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Quartzites of southern Minnesota: [specimens] 6900-6924. No. 12 1883-12

Irving, Roland Duer, 1847-1888

[s.l.]: [s.n.], 1883-12

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U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 12.

Oct. 1883

Quartzites of Southern
Minnesota

6900-6924

R. D. 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.

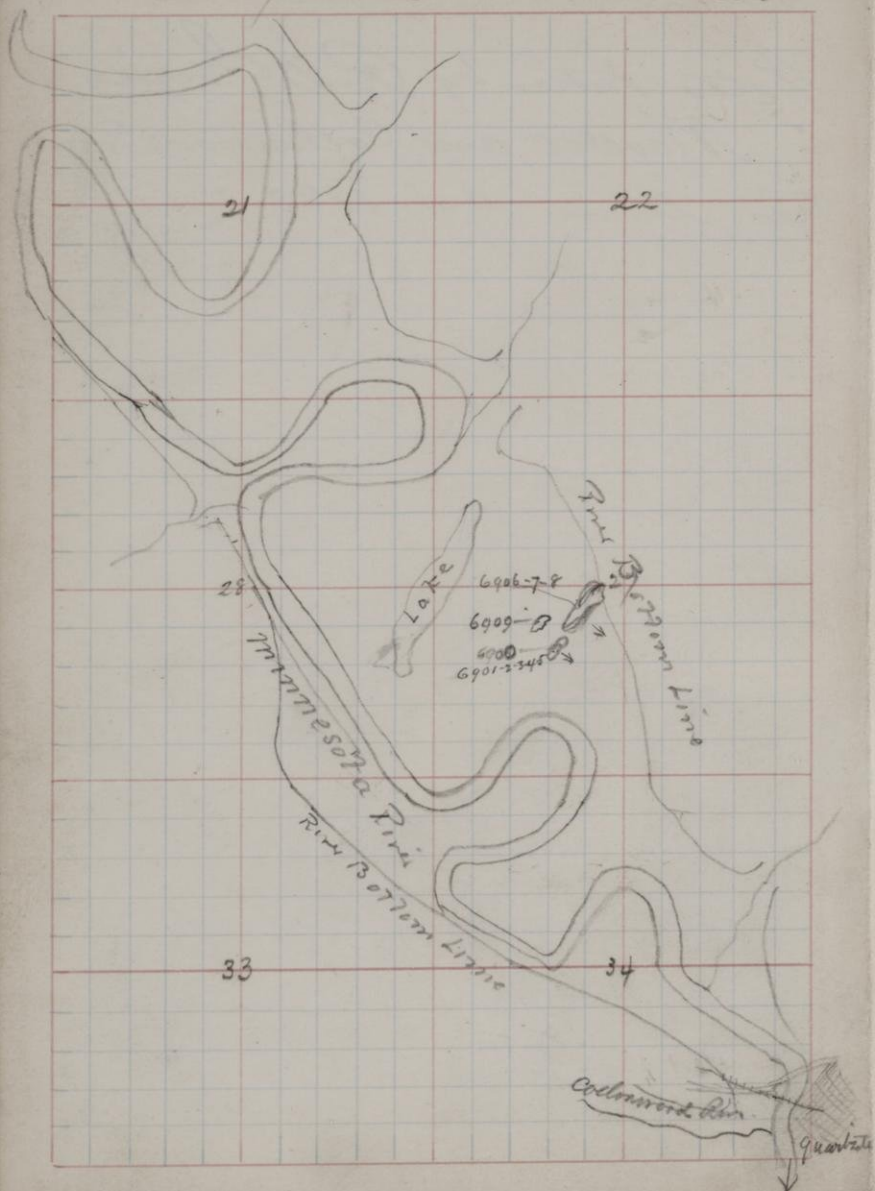
#12

Quartzites of Southern
Minnesota

Quartrites of Southern
Minnesota.

Notes taken by R. D. Irving
in Nicollet and Cottonwood Coun-
ties. Minn. Oct. 1883

Sec. 27 T. 110 R. 30 W. Minn.



Oct. 19 '83

Neis Uluu Minnesota - Oct. 19 '83

S.W. 27, 110, 30 W

6900

to

6968

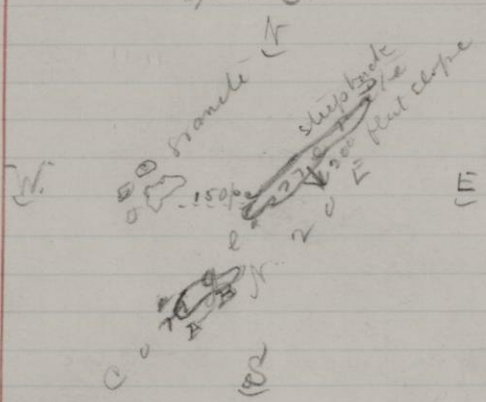
S.W. 27,

110, 30 W

Neis Uluu

Minn.

Conglomerate - very coarse in cer-
tain layers - rising out of
matrix - pebbles up to four
inches - white quartz pebbles, red
felsite pebbles, plentiful - also
others - see specimens - Also some
quartzite pebbles N. 20° E mag. strike.
Dip 20° 25° south of E. Higher layers
a fine conglom. false bedded -
this is exp. A.B.

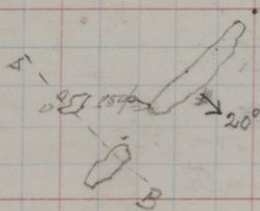


Exposure B.D. is larger - Pebbles
are 6" to a foot. mostly white quartz
sometimes granitic - see specimens -
Red felsitic boulders next in abundance
to the quartz ones. Next and there
a black pebbles - flinty.

Sec. 27 T. 110 R. 30 Minn.

corner

corner



see larger scale next page

x cut

x cut

Oct 19 '83

SW. 27-110-30W-Minn.

2

The matrix of the rock looks here perhaps as if a recrystallized granite -

6900

SW. 27, 110,
30W. near
Hesselm
Minn.

This conglomerate, showing pebbles of various size, and some of the matrix. From the exposure A B of the sketch on p. 1 - The higher layers are still finer - The lower layers are very coarse and thickly studded with pebbles, giving the whole at a little distance the appearance of a pebble bank.
(large conc. s. p. conc.)

6901

Same place
as 6900

Red felsite pebbles from this conglomerate - on exposure C. D. there run up to a foot and more in length - though usually not so large as the pebbles of white quartz which are also much plenty - the red felsites are next in abundance with the quartz.

6902

Same place
as 6900

Pebbles of a dark brownish felsite, not so abundant as the red felsites -

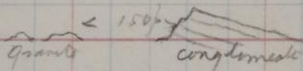
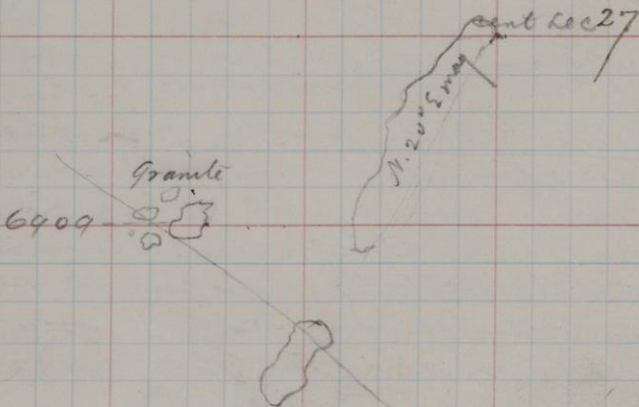
6903

Same place
as 6900

Pebbles wh. seem to be more distinctly granite-like - But it is strange that (in the time we spent, which was not long) we did not find any granites wh. we could refer to the granite exposed nearby

Sec. 27 T. 110 R. 30 W. Minn.

Each square 50 steps - roughly



perhaps 25' in thickness in all - seen

1/4 part
+ south line

Oct. 19th 53

S. Co. 27-110-300 Minn.

3

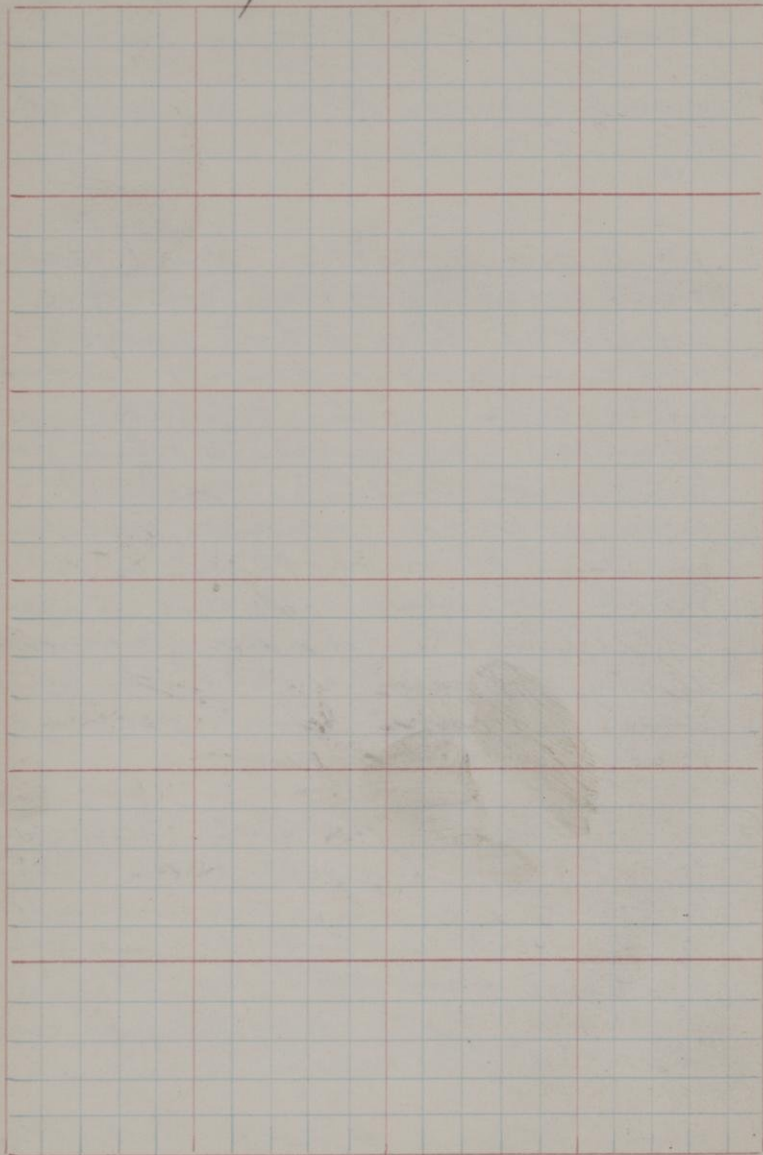
6904 Black flinty pebble. These
same pl
as 6900
occur often of some size -
6" long - but are always
much rarer than any of the
following kinds -

6905 White quartz pebble. Most of these
same pl
as 6900
white quartz pebbles are of a
pure vein-like white quartz -
and correspondingly quartz is never
to be seen in the neighboring
granite. Many of these white pebbles
are variable boulders - reaching 10-15
inches in length - mostly much
rounded - However there is also
much angular material - especially
by common the smaller fragments
many of which are sharply angu-
lar - Some of the quartz pebbles are
smoky quartz, as seen in

6906 which shows a moderate sized pebble
same pl
as 6900
of smoky quartz, with other smaller
fragments, and also the characteris-
tic pinkish matrix, looking on
a casual inspection something like
a granite - Is there any felspar, in
fragments, in this matrix?

6907 Shows fragments of pebbles of what looks
same pl as
6900

Sec. 27 T. 110 R. 30W. 11N.



Oct. 19183

Sec. 27-110-30W. Illern.

4

like an arenaceous white quartzite they are uncommon.

6908
sample
606900

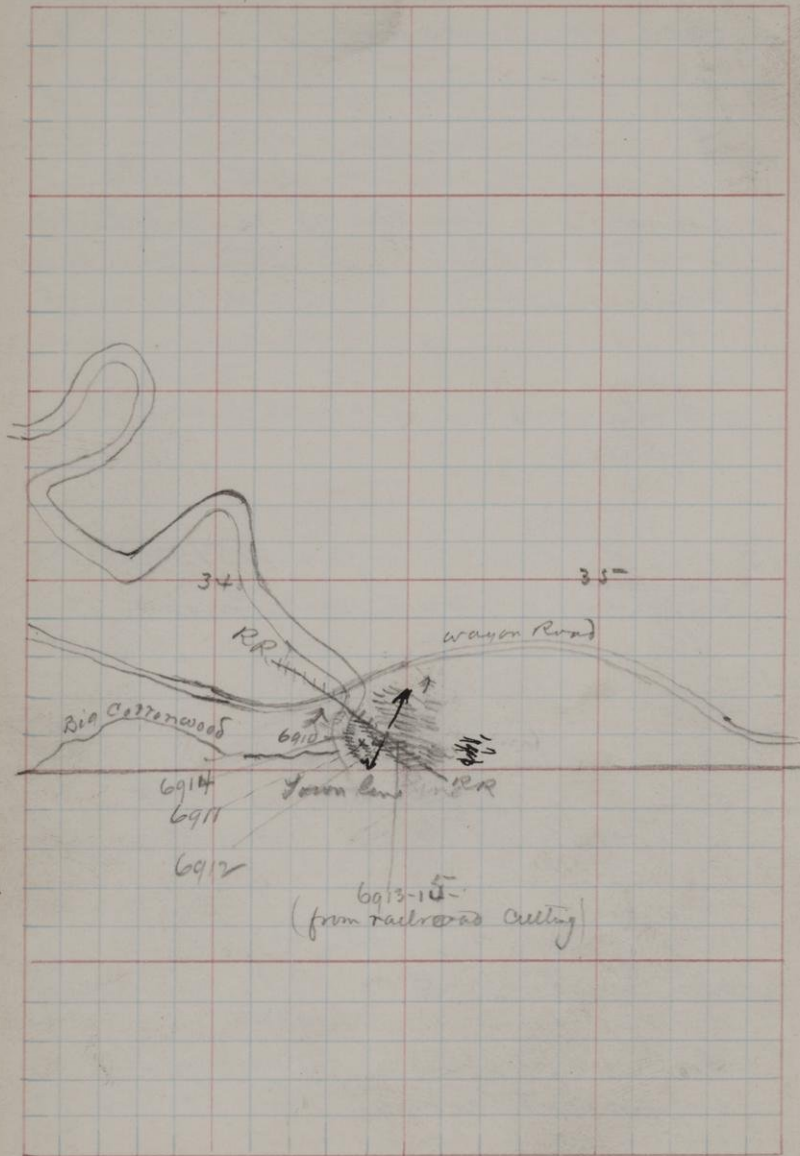
Fine Anglomerate forming matrix of the Boulder Congl. of exposure BD, and also the matrix of the upper layers - Are there any feldspar particles in this? Is there any chalcidonic quartz? Consider seriously the question of chalcidonic quartz in quartzites - At a distance this red dirt matrix is suggestive of granite -

6909
Granite
underlying
6900
150 p. west.

Granite from an exposure 150 paces due west of south west end of A.B. The rock is very coarse, and rotten and carries bits of quartz - It does not make a very nice exposure - but a number of small ones - less rounded and jointed. Note the very large rounded orthoclases which make up the body of the rock. We failed to find any of this granite among the pebbles of the residual Conglomerate. The white quartz pebbles may be traced to this rock and the other pebbles, etc. - may readily be supposed to belong to the same formation with the granite -

Sec. 34 & 35 T. 110

R. 30 W



Oct. 19 '83

5

Red Stone Mine - Oct. 19th 1883

S.S. S.E. 34, 110, 30 W - Mine.

The rock exposed along the East bank of the river, below the railroad bridge is thin bedded - even thin laminated shales - It is red spotted with white, and certainly recalls the "western sandstone"

6910

S.S. S.E. 34
110, 30, 10 -
Red Stone
Mine,

Comes from here. It was selected as showing a peculiar conglomeratic appearance. Yet on close examination the conglomeratic portions, or pebbles rather, seem soft & claylike. Are they altered pebbles? -

Ripple marks observable here in many places -

Dip here - number of determinations -
N. 25°-30° - Strike N. 58° W. may be
variation per town plat 11° E.
Somewhat further - better determination strike
N. 75° W

6911

Quarry
S.S. S.E. 34
110, 30 W
Red Stone
Mine

From small quarry on bank above - Fine opportunity for dip N.E. 25°-30° - Strike N. 75° E Shows heavy & lighter layers interstrat. This on flank of hill - Same conglomeratic character as before - see specimens.

6912

Quarry
S.S. S.E. 34
110, 30 W
Red Stone
Mine,

On top of this hill before reaching
r.r. cut - here massive purple
quartzite. Evidently overlies 6911 -
see specimen.

Sec. 34 T. 110 R. 30 W. *Ill.*

See maps opposite p. 4

Oct. 19 '93

6

SE 34, 110, 30W. Minn.

- 6913 From railroad cut shows Sandstone
+ quartzite in same piece
Railroad
cut S.S.
S.S. 34, 110
30W -
Redwoodlin
- 6914 From same place as 6910 -
Note Beccular material on
surface
Same pl. as
6910
- 6915 Ferrous concrete from
the R.R. cut.
Same pl.
as 6913

The rock at Redwoodlin covers a considerable area - showing along river bank (where it is thin, shaly & chaly con.); on a large scale between mine + r.r. cut (where it is, at top of hill had purple, typical quartzite). And again in the railroad cut. It also was seen forming a high knob east of the cutting, & probably extends somewhat somewhat into the next township. It was also crossed in large surfaces in going north from the railroad cut to the Wagon road. A number of good determinations all about showed a pretty persistent strike N. 75° E. and dip N.E. 25°-30° - more nearly the former - 26° or 27° would be near the truth for the whole. No attempt

Sec. 34 T. 110 R. 30 Willam.

— See map opposite page 4 —

Oct. 19 '83

70

was made to measure the total thickness. But it is easy to see that there must be several hundred feet at least.

At first it seemed as if the hard purple quartzite, fully as hard as any of the Baraboo, or indeed of the original Huronian quartzites, was restricted to the Exposed portions on the hill side and top, the softer portions below on the run being continually washed away. But in the railroad cut it became soon evident that the mould was - for then the hardest kind of quartzite is intercalated with, and arranged in irregular areas in the softest kind of unmetamorphosed sandstone. The peculiar, irregular distribution of the induration suggested the possibility of its production by solutions coming down along joints and spreading irregularly through the layers and often across the several layers, producing the irregularities observed. In some places - and the same was observed largely in the quartzite of Cottonwood County. peculiar, irregular concentric areas of iron infiltration were observed.

Sec.

9

T.

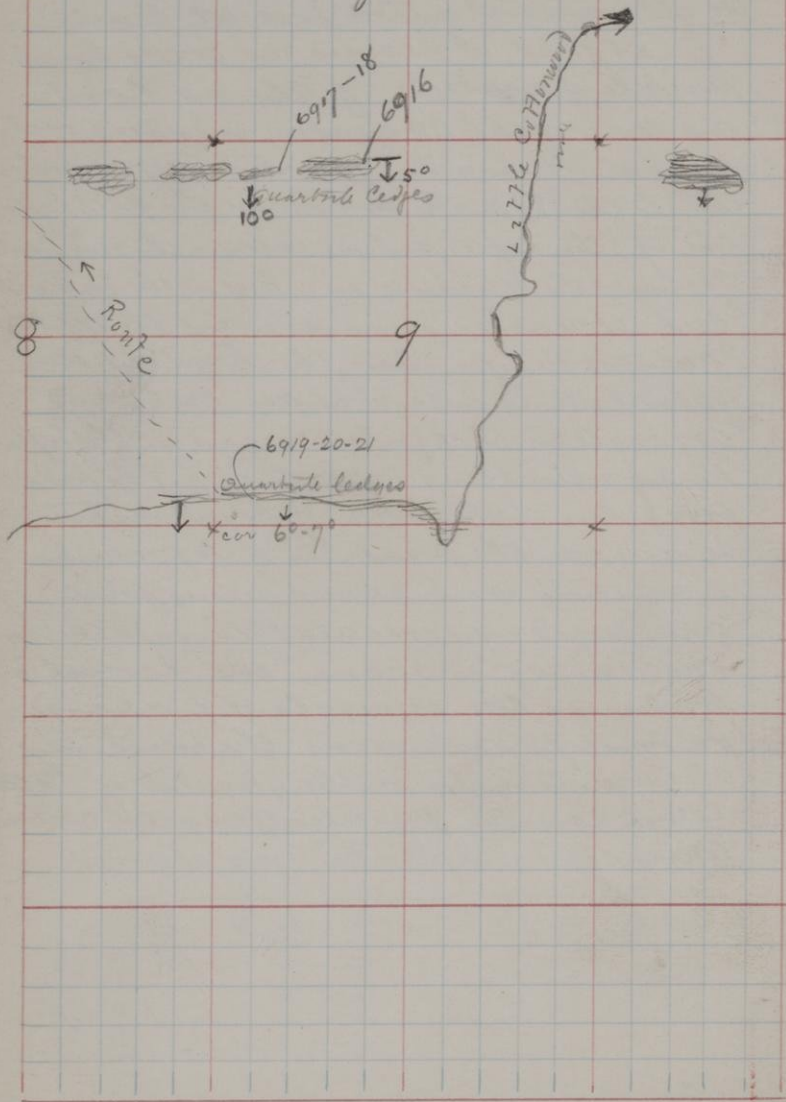
107

R.

350

Minn.

Town of Delton. Cottonwood County



Oct. 20 '83

Illin.

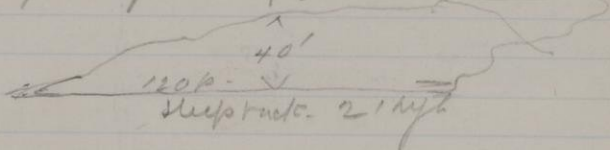
8

NW Sec. 9, 107, 35W - (Dellin) Colburn Co.

log
N.W. 9, 107
35W.
Dellin
Colburn
Co. Illin.

Quartzite from Summit of Springfield
on Little Colburn Mt. dips Summit
50° - strike E-W. (N 85° W' may.) -

A large surface ↑ South



Abm is outline of large dips sur-
face. A number of other
similar surfaces (doledores)
the prairie - the rock is red &
regularly and very heavily bedded
& splits into thin regular slabs - all
uniformly but not very thoroughly
indurated. Ripple marks
here and there -
(According to branch all the
quartzite ridge runs south
of here some ten miles.)

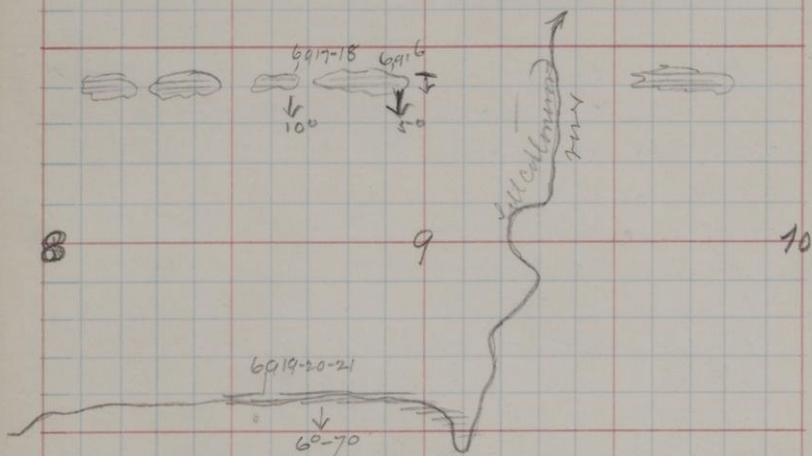
all fairly glaciated & Crutches
all SE - N-W a singular di-
rection. Several determ. make
S. 45° - 06°

South $\frac{3}{4}$ miles other beds dip
very same way. must be a
Cryol thickness

The glacial markings are strong here
also quite good road marks. A determ.
makes the quartz S 45° 2'

Sec. 8 and 9 T. 107 R. 350 Minn.

DeLton, Cottonwood Co



Oct. 20 '83

9

These low ledges rise from out
of the top of a high east-west
well in the prairie - ~~or~~ - ~~from~~
nearly continuously - ~~200~~ ~~feet~~
as far as eye can see

West of the former place several hundred
paces the dip is higher - 10° S. - a
better determination than before -
and the rock is purple and more
thoroughly indurated - but
linings like the Basalt
quartzite - and the quartz
induration seems to be greater
along the joint surfaces

6917 is this more indurated rock but
has one surface showing quartz
deposition on a joint - This
piece is broken from a cage
overturned mass

Nov 9
107, 350
Deltin
Co. Linn
Co. Linn

Exp. using one of prairie

6918 from same place as 6917

Same place
6917

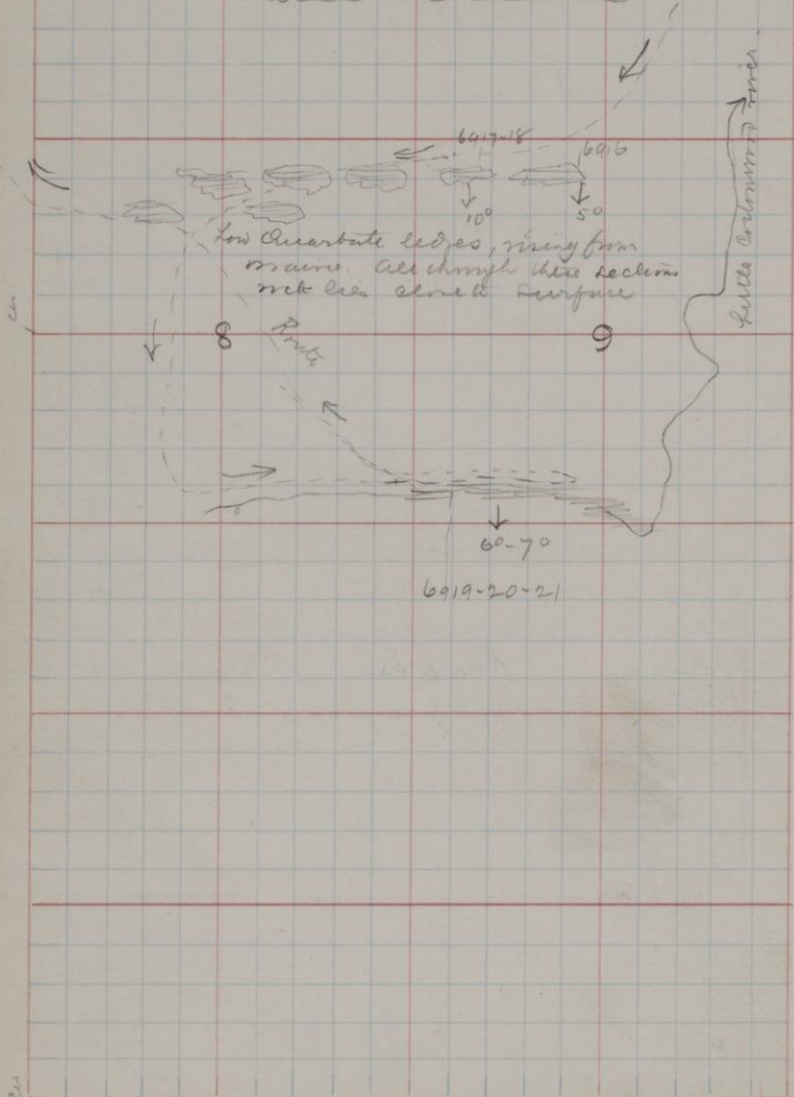
Following this ledge out we
found ourselves on N. 2. 1/4 Sec
8 - Deltin -

(Three miles east this rock is

Sec. 5 8 and 9 T. 107

R. 35 W Minn

Town of Dellon, Carlton Co



Oct. 20 '83

10

quarried.]

S

6919 Little columnar m. -
underlies 6920 Dip. 60 - strike E-W
mainly - 50 paces

Prange

6920-21

6919

red quartzite
not seen.

this layer
resembles zone 6

6919 Several samples illustrating
phases of zone 6 feet

6920 } represent the more massive
6921 } layer of atria section

SW. 9
107, 250
Section
Columnar
Column.

These specimens from the
same blocks of rock - note
that one seems much more
sandy than the other yet
the two are from within ten
feet of each other. 6920 is
from the side of a joint crack.
Does not show fracturing or
induration spread from the cracks!

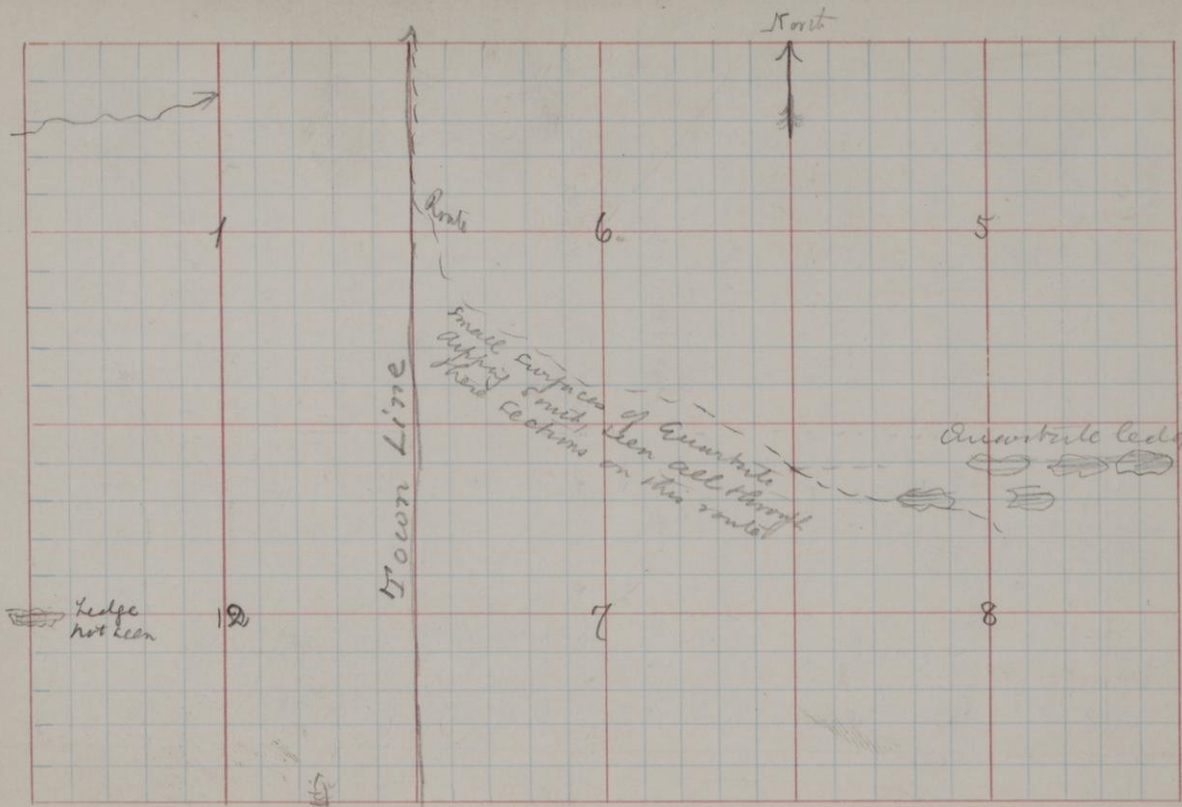
Note the peculiar iron staining in
concentric (irregular) lines. Con-
ditionary?

The upper massive layer
of atria section much like
Basater.

Sec.

T. 107

Ranges 35 and 360 Min.



Down line

North

Route

Small surfaces of quartzite dipping South, seen all through road sections on the route

Quartzite ledges

Ledge not seen

Ledge not seen

marked on Brown plat.

Oct. 20 '83

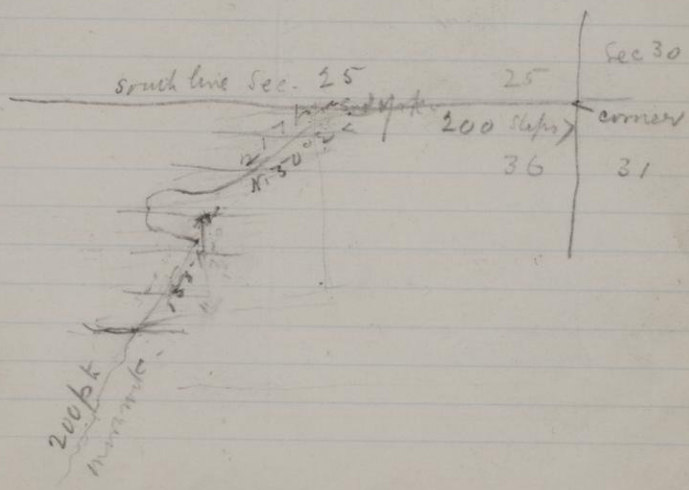
(103-2)

11

In this quartzite pebbles small
omnipresently occur. whole
quartz mostly - occasionally
red - Jasper or felsite?

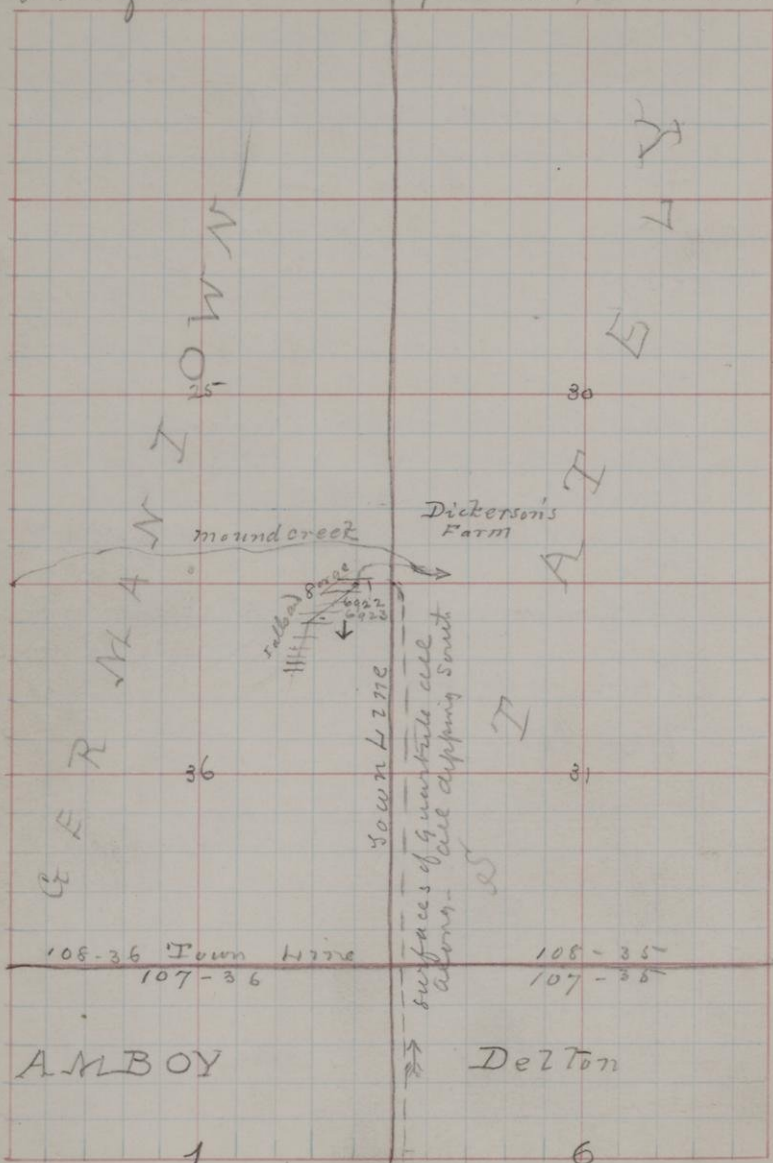
Spring now through sections 8, 7, 6, 107, 35, and 31
of 108, 35, 30.
We took the quartzite all the way
until in N.E. 1/4 Sec. 36 we found
on mound creek quite a gorge. There
30 feet + is shown in vertical section
of probably over 100' in the immediate
vicinity. The rock dipping S 50° as
usual wh. it has done all the way -
through Secs. as above

At the mound creek gorge the rock
is mostly very sandy - but is at times
hard and vitreous.



Parts of Sec.

T^s 10 9 + 10 8 R. angles 35-0 36 W Minn



Oct. 20 '83

(100-0)

12

6922 Hard rock at Merand ch. fuels
6923 soft rock most plentiful -

Cyclaceras
Sandstone
Sec. 16, T. 109
R. 29 W - Mem.

6924 Said to be Ordovician sandstone by Combed
Stroocian in place, containing decolp
leaves - Sec. 16 - Crystal Mt - T. 109
29 W - North side Minnesota river
(stone in bag)

In ^{SW} Sec. 30, T. 108. R. 35 W, further
exposures occur on Merand Creek, at lower
falls.

The quartzite is seen thus to have a
surface width from exposures on South
line Sec 9 - 107-35, and Sec. 12, 107, 36,
to those on north line Sec. 36, T. 108, 36, of
just three miles - The width may
be greater, no attempt was made to ascer-
tain as to this - but through this three miles
the dip, as shown by numerous exposures
all along, is constantly to the South
and is undulated at 50. Probably 6-7'
would increase the width - 15840 feet horizontal
width, at 50, gives a thickness of 1378 feet.

15,840	}	Probably 1500 feet would be a fair state- ment.
57		
110880		
126920		
100(1378,080)		

Sec.

T.

R.

Feb. 15th 1884.

E. J. Sweet tells me that in the middle of Mountain Lake, h. s. part of T. 105 R 34 West. is a great island 200 feet high, of quartzite.

Merriam went to this place June 1885 & found no rock!

