a large scale. Trending south
 18° to 20° ^{max} (true ~~to~~ meridian).

Geo. C. Stone, Minn. Iron Co.
St. Paul will furnish plats of
mines.

Aug 10. 1884

Examined today the Breitung
and Stone mines and vicinity.
P

Banded gaspers as in the hill at the Lea mine occur here also. To the south of them are greenish gray schists the same as sampled by Chester in 1880. They form the south flank of a bold hill, are mottled and carry porphyritic quartzes.

Schists similar to these lie also in narrow bands within the gasper belts.

The ore exposures at both mines (particularly at the Stone) are large but in each case the ore seems to lie directly in the course of gasper belts. These belts are certainly different ones than those seen at in the hill at the Lea mine. From what we have seen at these two hills it seems evident that there must be at least three main ore belts ~~be~~ and four main schist belts besides subordinate inter-laminations.

From the top of the Breitung mine

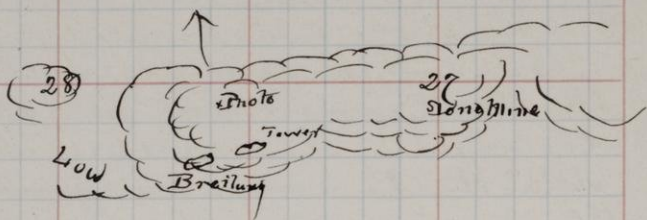
Sec.

T.

62

R.

15 W Men.



hill a photographic view of Vermilion Lake was taken looking west of north.

The strike of the banded jasper on Breitung hill evidently varies. At the Breitung mine it appears to be S. W. but at the Stone S. 95° W. (true meridian). The latter is also the strike of the schists S. of the Breitung mine and is taken to be the general course of the formation in this vicinity.

6927 }
 6928 }
 6929 } Specimens from the banded
 6930 } jasper belts of the Breitung hill.
 6931 }

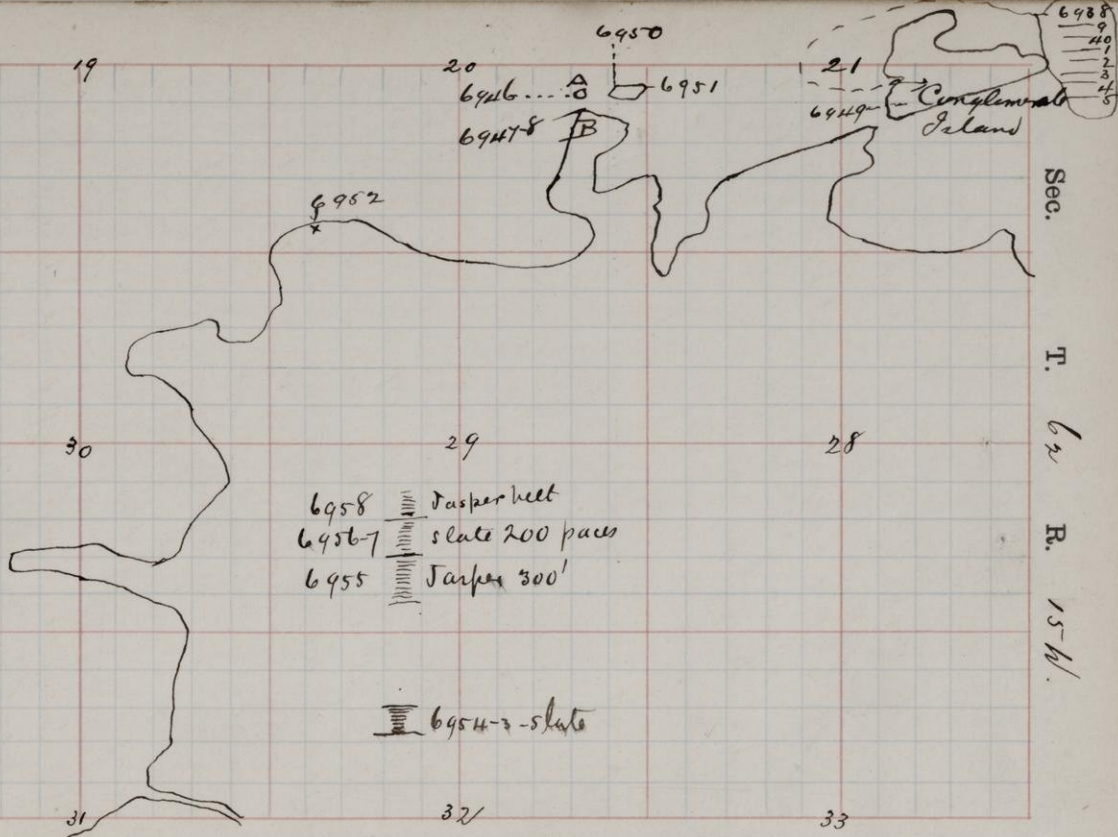
6932 } Ore from the top of the ledge at
 6933 } the Breitung mine showing glacial
 striae.

6934 Fragment from a large loose mass south of the Stone mine. supposed to belong to the schist belt, or does it come from further north?

6935 The schists south of the ore at the Stone mine

6936 A schist seam ⁱⁿ at the Stone mine
interstratified with the ore.

6937 An interstratified seam in the
schist 6935. Are the black part-
icles quartz crystals? These bands
like 6937 carry specular iron and
they seem really to be feeble develop-
ments of the jaspery ore.



Sec.

T.

62

R.

15 h.

Aug. 11. 1884.

9

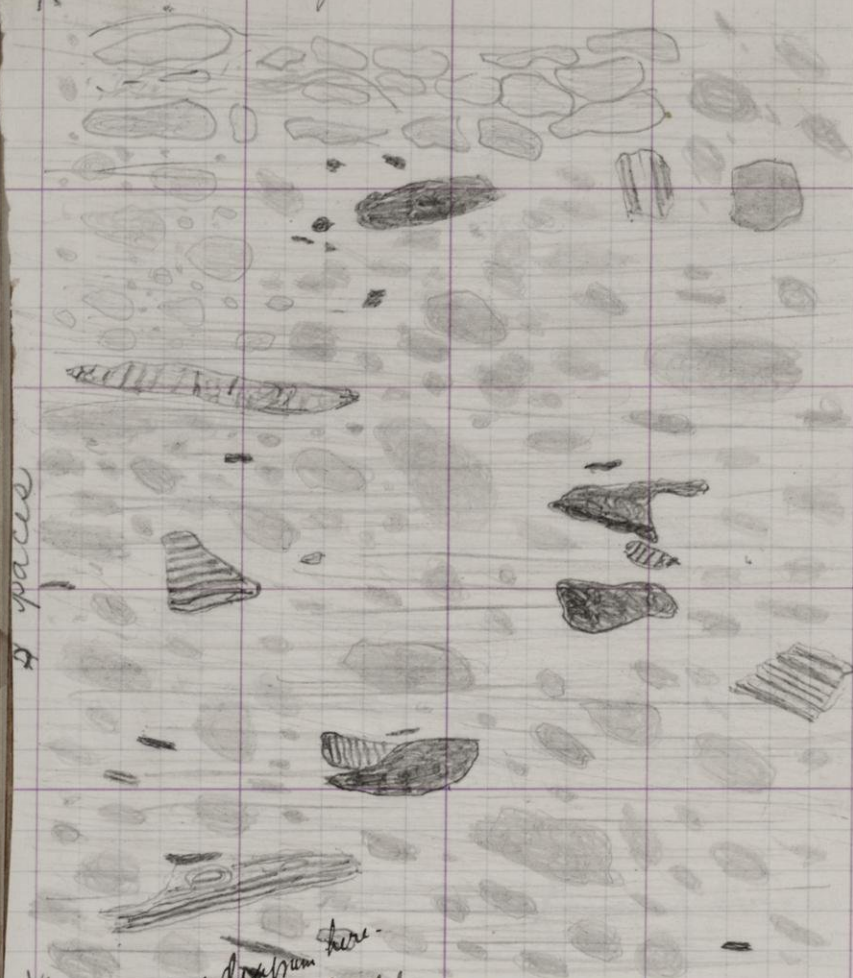
South side of Vermilion Lake, Minn.

On the ^{large} island in the E $\frac{1}{2}$ Sec 21
T 62, R 15 W, Minn glacial
striations are finely shown on
a white weathering of quartzite,
trending S. 10° W. (magnetic meridian).

This conglomerate contains numerous
fragments of a greenish to black slate.

6938 Shows ~~or~~ the quartzite carrying
these fragments. This is at the N.W.
corner of the island, crossing the
strike to the southward and pass
over quite a deep ravine into
which the lake runs at either
end and come again to a bold
bare ridge of this quartzite, which
is here a most striking boulder con-
glomerate strike S. of W. as
indicated by the trend of the
outlines of the island. The most
plentiful boulders in this con-
glomerate are apparently of a
quartz porphyry these weather
white and consequently on a weath-
ered surface are, though plain, not
so prominently brought out as are
the other fragments mentioned below.

Sketch showing conglomerate holding
 masses of chert, banded purple oo.
 4 paces.



Copy diagram here.
 also text below

on Island E. side Sec. 21 T. 62 R. 14 W.

Between the black masses above shown
 the rock is mainly made up of white weathering
 pebbles and boulders

6939 quartz-porphyrty pebbles
of a fine conglomerate.

6940 Congl. showing matrix of pebbles.

6941 - DO showing black pebble

6942 Dike it is 6941 - several
Dikes here - running at small
angle with strata - about ¹⁹ 5 to
One dike 4 feet wide - Another
3 feet divides runs in along
into the Congl. All seem to
be rock like 6942

In one place stringer from dike has
cut right through banded chert
fragments see sketch 30

6943-44 fragments from black masses embedded
in this Congl.

6945 frag. of porphyry pebble in this Congl.

The sketch on the opposite page was made by Mr. Merriam on the ground. It represents an area five by four feet in extent and is drawn to a scale.

6939 Shows the pre dominant quartz pebbles of this conglomerate. These are of rounded contour in comparison with the other fragments though not unusually rounded.

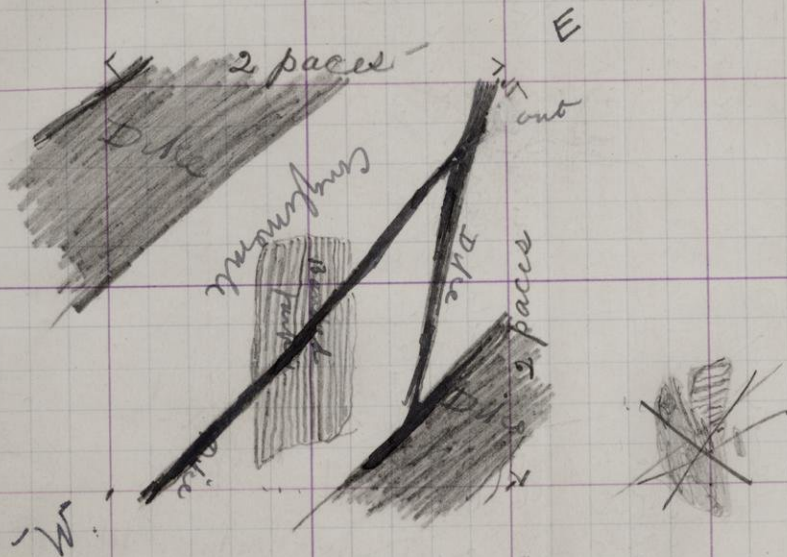
6940 Shows both matrix and quartz porphyry of this conglomerate.

Besides the prevalent quartz porphyry pebbles, pebbles of greenish slate and particularly of a banded chalcidonic and jaspery material most unmistakably from the jasper belt of the Breitung and Lea hills ^{from} are a most striking feature of this conglomerate. They are always sharply angular ^{at times} and ~~to~~ even thin slabs and being frequently of large size (see accompanying sketch in which these fragments are drawn to a scale) and of a very dark and pronounced color as compared with that of the ~~so~~ body of the rock present a most

Sec.

T.

R.

striking appearance
of batholith and dikeSketch on Congl. D. V. Lake -
Drum to scale6944 } banded masses in
conglomerate.6946 } Represents the
slaty rock from the

Aug 11

Island in V. Lake - E. Side

Sec 21 - 62 - 154 - glacial
correlations - S. 100W magnetic- on a white sandy quartzite
~~6938~~ - full of fragments of
greenish black slate 6938 -
this is interesting as showing
discontinuity of strataSlate fragments $\frac{1}{2}$ to 6" long - flat
this quartzite 6938 strongly
schistose
in this wayFurther south on this Id. the str. becomes a boulder conglomerate - of various
kind - Immense slabs three feet
long of purple banded purple & brown

11

striking appearance. The banded
chalcedonic and jaspery masses fre-
quently reach 3 to 3½ feet in length.

6941 Is a fragment of this conglomerate
showing a black pebble.

6942 Is the rock of a dyke traversing the
conglomerate, On the south side
side of the island and particularly
at the S.E. end several dykes may
be seen trending about E. & W.
or at a small angle with the strike
of the rock. One dyke noted was
4 ft wide, another 3 ft. All seem
to be of rock like 6942. In several
places these dykes were seen to
~~also~~ send out narrow strings
into the conglomerate. At one place
as shown on in the sketch on the
opposite page one of these narrow
stringers cuts directly across one of
the banded jaspery fragments.
The sketch is drawn to a scale.

6943 } Fragments from the large
6944 } banded masses imbedded in this
conglomerate.

6946 Is Represents the dark colored
slaty rock from the Islet A of the

map on the opposite page. (S.E. $\frac{1}{4}$
Sec. 20, T. 62, R. 15 N.)

6947} Banded slaty rock from Point B of
6948} opposite map. At this place glacial
strial run N. and S. (magnetic
meridian.)

6949} Fragment of one of the boulders of
the conglomerate above described (6940,
6941, &c.)

6950} Slaty rock from the islet island
6951} C.D. of the opposite map (N.E. $\frac{1}{4}$ S.E. $\frac{1}{4}$,
Sec 20, T. 62, R. 15 N.)

6952} From Point E of opposite map
S.W., S.W., Sec 20, T. 62, R. 15 N.)

Sec.

T.

R.

see map previous page -

889

6950

6953 }
 6954 }
 6955 } Specimens from the Jasper and
 6956 } slate belts in the north part of
 6957 } Sec. 32 and south part of Sec. 29
 6958 } T. 62, R. 15 N. as shown in
 sketch on the opposite page.

Port Arthur, Ont. to Kaka- bika Falls.

The road from Port Arthur to Kaka bika for the most part on rather low ground bold elevations lying both north & south of it. Indications that the cherty, ferruginous, basal, or beds underlie the country between Port Arthur and Mowille are constantly met with in the shape of frag^{me} characteristic looking fragments and of slight cuttings into the rock in situ. The slightest ditching on the side of the road nearly invariably turning up the rock.

- 6959 Is a fragment of the characteristic cherty material seen along this road
- 6960 Is from the top of the slate exposure at Kaka bika Falls on the north side of the road. east side of the river.
- 6961 } Other specimens of the cherty ferrugi-
6962 } nous beds ~~sp~~ above spoken of collected on the road between Port Arthur and Kaka bika Falls. and at the Falls East side - lfp.

