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Marquette Range: [specimens] 25285-25362. No. 148 July 1893

Van Hise, Charles Richard, 1857-1918
[s.l.]: [s.n.], July 1893

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AD
74
U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

Marquette Range
(Goose Lake vicinity, main)
C. R. Van Hise

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.

25285

#148

~~25203~~

25309

25325-31

25340

platted to No. 25375

Marquette Range.
July 1893

Remarks. The rock called
Goose Lake Schist in the
note-book, proves on mi-
croscopic study to be Kar-
lins Schist or Gneiss in
which the feldspar has
wholly decomposed. The
original rock was clearly
granite and the present
form is produced by shearing
and alteration. It is
possible that in the field
the sheared granite has
been in some cases confused
with the much altered clastics
such as Argillite and Mica
Schist.

Goose Lake, Friday, July 14

Went one mile toward Ne-
gawee on railroad from
Goose Lake station. Here
found typical exposures
25285 of iron actinolite, very reg-
ularly bedded strike $N70^{\circ}E$
 $D. 35^{\circ}NW$. In places contains
cherty bands two or three inches
in thickness. Going Southward
along the track exposures
of ordinary gray rocks
were found striking, and
dipping the same that is un-
der the iron actinolite. A
little farther along the track
are exposures of ordinary
quartzite, Bayley's spec. 17037.
Now crossing the bay of
Goose Lake we come to ex-
posures at and near the
belms of regularly bedded
rock consisting for the most
part of finely laminated
25286 black chert and more vi-
lucous layers. Interlamin-

A. being apparently the crown
of an anticline. The axis
of which plunges to the
Northeast from which the
rock dips off to the N.W.
and S.E. at flat angles.
In the first direction the
dip becoming as high as 40° .
The plunge of the anticline
could not be determined
accurately but appears to
be not more than 10° or 15° .

ated with these are thicker
 bands of material resem-
 25287 bling chert, S $N40^{\circ}$ to 40° E about
 20° to the N.W. Strike and dip
 taken near houses. Under
 the kilns the material ap-
 peared to be almost flat.

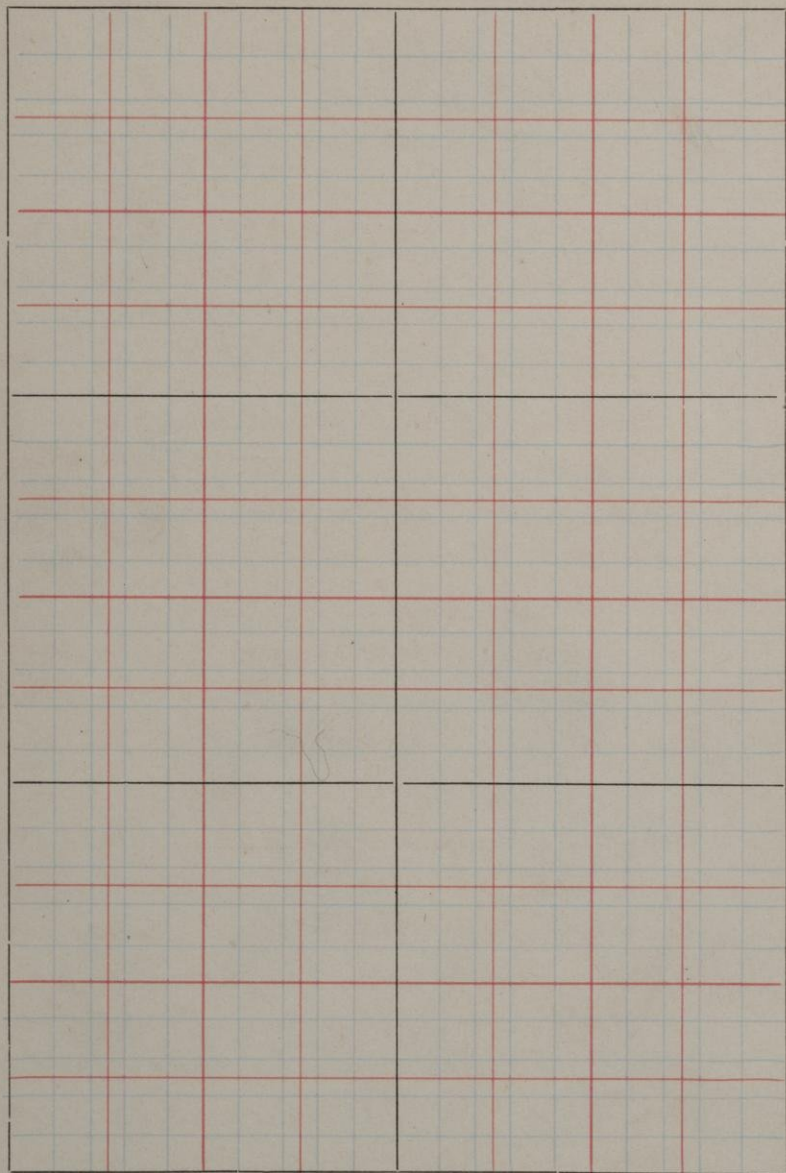
Between the exposure of iron
 actinolite (25285) and the
 typical gray wacke is an ex-
 25288 posure just south of the ~~gray~~
 track of gray wacke which
 contains bands of slate rich
 in iron carbonate. On the
 weathered surface it presents
 small areas which are almost
 identical in appearance with
 the iron actinolite. This tran-
 sition ledge combined with
 the fact that the gray wacke
 and quartzite dip under the
 iron actinolite seems to show
 that the latter belongs in
 the upper Marguerite iron
 formation.

4

S.

T.

R.



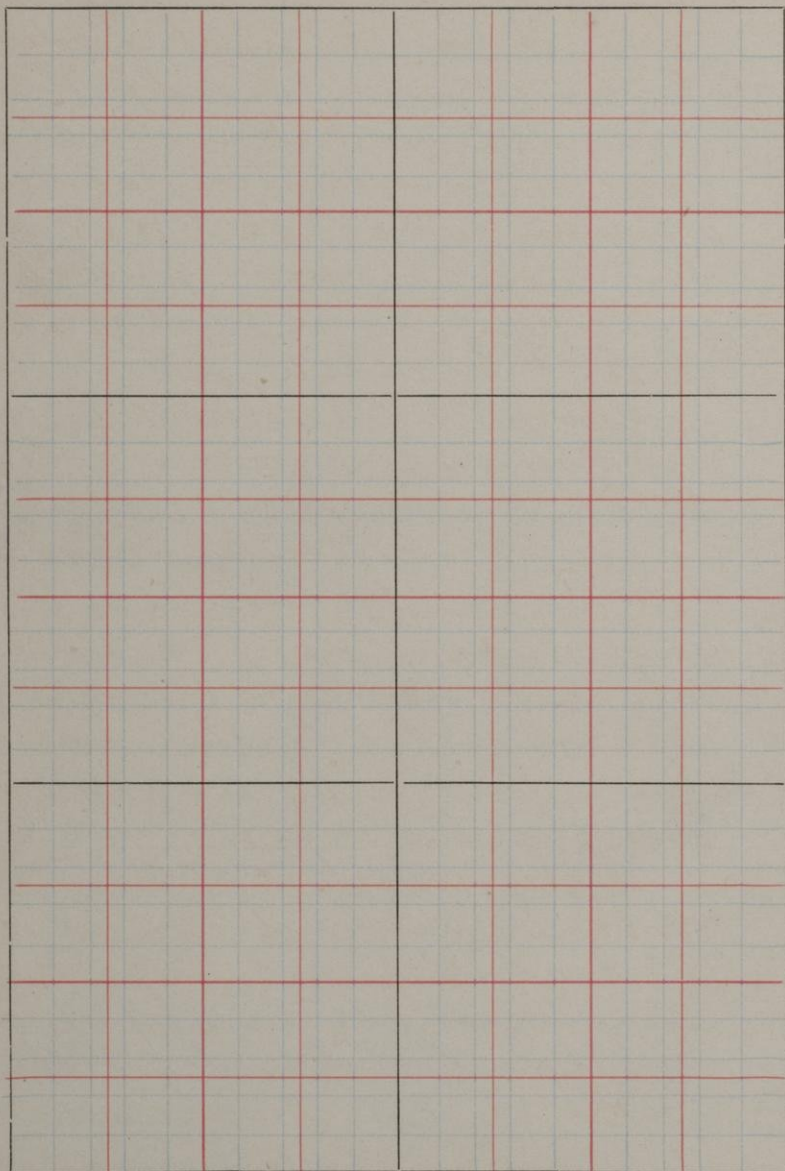
Going northwest from N.W.
 corner of conglomerate bluff
 in Sec 22 across a small
 valley we came to a bluff
 of the Good Lake cherty schist.
 Crossing this we found large
 25289 ledges of black laminated
 cherty schist, which has $S 71^{\circ} 15' 20'' N.$
 and $D. 60^{\circ} E.$ The ledge is also
 by a more prominent foliation.
 This strikes $N 50^{\circ} W.$ and has
 a vertical dip. The ledge
 is traversed through and
 through by veins of quartz
 but the majority of these
 are parallel to the schistosity.
 Parallel with the bedding
 75290 are cherty layers which are
 traversed by the veins of quartz
 along the cleavage and are
 therefore earlier than the
 schistosity. As the slipping
 movement which produced the
 schistosity left the space now
 occupied by the quartz veins.
 At one place the movement

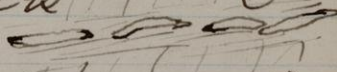
6

S.

T.

R.



7
has been so great parallel
to the schistosity as to break
up the chert and schist lay-
ers into angular fragments.
These have been recemented
by quartz and the zone
taken on the aspect of a "peb-
bles" breccia. It is hard to
believe that this ledge is
not of sedimentary origin.
It is now however apparent
lay a crystalline schist.
This and similar ledges
must be near the N.W. cor-
ner of Sec. 22-47-26. The cherty
layers wide and narrow of
thin ending in a series of
sharply oval pieces
lying end for end. 

When fractured the cherty
laminar layers have the
appearance of a quartz
crystalline schist.

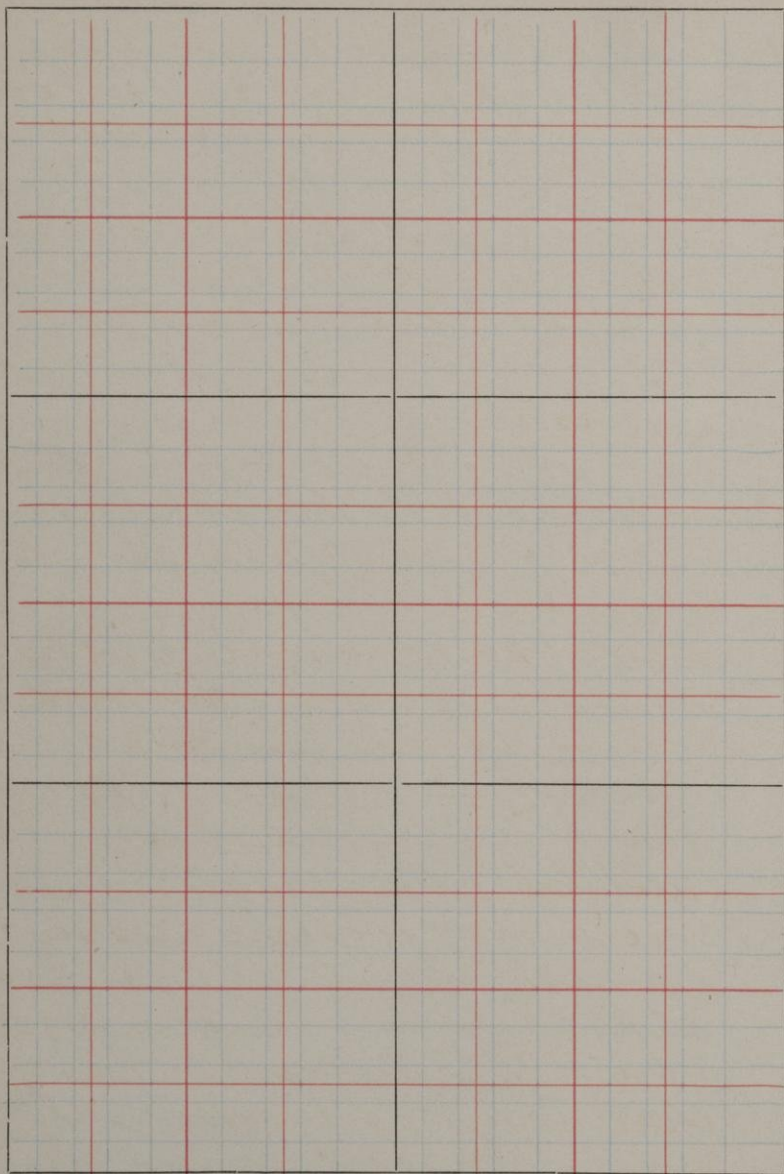
Going nearly west, along
the strike of the schistosity
we pass to another knob

8.

S.

T.

R.



where is finely shown a
 very remarkable breccia.
 The fragments are all of the
 black, slaty or cherty rock they
 vary in size from minute
 fragments to great blocks
 several feet in diameter.
 The whole is cemented
 mainly by rein quartz
 but in part by hematite
 and jaspery ferrous. The
 veins of the latter are later
 than the white quartz veins
 and when of some width the
 bands of ore and jasper could
 not be discriminated from
 the ferruginous parts of
 the iron formation. The
 fact that the cementing ma-
 terial is of a vein character
 the fragments all of one kind
 and usually excessively ang-
 ular leads to the conclusion
 that the exposure is a "Ri-
 bbing" breccia rather than
 a conglomerate. The black

10

S.

T.

R.

and gray schist set in the
white quartz vein and orna-
mented by the specular ferri-
malite and red jasper in
less or quantity make the
rock a very striking one.

The fragments of schist often
have around them paral-
lel zones of quartz, hematite
and jasper although usually
the quartz zone is above.

25291 Small fragments of finer part
25292 of breccia.

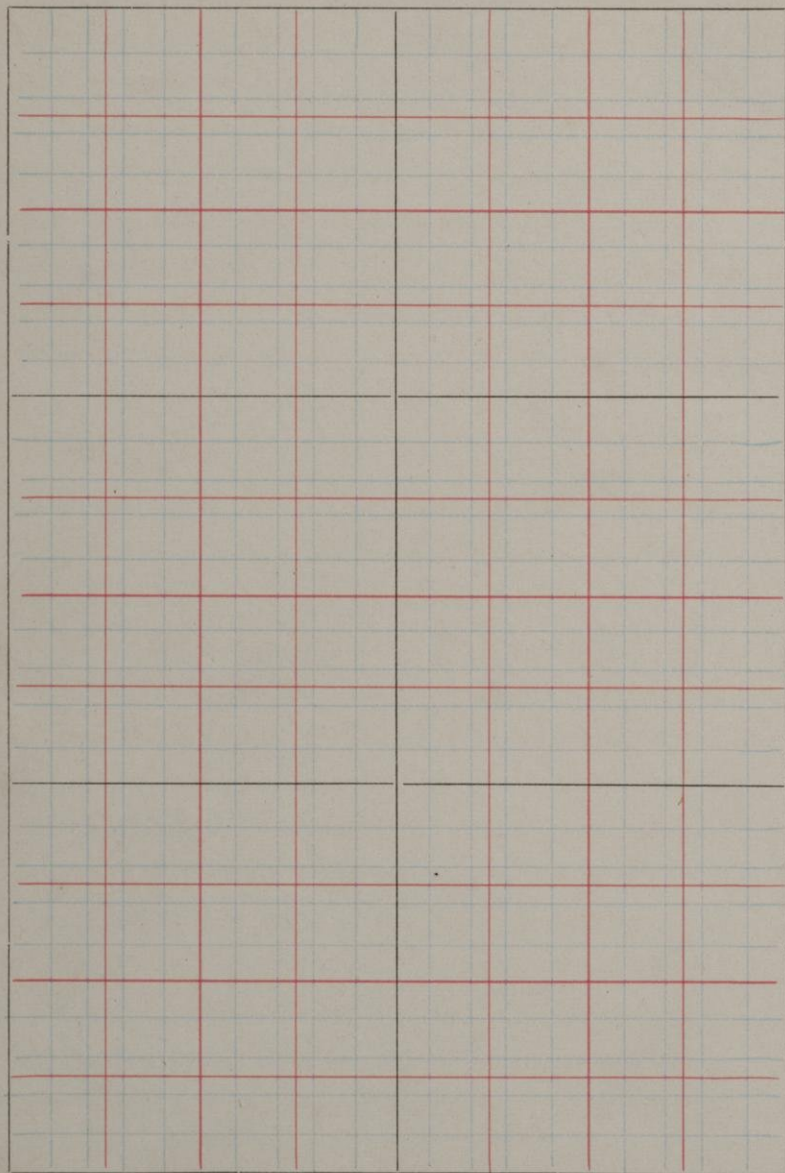
Following the ledge to the
west along the schistosity
we pass almost immediately
to ordinary ledges of the
district such as before de-
scribed. We however con-
tinued onward until we
reach a prospector's cabin
where the "Ribby" breccia
again occurs but the vein
filling is here very largely
hematite, so that the material
has been prospected as at Goose Lake.

12

S.

T.

R.



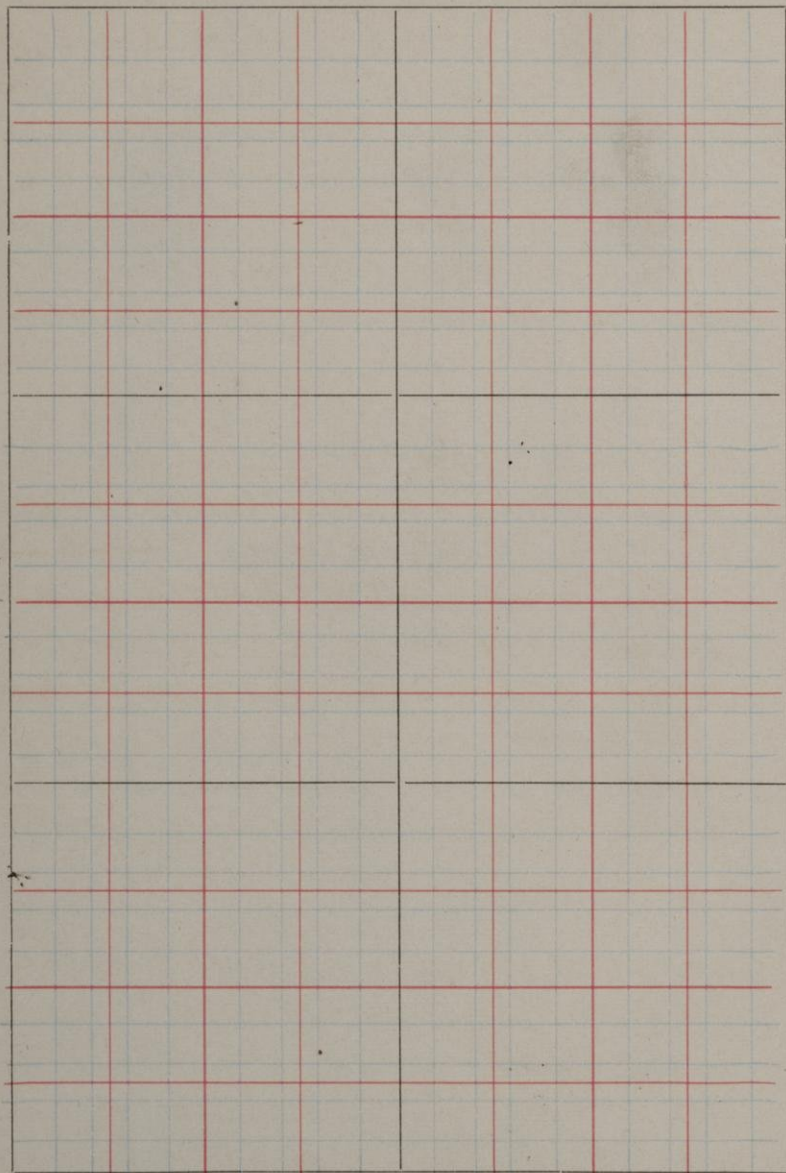
There, jasper and schist
 associated by the quartz
 jasper and hematite give
 a strong resemblance to
 the basement complex of
 the Upper Huronian. This
 resemblance is plainly
 superficial. The two rocks
 being radically different
 both in geological position
 and origin. The unmistak-
 able secondary character
 of the jasper however gives
 support to its secondary
 nature in the transforma-
 tions of the Huronian. Go-
 ing south down a little
 river the black schist
 with a transition zone of
 three or four feet by the
 typical white cherty schist
 so extensively found in
 the Marguerite District at
 upper part of the basement
 in color. The dip of the schist-
 osity is about 80° north.

14

S.

T.

R.



25294

Going about one fourth mile
across a valley in a direc-
tion somewhat west of south
we came to typical well
bedded ledges of vitreous
upper quartzite S. N 78° E D 20° N
That is the strike ^{approximately} ~~to the east of~~
parallel to the range of schistose
ledges and the dip is away
from it. E. r.

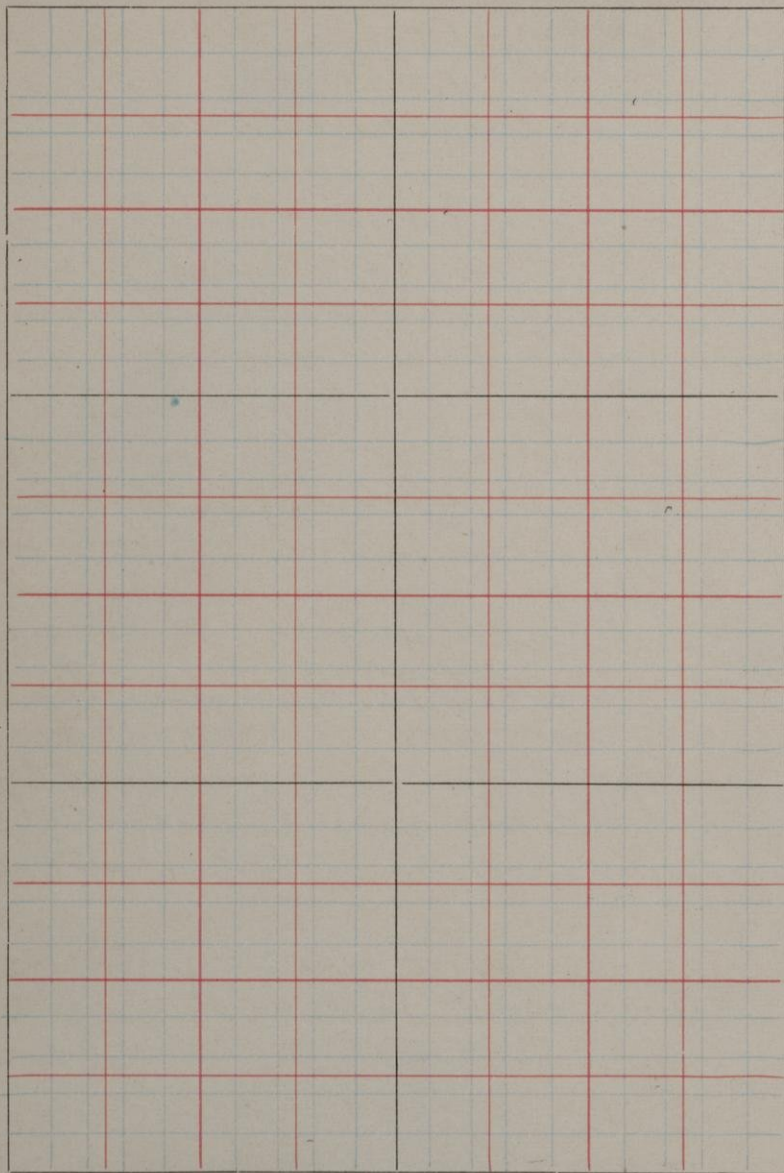
In returning followed
along south side of ~~schist~~
~~ridge and found ledges of~~
~~same class & the bottom of~~
~~the valley showing that~~
~~stream is not a boundary~~
~~of two formations. valley~~
and have found ledges of
gray wacke with S. N 50° N D 45° N

Just below a spur near Pikes
the ~~gorge~~ Lake schist has S. N 50° W
and D 30° S. r.

S.

T.

R.



Returning to the conglomerate bluff the ledges were examined immediately to the north across a little valley and were found to be the Cherty phase of the schist.

25295

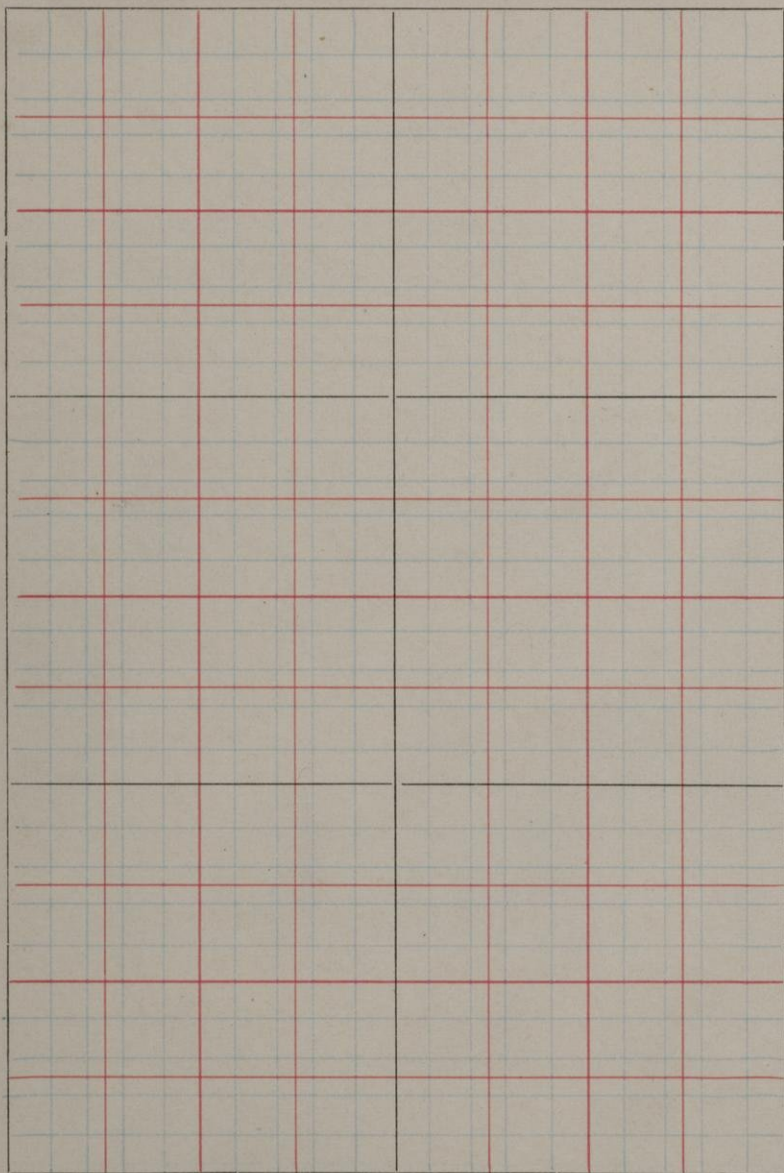
Now returned to Goose Lake and went Southeast toward Gauthier. Just southeast of the Goose Lake river appears a ledge of Goose Lake schist which has S. N. 50° W and D. 20° S.W. About half way between Goose Lake and Gauthier the strike is $N 60^{\circ}$ W and dip 28° S.W. On the opposite side of the arm of Goose Lake the impure limestone was seen to dip at a flat angle toward the N.E., suggesting that the arm occupies an anticline. Just before Gauthier is reached the rock becomes brecciated cherty quartz rock.

16

S.

T.

R.



19

Goror Lake, Saturday July 10.

Went to end of road about the
centre of the east half of S. 22-47-26
Found knob on west side of road
to be Goror Lake chert. This
varies from light to dark gray
in color, is much broken by
dynamic action and contains
brown stains and small
veins of specular hematite.
The bedding has S. N. 55° W, D 65° N.E.

20296
25297

Examined knob which Bailey
calls conglomerate from which
17413 is taken. Found most
of the ledge to be granite but
it is ^{partly} capped by conglomerate
the contact being uneven
the N.E. & S.W. corners. The
granite rising as a knob
over which the conglomerate
was mantled. The conglomerate
also surrounds the hill on
the side from the N.E. to
the S.E. The knob immedi-
ately to the south appears to
be wholly conglomerate.

27

S.

T.

R.

[illegible]

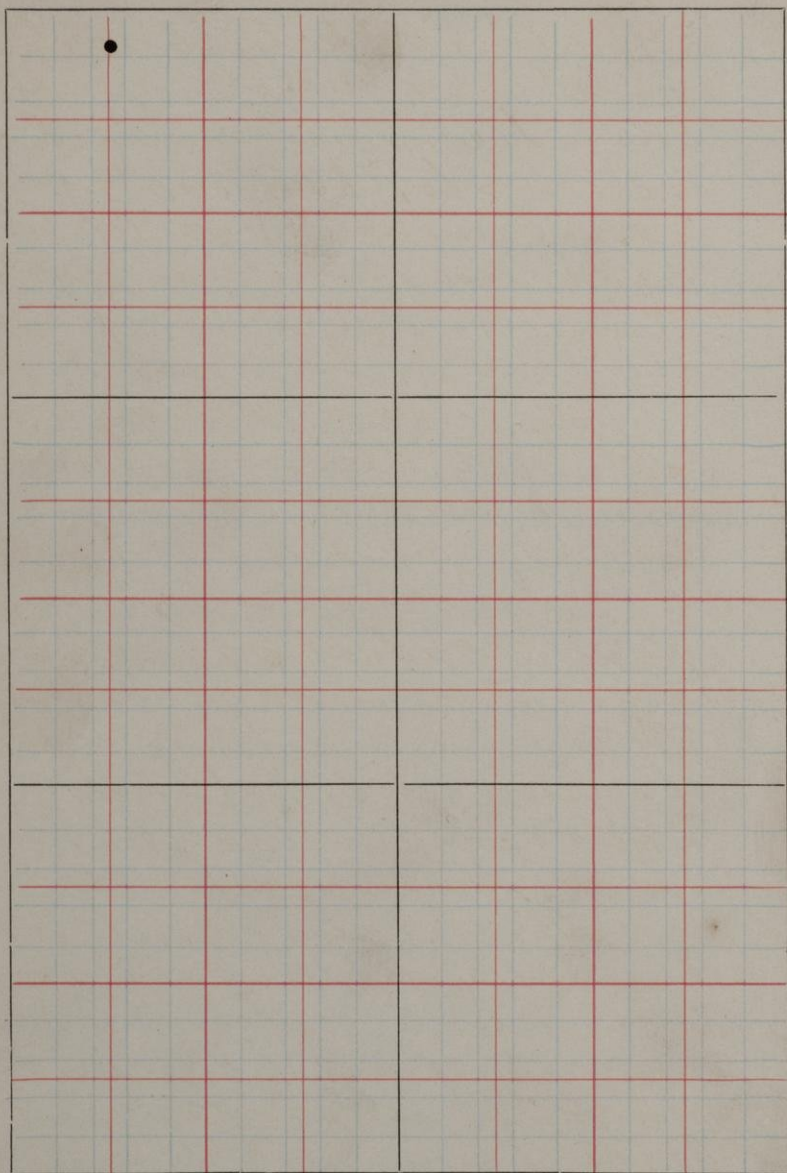
Directly south of high knob
of S. 22 is a small
ledge of S. 22 like schist di-
rectly south of this again
and almost in contact with
it is conglomerate inter-
bedded with coarse gray-
wacke. ~~East~~ Strike of bands
N. 0. 45. E. and dip about 45° S. W.

The series of knobs running
north of west from the most
easterly granite outcrop are
in two ridges the northern
ridge is gneiss and granite
the southern ridge conglom-
erate and recombined gran-
ite with balls of gray wacke.
The conglomerate sits a-
round the west end of the
most westerly granite knob,
About 150 steps east of cen-
tre of Sec. 22. Within the granite
are veins of hematite and Jasper
one of the largest seen is
two inches across. About 130
steps east of the centre of Sec.

22
S.

T.

R.



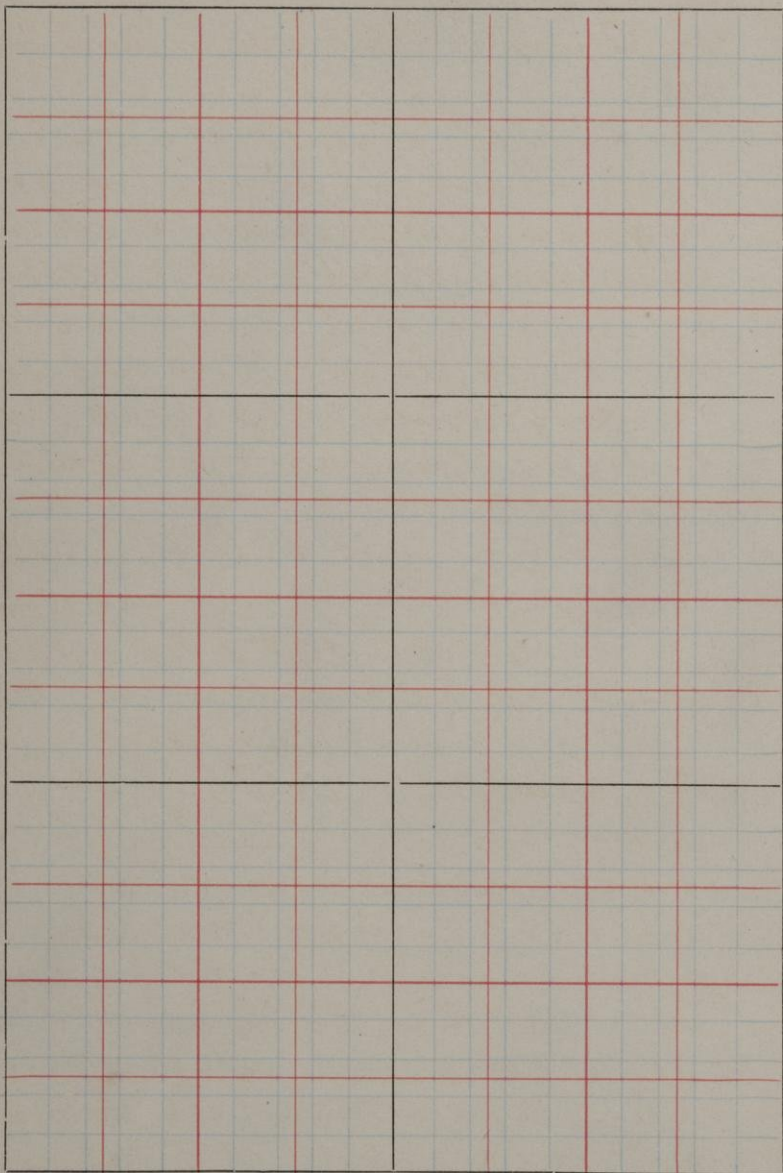
25298 is a typical ledge of granite with quartz with S. 70° W. to 50° N. The ledge is pegmatized with red granite, the balls running for the most part parallel with the foliation, although veins are seen cutting across it. Some of the veins are largely quartz although mingled with this mineral is a good deal of feldspar. At the west end of the ledge conglomerate appears, the actual contact between it and the granite being seen. At the conglomerate mantle around the west end of the exposure the contact plane is directly across the foliation of the granite. The blocks in the conglomerate are many of them subangular and are identical in appearance with the subjacent granite.

24

S.

T.

R.



25249[✓] Going north from and a little east from granite barab found ledges of quartzite beyond which are typical exposures of Goose Lake schist. Did not examine west end of exposure. Did not examine west end of exposure closely enough to determine relations. (Examine Bayley's specimens no 17480 to 82).

25300[✓] Half way between place where took 25249 and specimens 25296 & 97 found ledge which has a fragmental appearance and which is probably reworked rock from the Goose Lake schist. The ledge does not have the foliated, banded, brecciated and cherty character of the typical schist. Directly east of — 46597 found ledges of quartzite. About 50 steps east or road near crest of ridge on the west face of the ledge.

Feb.

S.

T.

R.

(1906)

Afterwards revisited this place with Seamon. He did not think there is sufficient evidence of unconformity, and the question arose as to whether the appearance could be produced by shearing, and the conglomerate be in the nature of a Reibungs breccia. The second closer examination left doubts in my mind as to the existence of a structural break between the conglomerate and the fragments. In the field it is not certain that a discrimination was always made between the Karpinsk quartz-schist (gneiss) and the much smaller fragments.

✓
25301

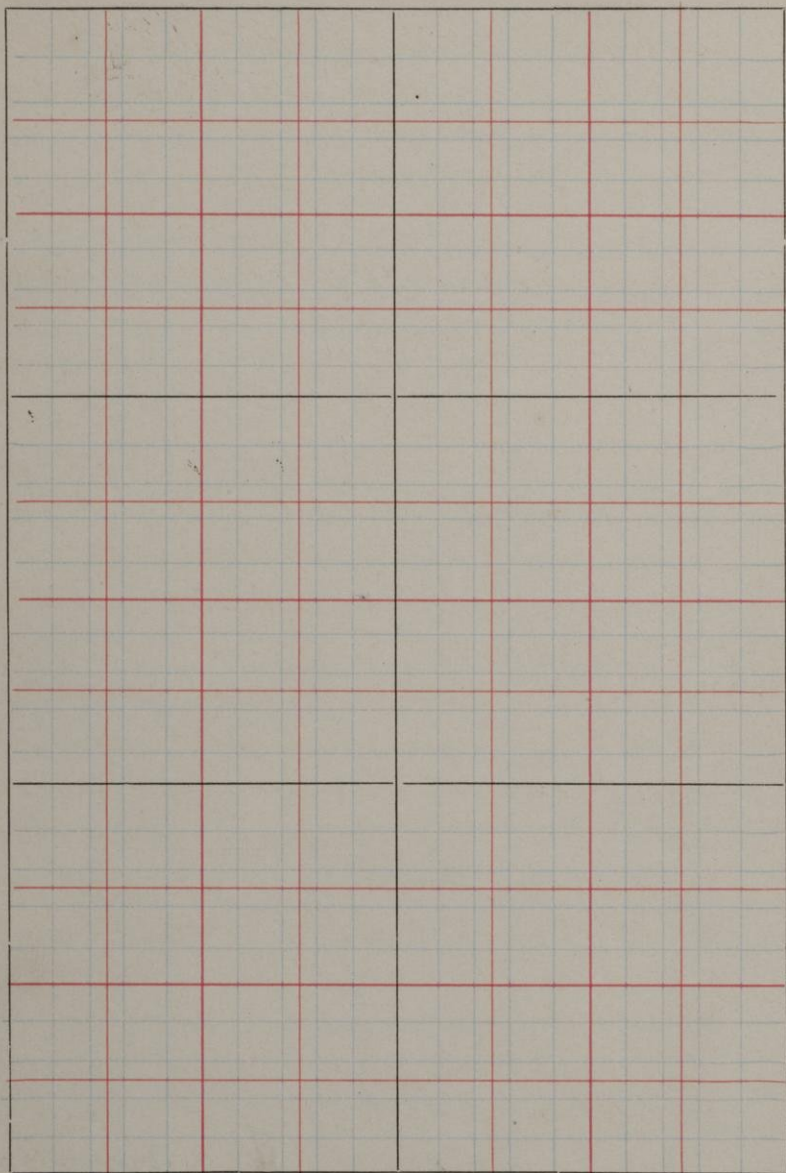
May be seen the typical
~~Soo Lake~~ Lake schist & certain
 unconformably by the
 quartzite which at this place
 takes on the character of
 a massive basal conglomerate
 & carry in numerous
 angular, subangular and partly
 rounded fragments of the Soo
 Lake schist. The conglomerate
 forms a very irregular
 masses surrounded on
 every side by the schist, the
 conglomerate being no more
 than a cap.

The large ledges east of the
 road near the center of S. 22
 are however mostly quartzite
 and conglomerate. For when
 the crest of the hill is reached
 east of the road no more
 schist was found and the large
 ledge to the northeast is all
 quartzite and conglomerate.
 Immediately after crossing
 the valley between the two.

S.

T.

R.



a belt of conglomerate was found which strikes nearly E and W and dips to the north. This belt was followed around the hill to the west side where it strikes nearly N and S and dips east. This may be merely local or it may be at the south west end of a north east plunging minor synclinal. In this conglomerate was seen a number of unmistakable jasper pebbles.

We next examined the Gosser Lake cherty limestone. In all respects this has the character of a typical limestone ledge. The layers of the central and upper parts vary in massiveness in amount of chert and in quantity of argillaceous material. The color corresponds with amount of impurity from white through pink to red.

Near the middle of main point
 of limestone and argillaceous
 layers between two massive
 beds of limestone has devel-
 oped within it a slaty clear
 layer which stops abruptly at
 the massive layers. This is
 precisely similar to exposure
 on railroad track (described by
 Bayley) except that the bounding
 layers revealed by him is not.

to purple. On the weathered, surface the hydration of iron gives the impure layers a brown color. The cherty layers on such surfaces stand out as ridges. The impure beds contain a good deal of iron carbonate as shown by the a dark brown skin of limonite, $\frac{1}{6}$ to $\frac{1}{8}$ of an inch in thickness. The lower layers

- 25302 exposed are very impure, massive and approach in many respects, although it is very different, to the pink cherty rock exposed south east of the Gosser Lake Spur. The strike of limestone a little south east of the main point and was found to be $N 55^{\circ} W$. (magnetic) with a dip of $10^{\circ} N.E.$ That is the strike corresponds with the ledge just referred to on the opposite side of the Gosser Lake area. Of the two rocks
- 25303
2

१२

S.

T.

R.

[illegible]

are really the same, the
 arm occupies an anticline.
 The ledges exposed on the Goose
 Lake track between the last
 mentioned and the Section
 House have a distinctly dif-
 ferent appearance from any
 thing we have yet seen
 in the Goose Lake Area. The
 following set was taken going S.E.

25304

Laminated quartzose slate ap-
 parently fragmental and re-
 sembles ^{in some respects} the limestone series
 may be a lower member than
 has yet been seen.

25305

Nearly the same except that
 it has been sheared and hem-
 atite has been infiltrated
 along the cracks.

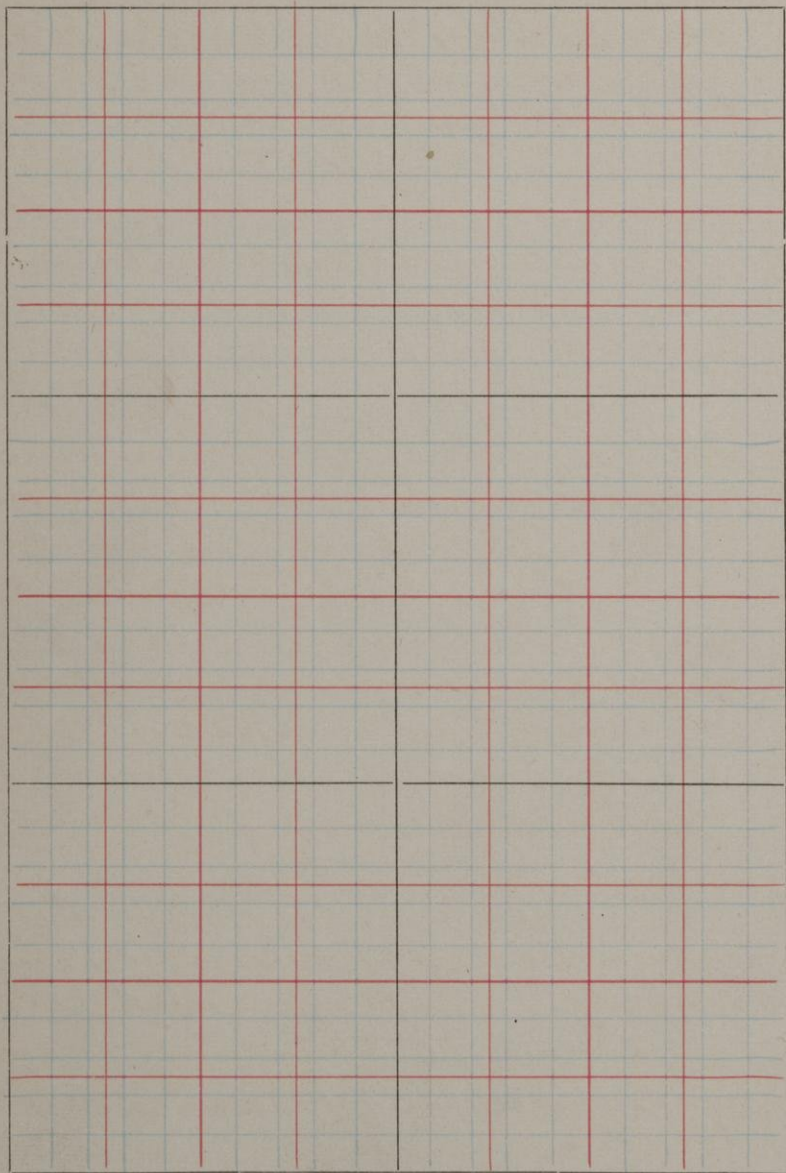
After a short interval of
 no exposure there appears
 a peculiar brecciated cherty
 rock which has ~~been~~ much
 panned with white quartz and
 to a less extent by hematite.
 Displaced rounded rocks of frag-

34

S.

T.

R.



mental quartz is seen in other
the whole has a sugary, crystal-
line appearance

25306 Very Cherty phase first found.

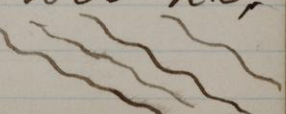
25307 Fragmental looking phase.

25308 Brazeated mined and crystal-
line phase

Just back of the Section.

There is a very impure lime
stone ledge which has been
so compressed as to have a
strongly developed slaty cleav-
age. At one place a normal
fault of about one foot was
observed. While most of the
ledge was more or less slate or
micritic than a limestone
one layer of ordinary gran-
ular limestone was seen.

The strike is as nearly as could
be determined was $N 35^{\circ} W$
and the dip varies from almost
horizontal in places to $60^{\circ} N.E.$,
The ledge showing
several crenulations.

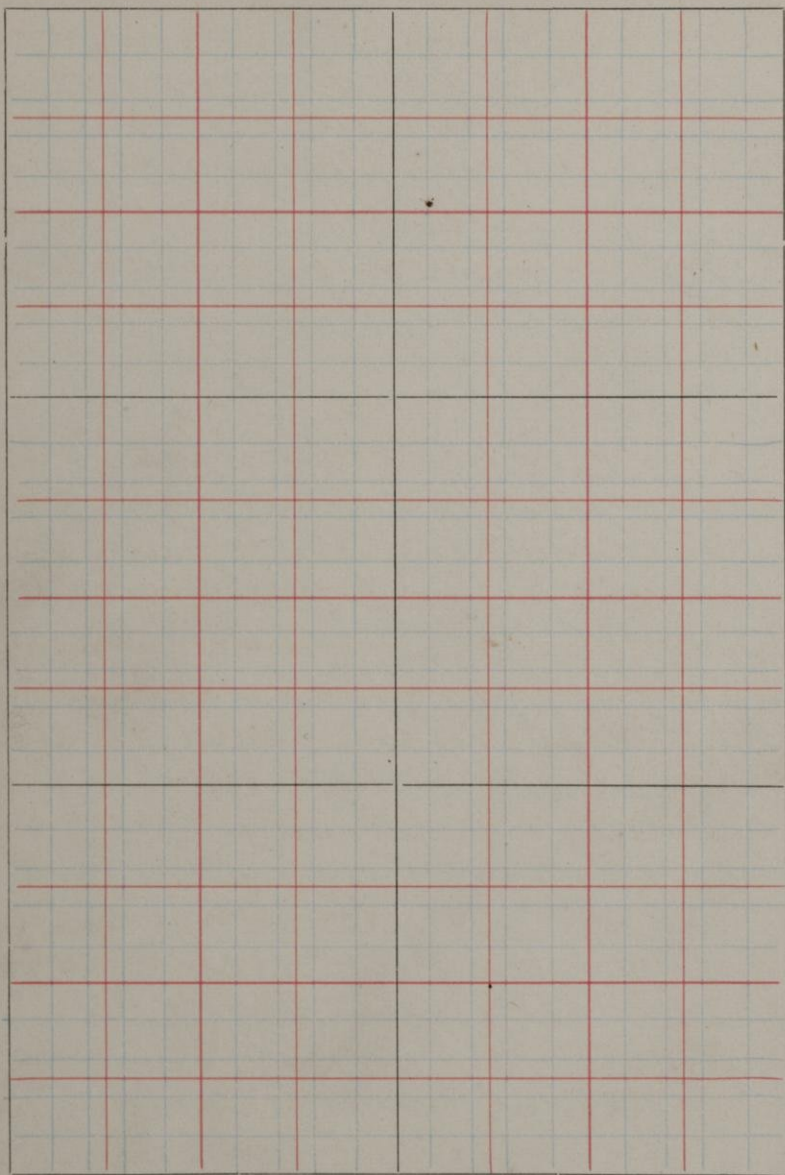


36

S.

T.

R.



37

Cascade, Sunday, July 16 '93

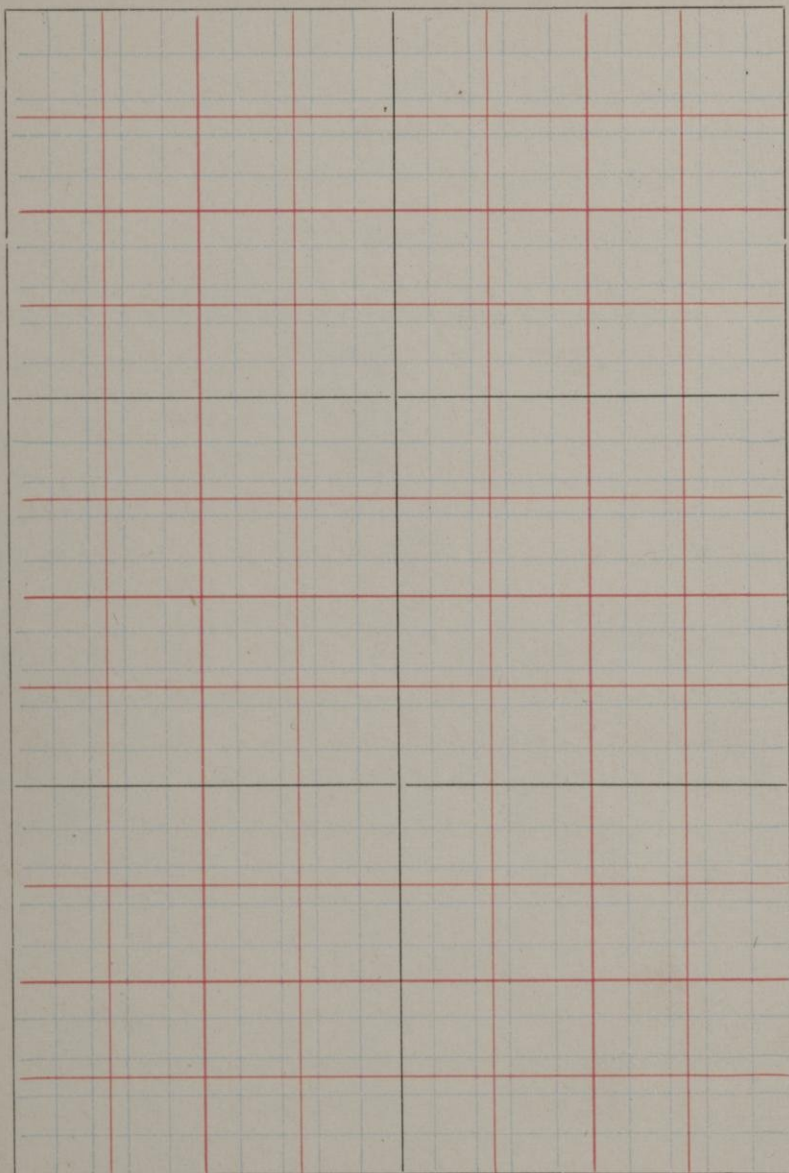
Bayley and I visited again the section of white schists just south of the junction at the brook running through Palmers. On the north side the exposures are wholly of white schist. Passing south the white schist and green schist are seen in contact, their relations being such as to lead to the conclusion that the white schist is an intrusive. It was found alternating with the green schist and cutting across its foliation. Going farther south the white schist sometimes takes on a cherty or felsitic aspect. Going yet farther south the ordinary red granite is common in the district cutting thro' the schists, the white

25309

S.

T.

R.



schist and the green schist
were all found in the
same exposure. Here
the white schist was found
to occupy the shear plane
while the less sheared
rock the intrusive is red.
Actual gradations between
the two were seen, the red
granite fading off into

25310 the white schist. This
exposure seems to demon-
strate what was before sus-
pected that the white
schist, in places closely
resembling a quartzite,
is in reality but the
sheared granite. Specimens of the typical white
schist along the shear
plane from this exposure

25311 It of course does not
follow that the white chert
schist of other localities
is of the same origin.

S.

T.

R.

Later examined this locality again and was not able to convince myself that there is any break between the Conglomerate and Gorse Schist plates and metazoids, while it is clear that there is a break between the Conglomerate and the Gorse Schist. (See introductory note)

41

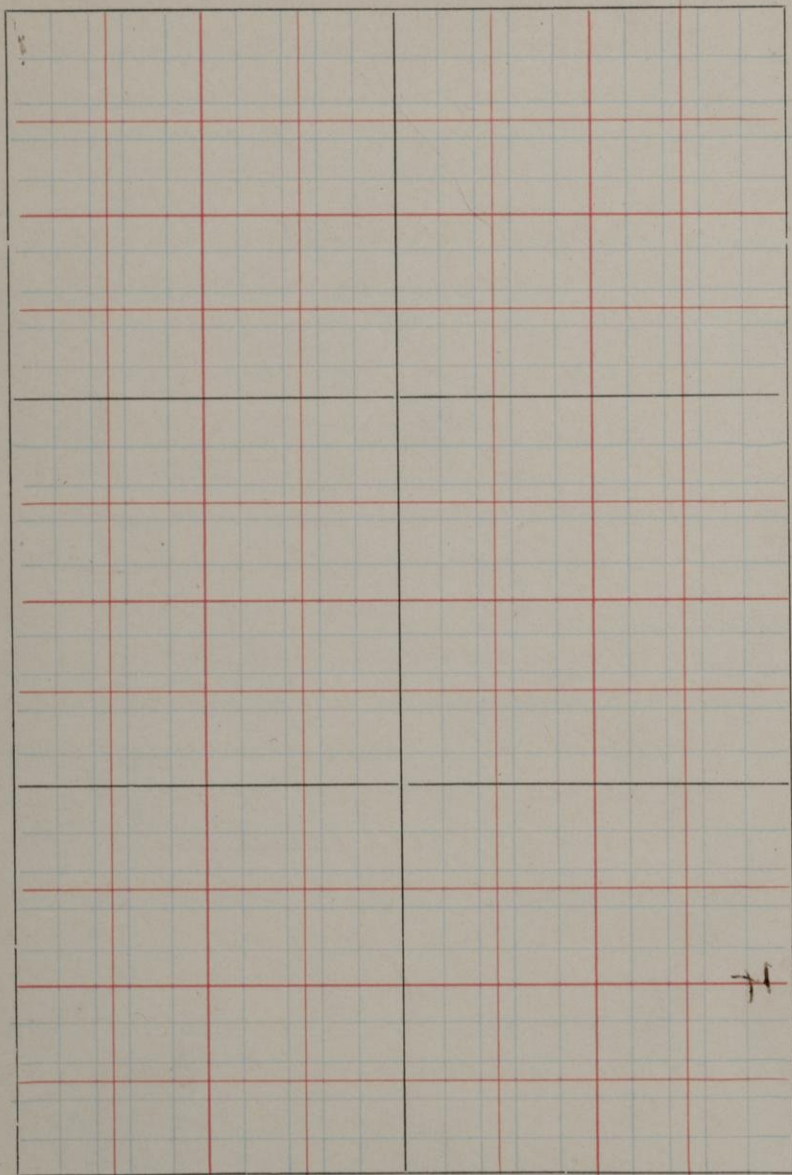
Goose Lake, Monday July 17
The row of knobs marked
granite on Saturday east of
center of Sec. 22, are found on
closer examination to have
conglomerate mantling them
in places on the north side
of the double peaked ridge.

Some of the granite-like ma-
terial appears to be the
25312 Goose Lake schist pyramitized
through and through by granite.
A little knob of undoubted
schist is adjacent to the knob
above described. Following
the south slope of the hill
southeast numerous exposures
of schist were found overlain
by quartzite and conglomer-
ate containing numerous peb-
bles of the black slate and
white cherty phases of the schist.
In some places the schist re-
sembled ~~some~~ ^{some} rock closely resem-
bling the schist in color. At
one place the schist was
found with a N. W. and S. E.

4-2 S.

T.

R.



strike and a flat dip to the southeast. While the banded slate and quartzite somewhat resembling the schist has a strike $N. 20^{\circ}$ to $30^{\circ} W.$ and a flat dip toward the northeast.

Going on a little farther about half way up the slope on the spur of the main ex- ridge well bedded quartzite was found with an ex- strike and a dip 20° to north. Continuing east and south we found nothing on the top and slope of the ridge but quartzite. This became brecciated and veined with white quartz but is undoubtedly all the same formation. Crossing a little ravine the

25314

quartzite has become very much veined with white quartz and cherty looking quartz. It however contains a distinct conglomerate band which has $SN 60^{\circ} W, D 75^{\circ} N. E.$

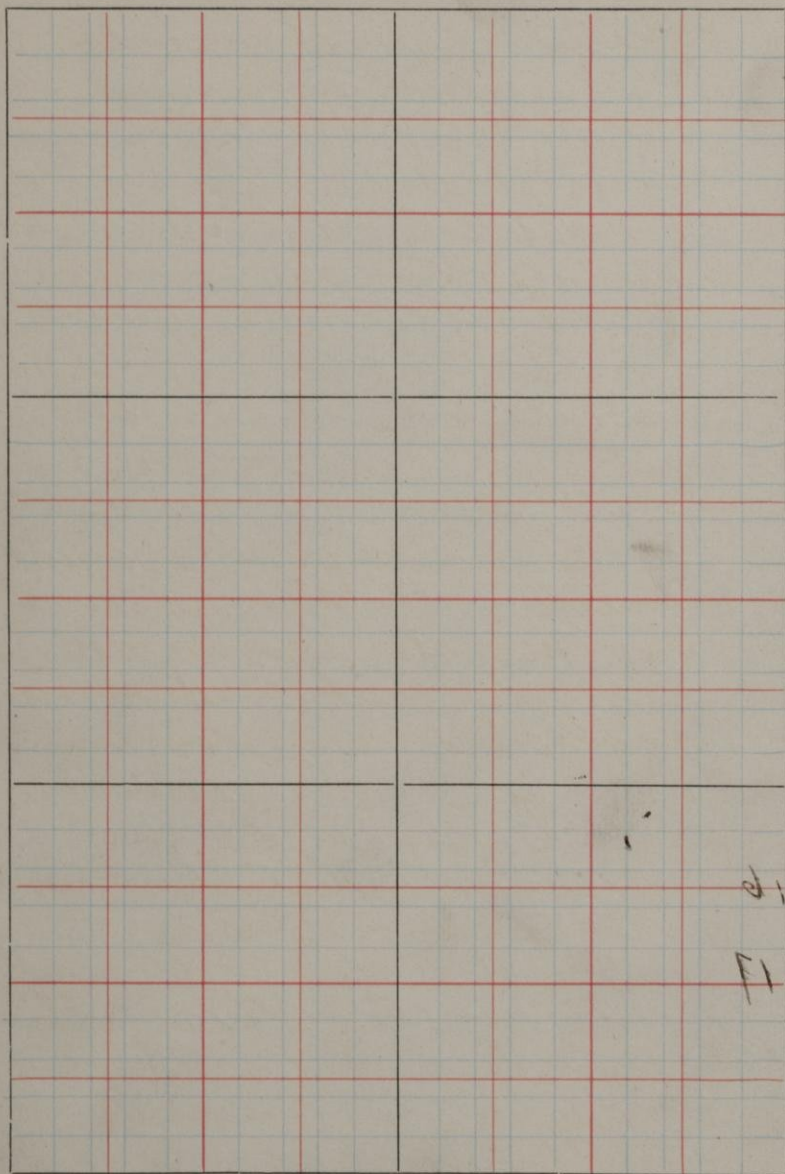
Returned west on north side of schist run across same to then south east. After crossing schist found very numerous ledges of quartzite and gray-wacke. We ran south about a quarter of a mile, turned west and then north reaching valley just south of east-run most ledge of granite conglomerate.

Examined quartzite ridge including large bluff in S.W. $\frac{1}{4}$ of Sec. 23. The clearly fragmental quartzite is in ^{thin} ~~thick~~ ^{fine grained} ~~massive~~ schistose layers which resemble certain phases of the Goro or Lake Schist and particularly that phase on the south west corner of the great hill to the northwest. The rock is however undoubtedly a conglomerate. At the foot of the large hill (Payson's spec 17396-17406) is a solid ledge of white schistose rock observed

46.

T.

R.



to be a sheared granite. It is in contact with and mantled upon both north & south by a basal conglomerate that preserves the original bedded having fragments and matrix exactly like the original rock, so that its recomposed character scarcely shows except upon the weathered surface. Here may be seen fragments running up to great sizes. A little farther to the north in the conglomerate are fragments of coarse granite and pieces of a different character and the matrix here becomes an ordinary quartzite.

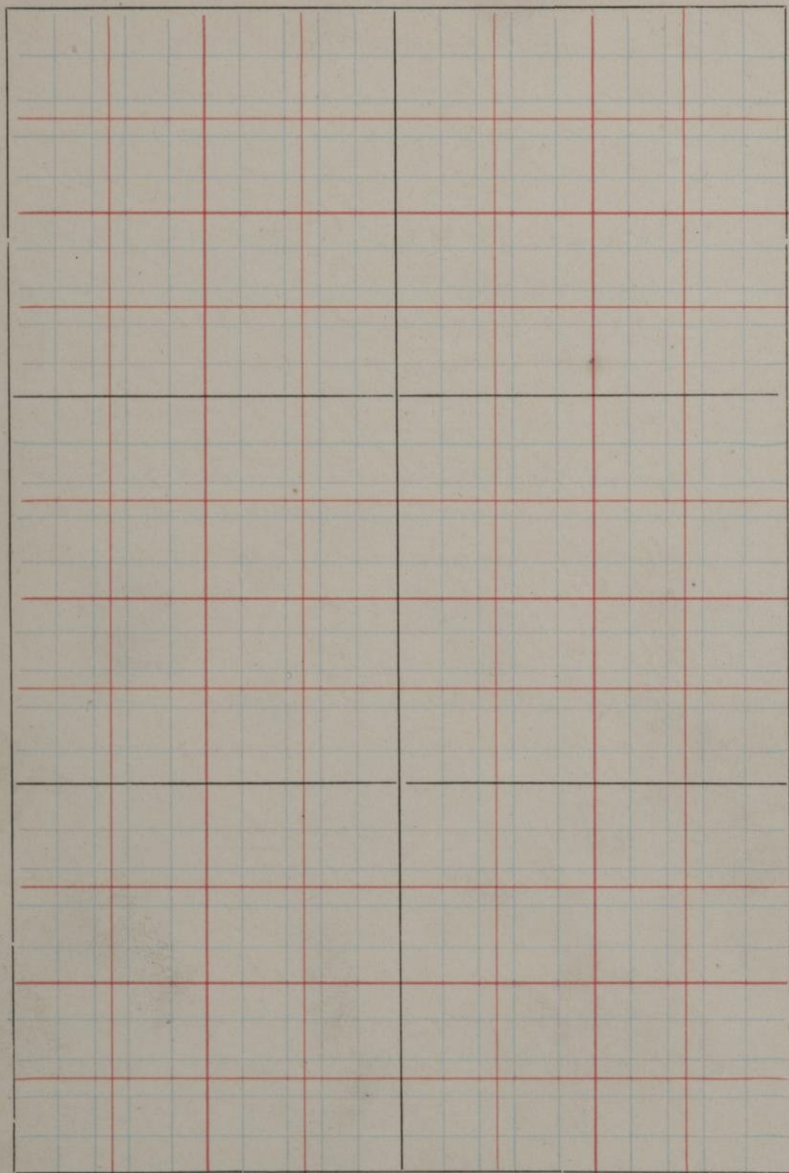
25316 Portion of rounded granite boulder 18 inches through

25317 Specimens of quartzite matrix
Going along the south crest of Bay Lupo Hill BK (note book 107 p 28) we followed the contact of the conglomerate and sheared granite. 7

48
S.

T.

R.



At several places the contact was seen. In the conglomerate the fracture frequently follows the pebbles. About the middle of the hill the ledges of granite with pink feldspar crystals the same was found the source of pebbles of this kind. The white granite appeared to be the pink granite sheared although this was not certain. At the southernmost slope of the hill the granite with pink feldspar was cut through and ~~by~~ through with veins of red granite. Passing north across the hill the white granite replaces the granite with the pink feldspar and this grades into the typical Goose Lake Shale having dark slaty layers.

Going east from hill B K to hill A in Sec. 20 found mainly granitoid gneiss with pink feldspar. If we go north across

75318

25319

50
S.

S.

T.

R.

the course the feldspar dies
out and the rock becomes
the white granitic schist.
The north and central part
of hill A is wholly of this
material but the south
side is the gneiss or diorite
with pink feldspar.

Phillips found hill Bay-
ley's number 17328 and
all hills intervening be-
tween this and A to be

341

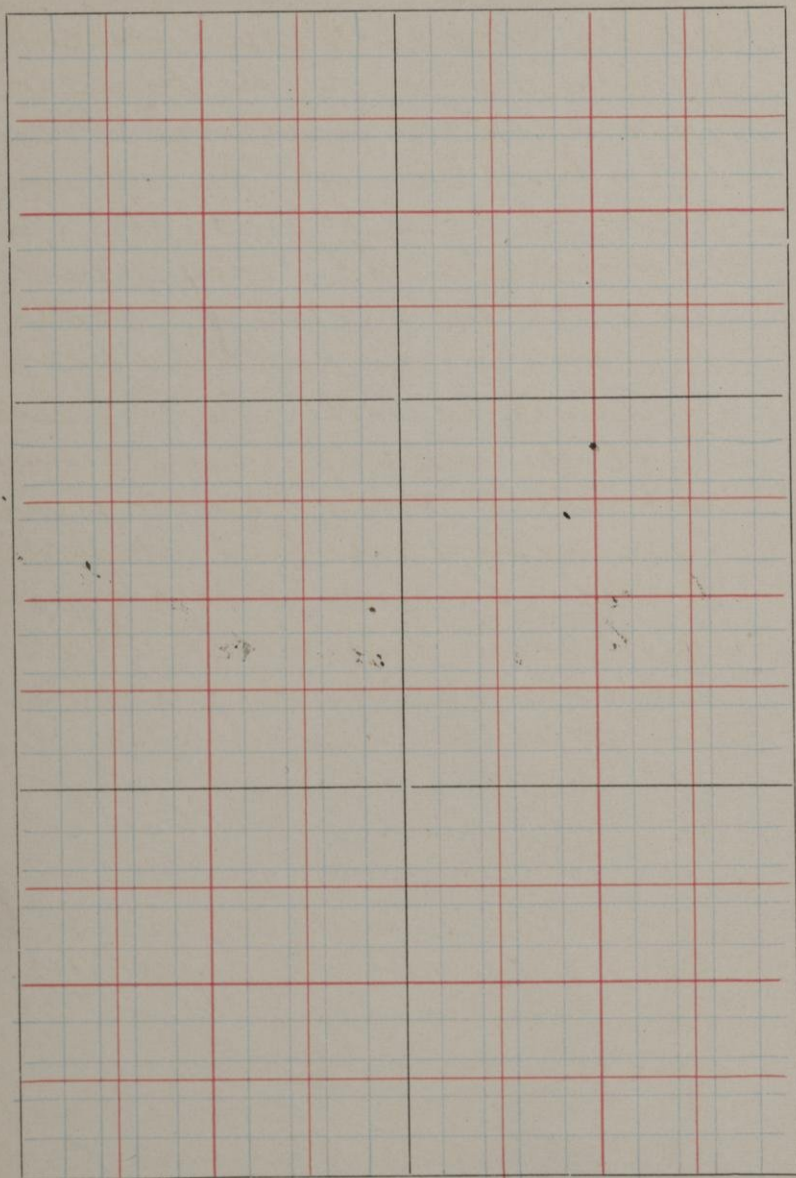
25320

granitoid gneiss with pink
feldspar. At several places
on the east slope of Hill Bk
the white granitoid schist
is cut by dykes of red granite.
The red granite is the later
intrusive rock. Whether
the pink granitoid gneiss is
the white schist pyramized
or is an independent in-
trusion is uncertain but
the latter is thought more
probable. ~~The~~ Specimen of gneiss
and granite from Bayley's 17328

52

T.

R.



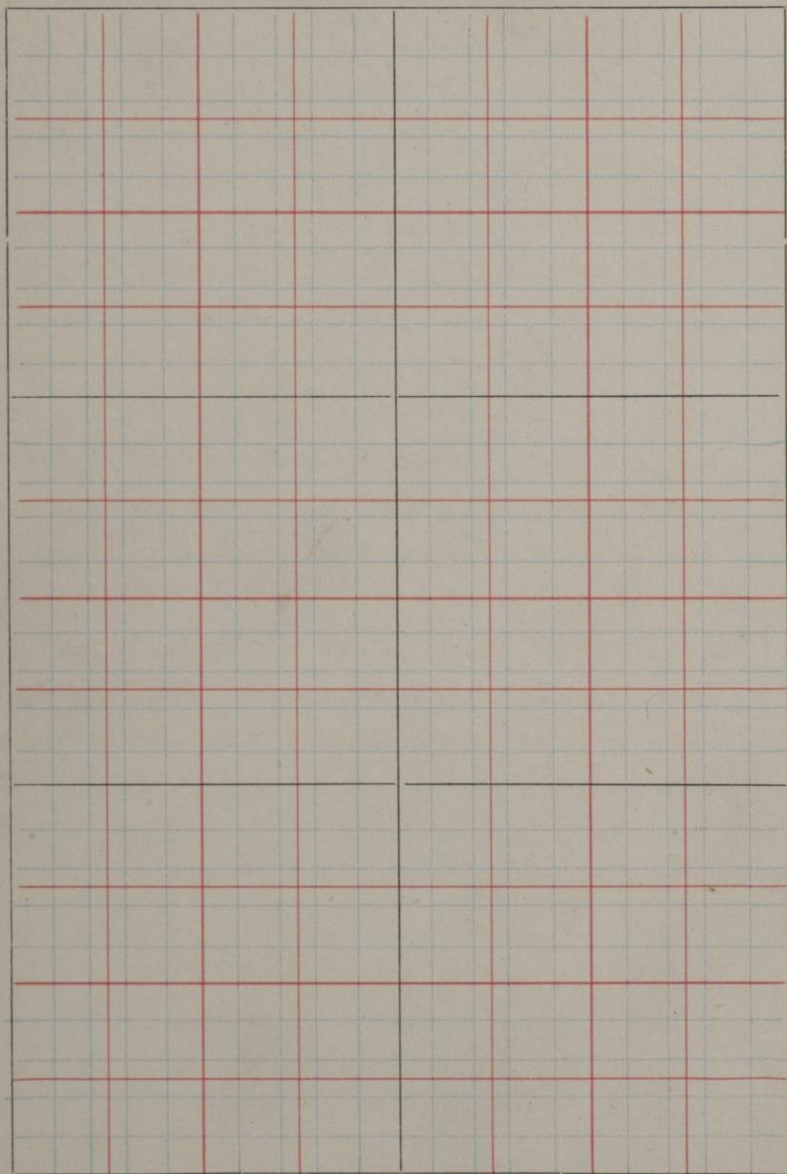
On top of hill A in typical white schist is a vein of jasper like material and quartz. The jasper when present occupying the center or whole of the vein. This is two or four inches across and another vein containing jasper and quartz interbedded is at its maximum a foot across. These jasper veins are probably the source of the jasper pebbles found in the conglomerate. The rock has the peculiar yellow stains along cracks so common to the Goose Lake schists.

54

S.

T.

R.



55

Gauthier's - July 18-1893.

Took strike of limestone at or near center of NW $\frac{1}{4}$ N.E. $\frac{1}{4}$ S. 34-47-26. Found same to be E.W. A little higher on ledge found strike to be N 60° W and dip 10° N.E.

At one place in ledge found in tr. laminated with the argillaceous, non-aclitic limestone layers.

25321 narrow belts of impure quartzite.

Higher in the ledge were found two belts of pure quartzite, one about a foot thick the other 9 to 10 inches. From

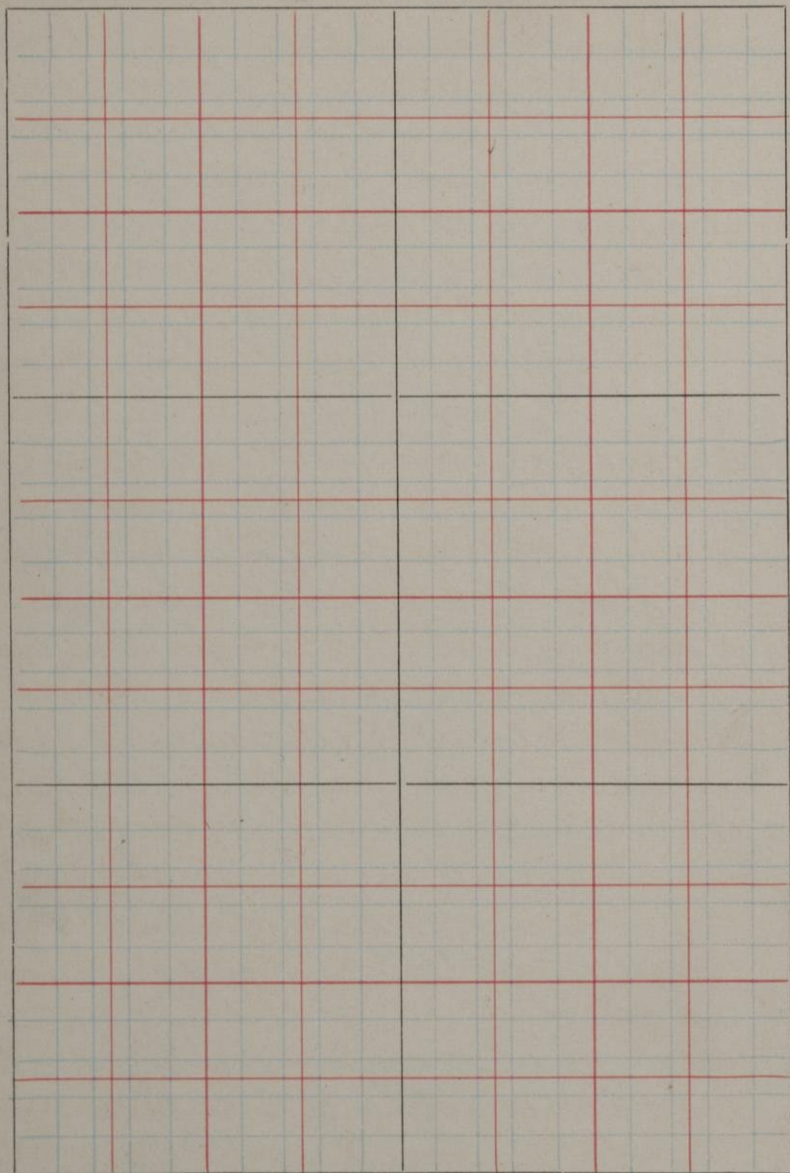
25322 the latter was taken specimen which is clearly an ordinary sandstone indurated by enlargement. This quartzite cannot be differentiated lithologically from the vitreous quartzite but conformably on the south west of Goose Lake. Going along a little farther east

56

S.

T.

R.



took strike again and found
 it to be $N60^{\circ}E$. Going a little
 farther east along the face
 of the cliff we found minor
 folds in the limestone
 the axes of which as near
 as could be determined
 is $N40^{\circ}W$. the folds plung-
 ing toward the N.W. The
 strike of the ends of the axes
 disregarding the minor buck-
 ling is about $N60^{\circ}E$. Cut-
 ting ~~the~~ vertically across the
 limestone and having a
 vertical schistosity is a
 dyke of some basic erup-
 tive with pink porphyritic
 feldspar(?) about four
 feet wide. This is a short
 distance west of small
 isolated knob in plain.
 Going around to top of
 hill north of little knob
 strike at one place is $N25^{\circ}$
 to $30^{\circ}W$ and dip $S.W. 20^{\circ}$.

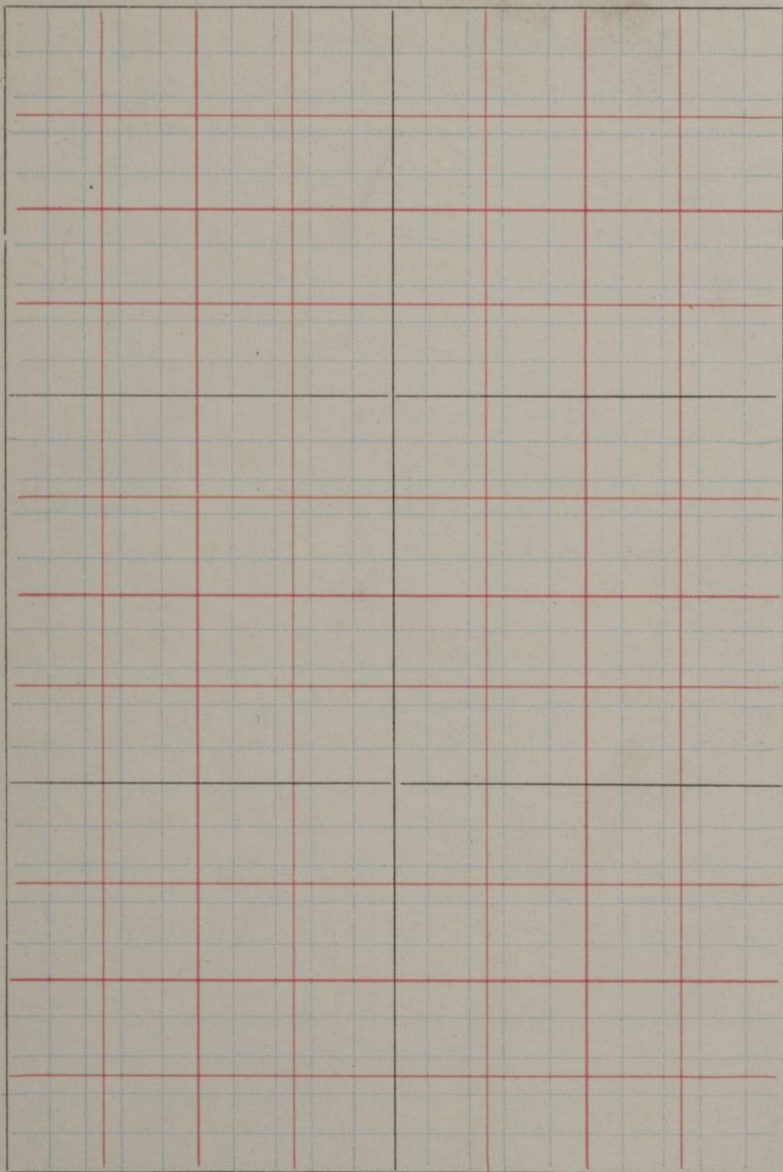
25323

C

S.

T.

R.

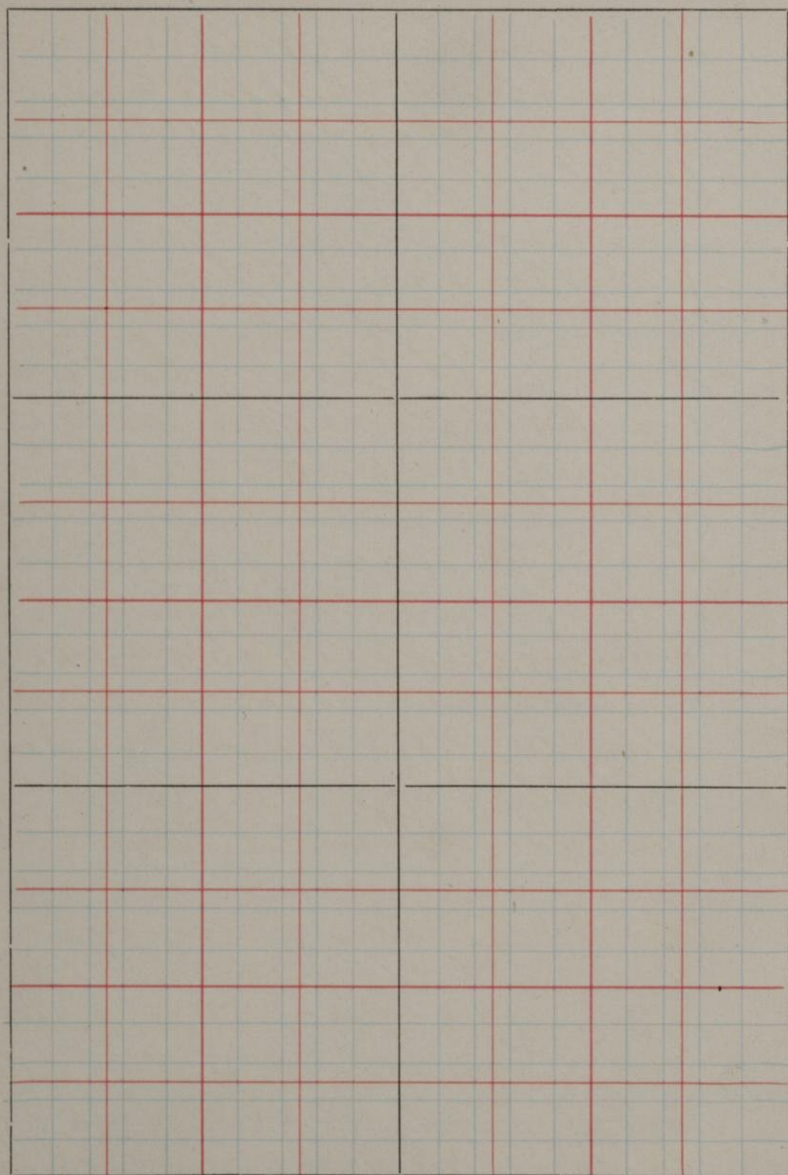


Going east from top of
 limestone bluff to point
 where Bayley describes
 prospect pit we crossed
 two ravines, the first sharp
 and striking $N 20^{\circ} E$ the
 second open and striking
 $N 10^{\circ} E$. At three places the
 strike of the limestone was
 taken, results varying from
 $N 50^{\circ} E$ to $N 40^{\circ} E$. The dip
 for the most part was
 at flat angles 10° to 20° to the
 northwest. At the east face
 of the limestone on the west
 side of the eastern ravine,
 a slaty layer below one of
 massive limestones is broken
 into a series of lit-
 tle anticlines and syn-
 clines with $N.W.$ and $S.E.$
 axes. On the east side of the
 last ravine we find for the
 most part massive beds
 of quartzites having argilla-
 ceous layers in which a few

60 S.

T.

R.

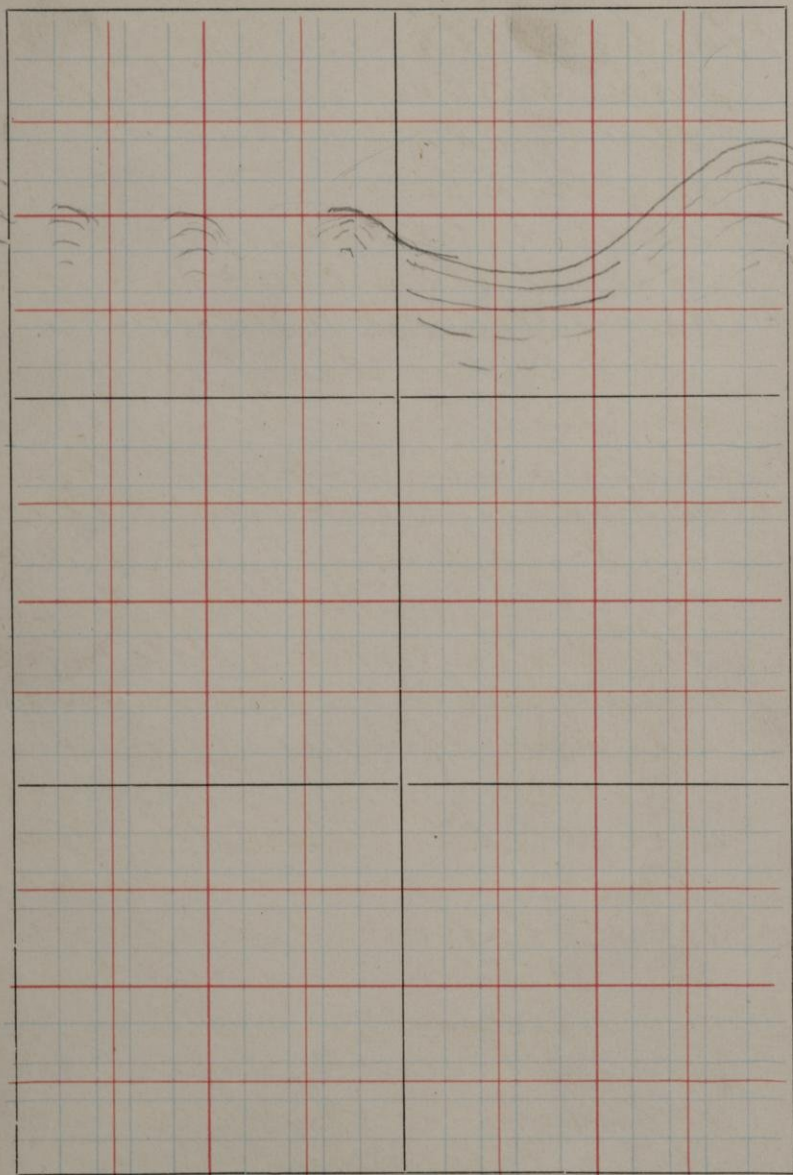


the bedding in two directions
 has developed a slaty cleav-
 age and the rock here ap-
 proaches more micaceous.
 The belt where prospecting was
 carried on is merely a zone
 of shattered quartz that is along
 which the quartz has broken
 on and crushed as to lose
 its planarity. Fragmental char-
 acter and becomes brecciat-
 ed and cherty the latter
 largely by infiltrated silica.
 Films of hematite have
 formed along the cracks thus
 causing the prospecting.
 There is not reasonable
 doubt but that the quartz
 is the same as that
 west of the section house
 at Gauthers, where also there
 is much brecciation veins
 of chert and jaspers and
 hematite. Stripes of quartz-
 ite (roughly) N and S. with dip E.
 8 to 10°.

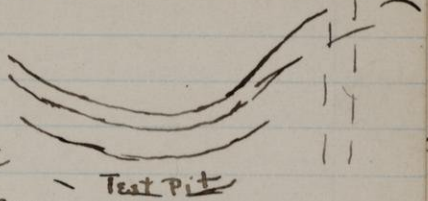
62 S.

T.

R.



The top of the
 ledge where
 the test pit
 was been
 done is bottom
 of a little synclinal whose
 axis strikes N 75° W. Imme-
 diately south of this is an
 anticline with similar
 strike. The axis of the syn-
 clinal plunges 80° to the
 east and the anticline
 has the same. The top part of
 the ledge takes on a cherty
 and jaspery character and
 the argillaceous layers
 have slate cleavage. When
 the syncline lies in a depres-
 sion running E & W across
 the ridge. The ledge of quartz-
 ite is known to extend for a
 distance of a quarter of a
 mile or more north & south
 with little depressions run-
 ning E & W which doubtless
 correspond with other synclines

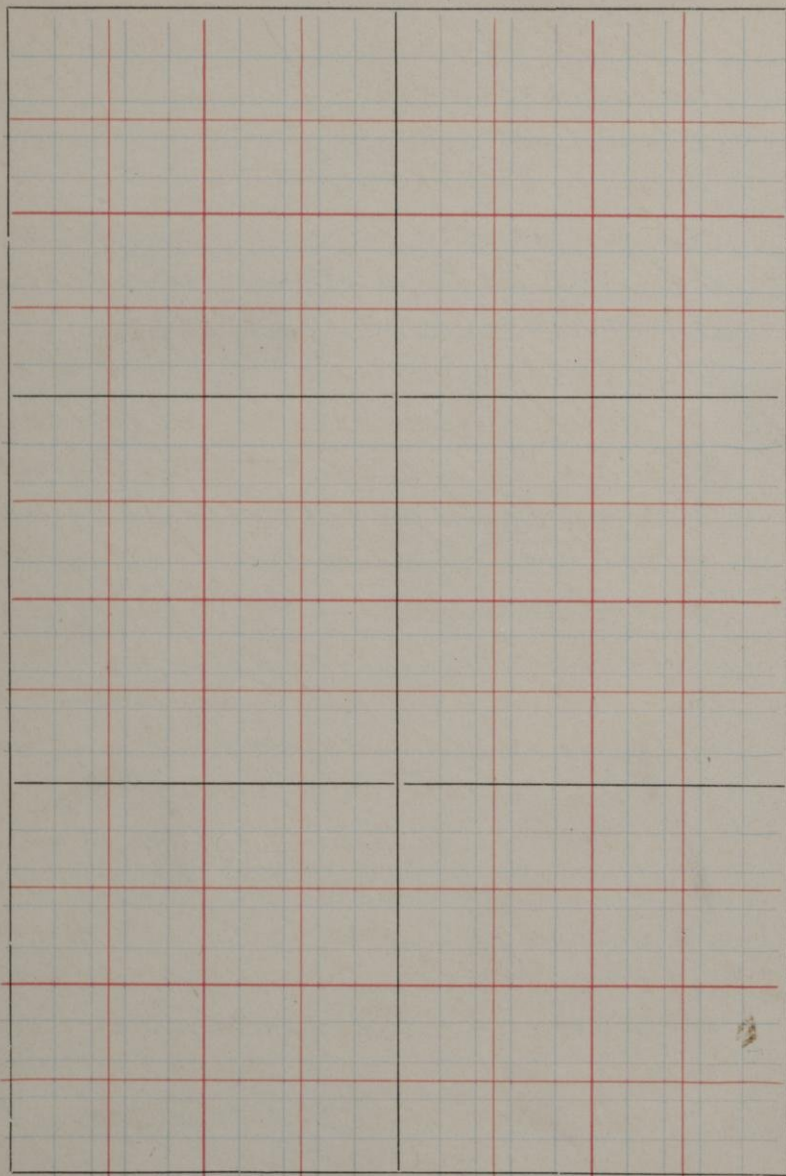


64

S.

T.

R.



Just across the valley to the west outcrops of limestone appear which are also clearly folded into a series of minor anticlines and synclines with axes nearly east and west. Going north along the quartzite belt a layer of slate compressed between beds of quartzite is sharply folded and takes on a schistose structure, the black phase resembling

- 25325 the black cherty slate and the other phase resembling
 25326 the red cherty material which outcrops at Gros Lake station. The second cross ridge is on an anticline the slate rising to occupy the valley. Directly under the bed of slates, about four feet thick, appears a
 25327 red, jaspery quartzite. The next ledge, the north or lower three hundred steps are crowned by the slates and

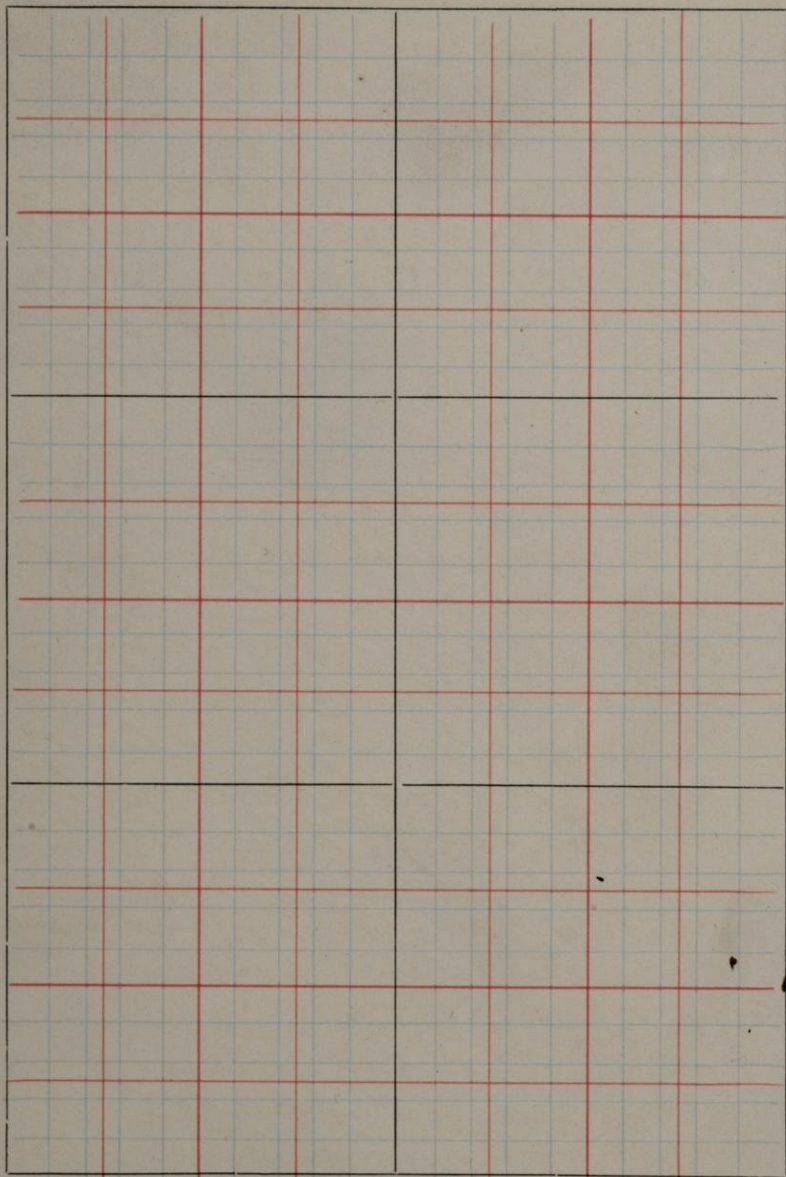
(a) In places they appear to
grade into each other.

A red cherty material. The schistosity is somewhat north of west (50 or 60°) and the dip of the slaty cleavage is at a high angle to the north. Cutting across the cleavage at the ends and sides of the ledge may be seen the alternating bands of black and red slate, the total thickness in any ledge being less than ten feet.

75328 Specimens of red slate somewhat less shivered than usual and under the microscope will show fragmental origin.

In places in the black and red slates are beds of novaculite and more rarely beds or veins of

25330 cherty looking rock which may however be novaculite. One of the slates anticlines plunges to the east at an angle of 23° . Continuing north several anticlines and synclines are passed



The ledges being on the anti-
 clinal band having smooth
 surfaces on the north and
 south sides corresponding
 with the dips and sloping
 off smoothly and gradual-
 ly to the east corresponding
 with the pitch of the axis.
 After several ledges are
 passed while there are
 minor rolls the dip is
 mainly to the south. Ap-
 pearing under the black and
 red slate is red poraculite
 interstratified with beds
 of quartzite some layers
 of which have a cherty ap-
 pearance. It is very difficult
 to estimate the thickness
 of this series thus far on ac-
 count of the folds and cross
 ridges which are covered.
 But a rough estimate is
 as follows in descending
 order: - Quartzite - 10 ft, black
 and red slate - 4 ft, cherty quartz-

10
S.

T.

R.

55°
Bluff - ~~Bluffs~~
Quartzite
State - ~~State~~
Slate - ~~Slate~~
Chert - ~~Chert~~

Limestone

its - 10 ft red and black slates
(Boose Lake schist) - 25 ft no-
vaculite and quartzite, from
30 to 50 ft. The lower bed of
quartzite comes over in per-
fect conformity the slates,
noraculite and marble of
the marble series. The
strike at this point is ex. w.
and the dip is 50° to the south.

25331
or breccia

Within this basal layer of quartz-
ite are beds of conglomerate
containing ^{or fragments of} numerous chert
pebbles, but as nearly as could
be made out this belt of con-
glomerate does not mark any
structural break. Similar
phenomena have been dif-
ferently interpreted in the
Parkman District.

The place where the limestone
first appears is on slope just
west of hill where Bayley took
17566. As far as went north,
i.e. to near Bayley's 17816, the
limestone continued with

72

S.

T.

R.

In a block which had fallen down from the cliff was found the actual contact of the limestone and gray wacke

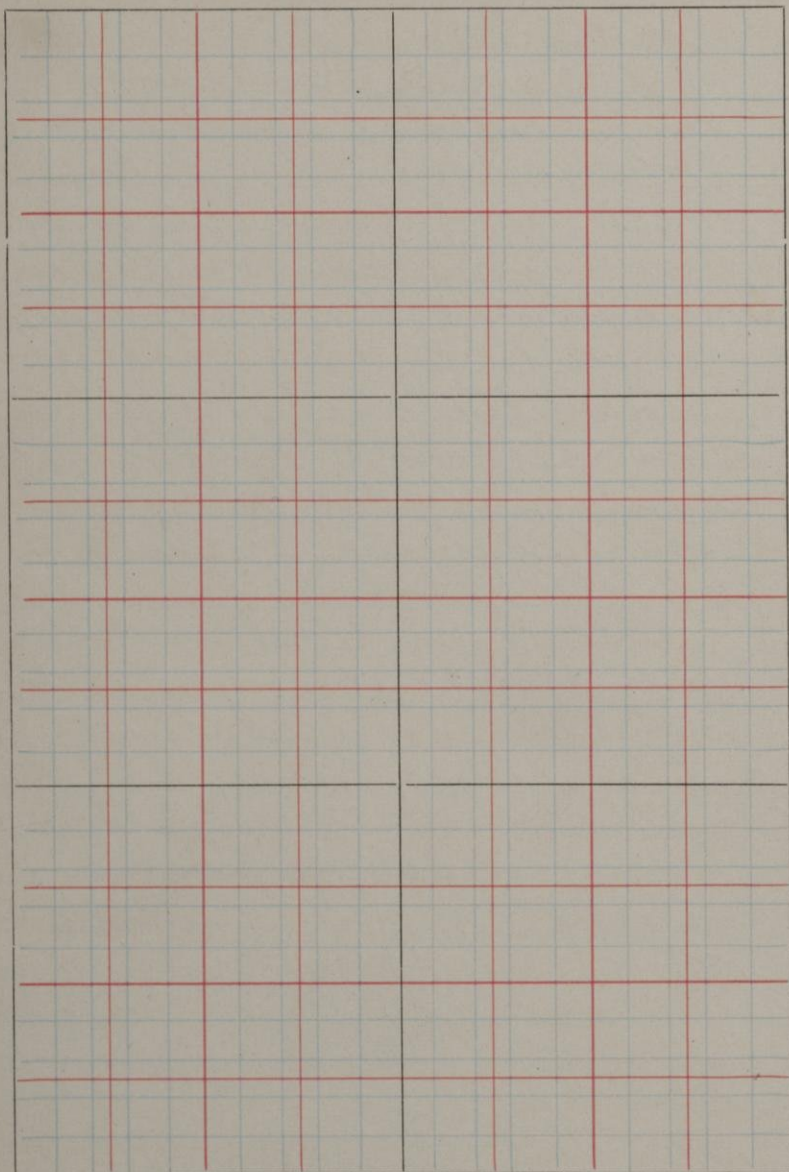
southern dip. Directly west of 17560 on east slope of main ridge of limestone Phillips found a green schist and a slate conglomerate containing numerous fragments of red weathering granitic looking pebbles. In places the green schist becomes almost massive, indicating that it is eruptive, and it contains reddish porphyritic looking feldspars. The slate conglomerate may have derived its fragments from some phase of this schist. In the valley below and on the hill above the limestone appears, in some places being almost in contact with the schist and conglomerate. Between the two in places is a slaty looking gray-
 wacke ^{massive rock}
 25332 Green ~~schist~~ containing feldspars. In other phases the feldspar is absent.

74

S.

T.

R.



✓
25333 Gneiss schist, whether sheared original or recomposed doubtful, ~~probably~~ ^{almost certainly} the former.

25334 Conglomerate. Granite looking pebbles run as high as two or three inches in diameter.

✓
25335 Graywacke grading into red material and this is in contact with typical limestone.

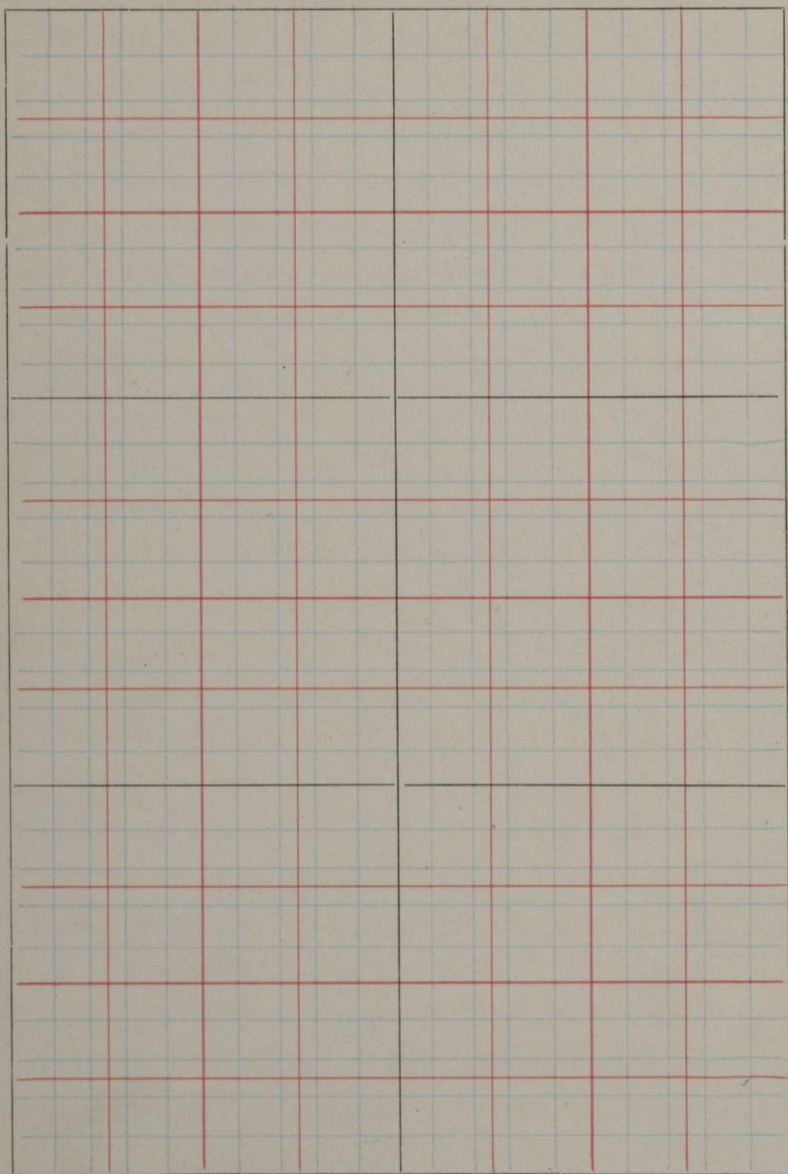
Examining the ledges again for a brief distance it became evident that there is here a considerable ledge of gneiss schist cut by granite veins and that the conglomerate is mainly derived from this material. At one place the belt of conglomerate was found to be horizontal like the limestone and upon this was the graywacke and above the limestone. Going north the ledges of limestone were near

76

S.

T.

R.



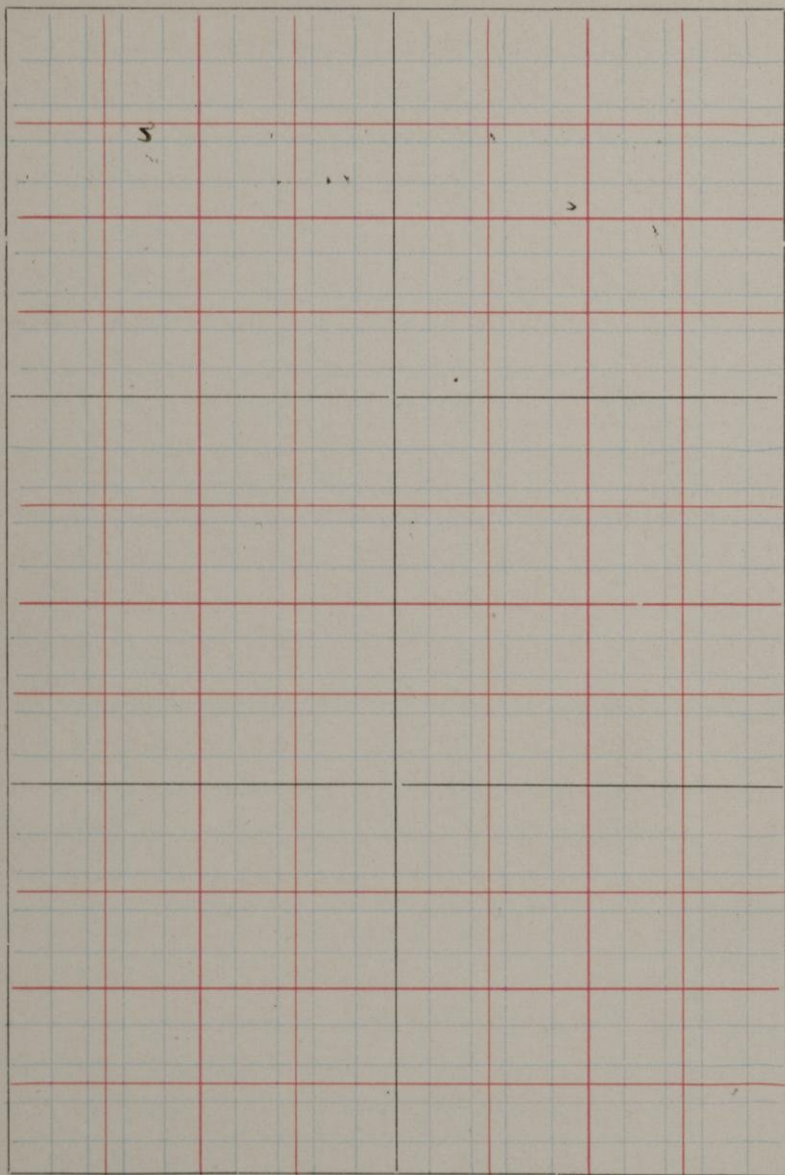
ly horizontal some inclining to the north and some to the south, the latter being the more common case. To the north of the ledges of limestone is a pond and beyond this the limestone ledges appear. As the limestone in the north part of Sect 6 always dips north (Bayley) there is little doubt that the crown of the anticline of the complex anticline given is along this lake. The gran. schist shot with granite is the unconformably underlying Archean. The north and south valleys ^{probably} mark folds in the limestone corresponding to a pressure in an ~~ex~~ direction or perhaps more accurately in a N.W. & S.E. direction. This may have produced the minor cleavage in the slates cutting the major

78

S.

T.

R.



clearly at an angle, and the latter corresponds to north and south pressure which produce the main folding.

We now return to South's and went west along the quartzite ledges in Sec. 23-47-26. Went along the slope finding nothing but quartzite to near the n.w. quarter line. At one place about half way the heavy beds of quartzite were seen to dip parallel to the face of the cliffs that is a direction somewhat north of east and to dip at a low angle to the south.

S.

T.

R.

(a) The strike of the foliation of the gneiss is $N 20^{\circ} W$ (about), and the dip at a high angle (60° or 70°) to the southwest.

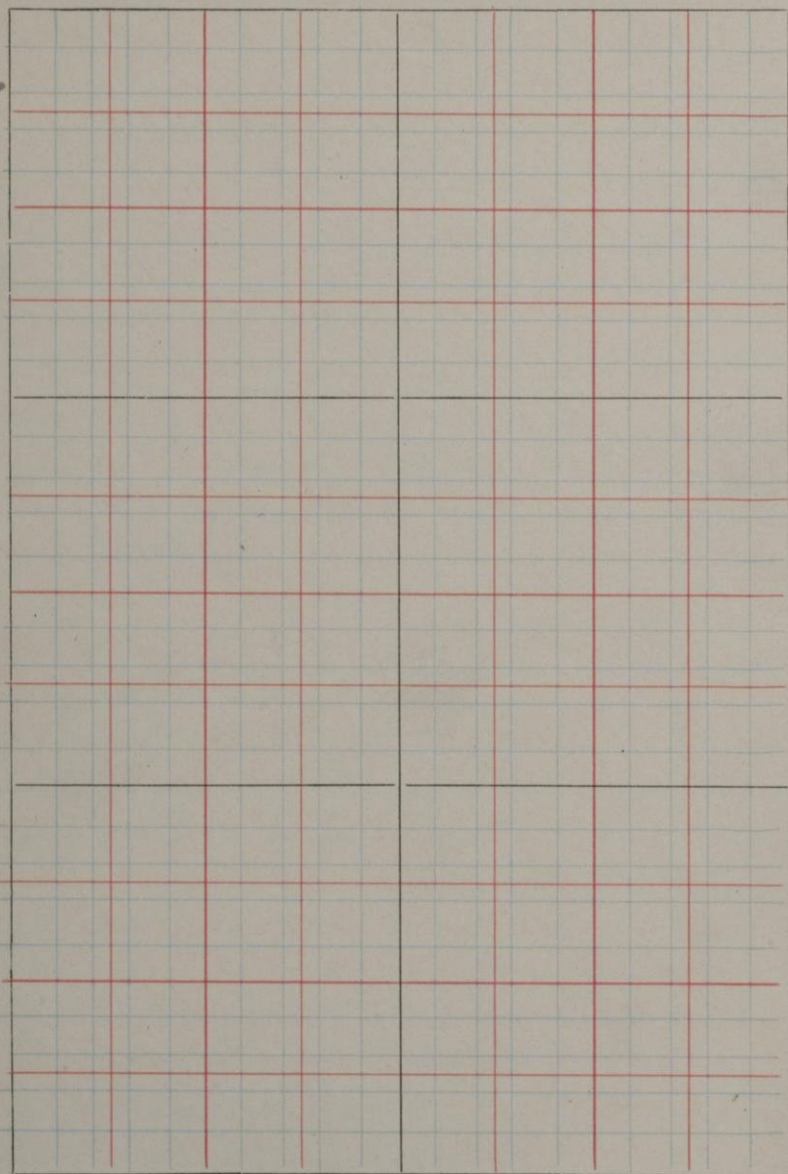
Gauthier's July 19-1893

Went west on road over
sand plains just south of
quartzite ridge. About the
east line of Sec. 23 we
went into the woods and
continued along range
for a little less than half
a mile. Then took a course
a little west of north first
finding quartzite but reach-
ing the top of the first
prominent knob we found
ourselves on the coarse
feldspathic schist cut by
granite veins. Travelled
over the knobs represented
by Bayley's Spec's 17229 to 233
and 17331 to 337 finding most
of them to be a coarse gran-
itoid gneiss with bright pink
feldspar augen and cut by
veins of red granite. Occasion-
(at) al ledge of the white
granitoid schist without the
red feldspar or granite veins.
Going to the point from which

S.

T.

R.



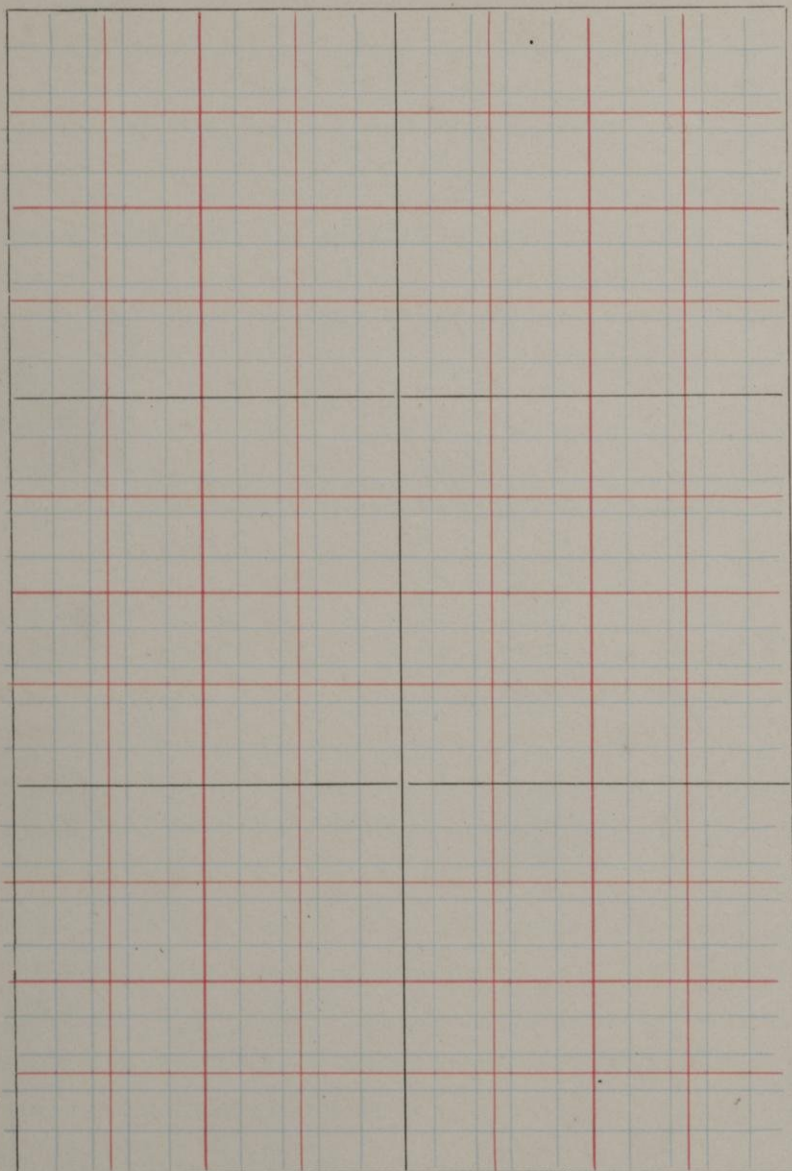
Baylrop Spr. 17361 to 365 course
 we found the ledges to be of
 the same character. At the top of
 the ledge to the west, Baylrop
 spr. 17366, the gneiss is
 granite conglomerate or recrys-
 tallized granite. The ledge im-
 mediately to the west is
 still a conglomerate but the
 boulders rapidly decrease
 in size. The rock changes
 into a pebble conglomerate
 then into a graywacke. After
 the graywacke has become
 predominant belts of fine
 conglomerate reappear contain-
 ing very numerous rounded
 fragments of feldspar evi-
 dently derived from the
 core of the gneiss moun-
 tain also with small pebbles
 of granite and schist. In
 travelling north from Baylrop 17-
 366, we found a little valley
 projecting up in which is de-

25336

S.

T.

R.



Two ridges of granitoid gneiss which
 runs west about 150 steps. Again
 going northeast we crossed a
 great exposure of conglomerate
 containing numerous bould-
 ers of red granite, gneissoid
 granite with pink augen of
 feldspar and of the white
 granitoid schist. In going
 up the hill the pebbles
 passed into boulders. There
 were a few feet without ex-
 posure and then the
 gneissoid granite with pink
 feldspar augen appeared.
 There may be here a minor
 fold or the tongue of gran-
 ite may be simply due to
 the topography. The conglom-
 erate lying with low dip to the
 southwest and thus allowing
 the little granite ridges to
 appear on the lower ground.
 We now walked around on the
 west and north west slope of hill
 Bk following along the contact.

S.

T.

R.

(a) We next went southeast to the road going west from Goose Lake and on the way passed numerous ledges of quartzite

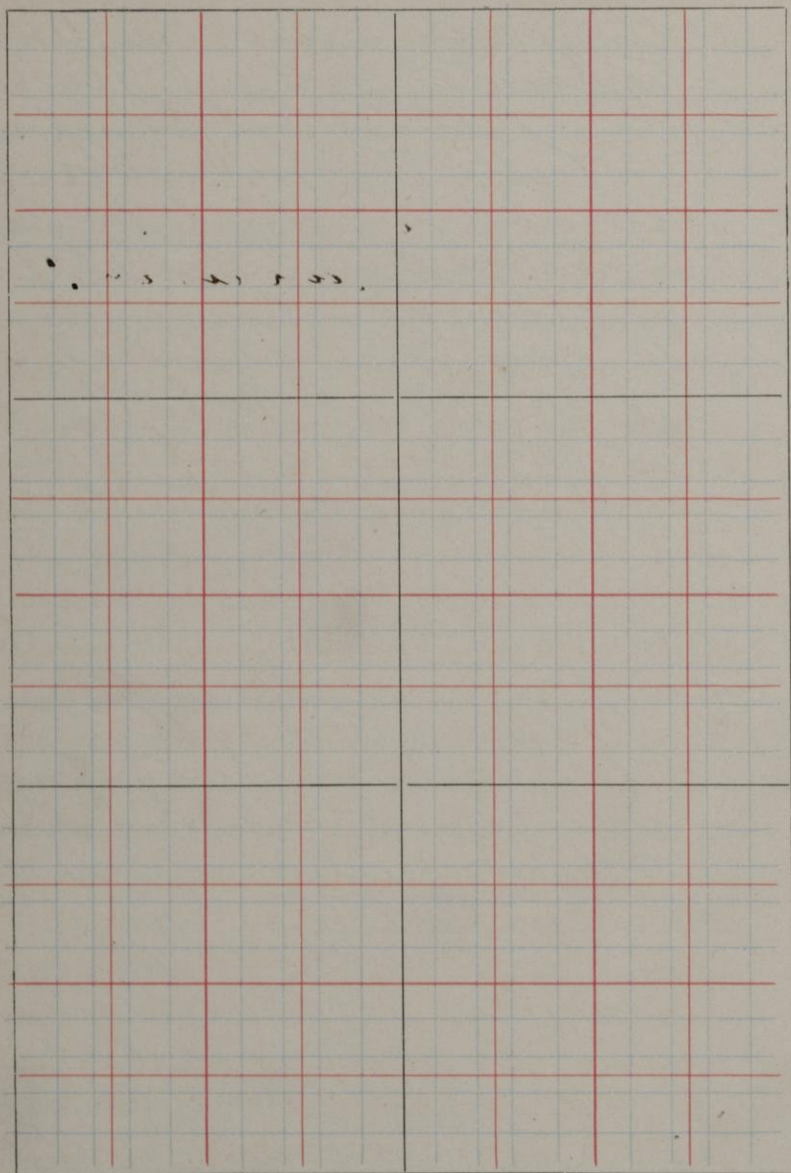
of the granite and conglomerates until we had turned N.E. at the west point of the hill. We were able to follow the contact ~~only~~ a short distance in this direction. We however found the north slope of the hill ~~to be~~ ^{to be} wholly of the massed granite. Passing down into the first little valley in going north we soon arrived at a minor crest upon which is the Quarry.

- (10) We have thus outlined an Archaean axis occupying a considerable area in S.W. $\frac{1}{4}$ S. 23 and a small area in the west part of S.E. $\frac{1}{4}$ 3. 23. This Archaean material having typical characters is entirely surrounded by conglomerates and quartzite. The relations are those of unconformity. A great basal con-

S.

T.

R.



glomerata being found to rest unconformably upon the granitoid gneiss. The contacts being seen at many points along the S.W. border of the Ordovician area. From the strikes and dips noted by Bayley and those observed by me it is plain that the ledges of quartzite in the ^{small} East part of S.W. form a great anticlinorium with axis plunging to the east. On larger ledges of quartzite on road from Goose Lake to Gaultier's an anticline in the quartzite was seen with axis running N.E. and S.W. and the axis is pitching to the northeast. In order that the Goose Lake slates may be under the quartzite it is necessary to assume that the quartzite rises into another anticline at Goose Lake Station. This supposition is reasonable.

S.

T.

R.

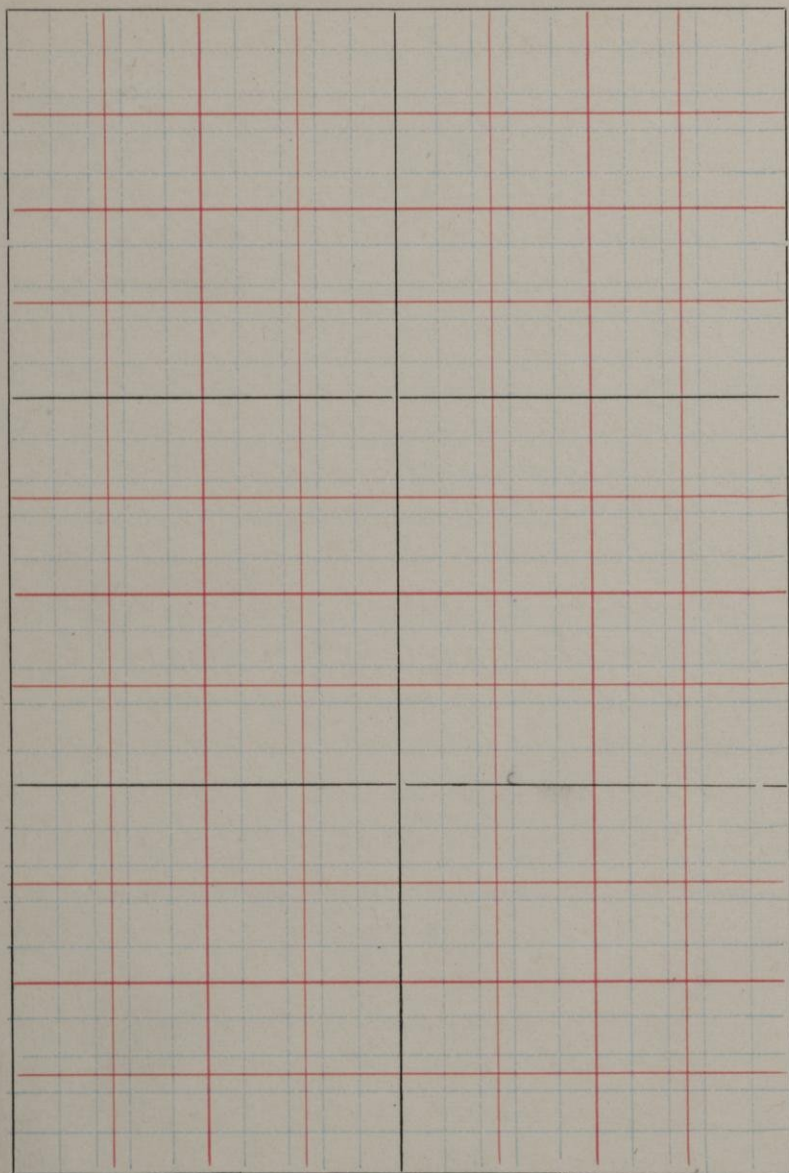
[illegible]

because at this point is the
 crown of an anticline as
 shown by notes of previous days.
 It would then follow that the
 quartzite on the north side of
 Goose Lake is the same as
 that arching the Anderson axis
 in Sec. 23. It is probable,
 that this series of anticlines
 and synclines which seem
 to have major axes in a di-
 rection South of east and
 north of west is cut across
 by other folds running paral-
 lel to the ^{valleys observed in the Simpson} ~~Goose Lake~~ ^{formation}
 arm. The little fold in the
 quartzite, mentioned as on
 the Southern road, probably
 belongs to the latter series.
 While the south arm of Goose
 Lake is an anticline of the
 main series. It appears that
 the folds which have E-W axes
 on the east side of Sec 13 have
 swung around to $N 20^{\circ} - 30^{\circ} W$

S.

T.

R.



Measured the section of
 limestone ledges computed as
 base the ledge at the section
 house to point where Bay-
 ley took Spr. 17114. The thick-
 ness of the section as nearly
 as could be determined
 was two hundred and twenty
 feet. The amount of
 error might possibly carry
 the real thickness as low
 as ten hundred or as high
 as two hundred and fifty
 but these are believed to
 be outside figures. In
 climbing over the ledge
 with a summit which was
 not limestone, this rock
 comprises about one third
 of the ledge. The remain-
 ing two thirds is red and
 black slates mostly the for-
 mer with occasional ^{streaks}
 of gray wacke and quartzite. At
 one place on south slope
 of main ledge of point was

S.

T.

R.

Crown of an anticline

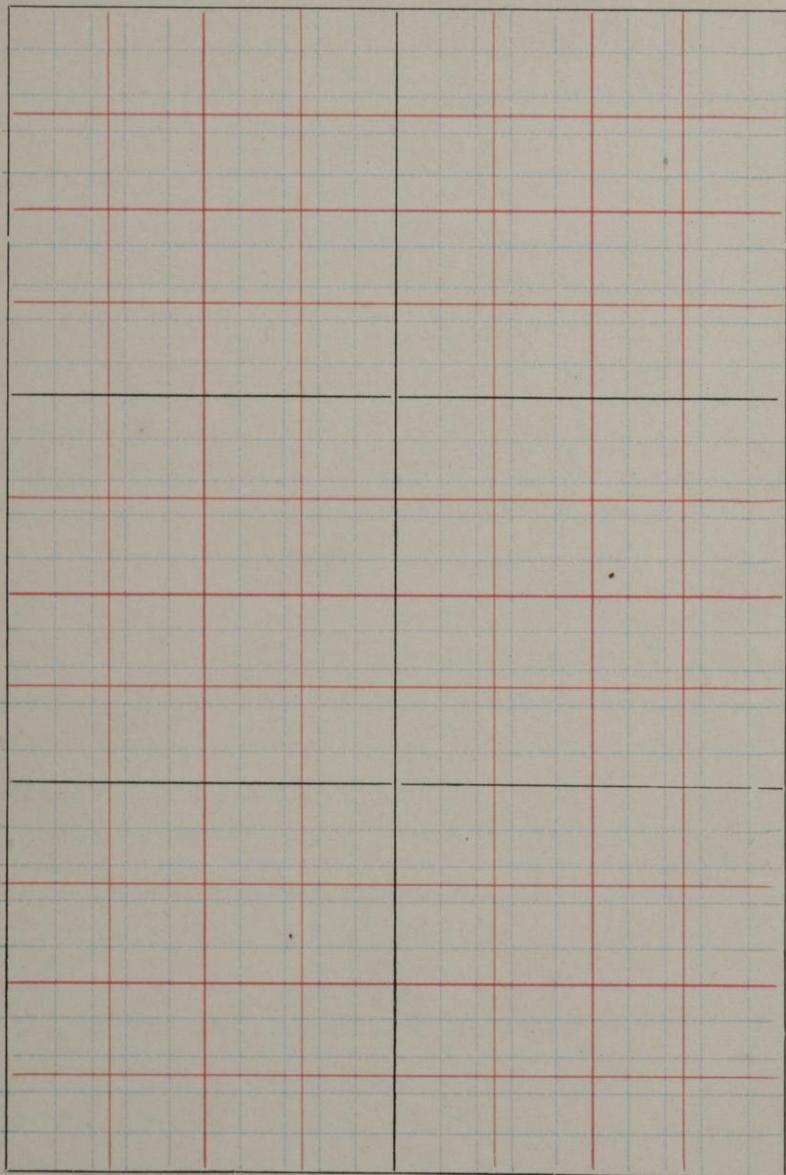
able to take strike along a horizontal ledge many yards long, it was almost due east and west and a flat angle to the north. At several points Phillips took strike and dip at places on Bayley's maps marked A. B. & C. with following results — A S N 60° W. Δ 18° N. E. — B., main face, several determinations made S. N 70° to 90° E, Δ 5° to 10° N. C — S N 90° W. Δ 18° to 20° N.

From Section house two valleys running almost ~~N. & S.~~ ^{South & North} are seen to divide the cliff face into three parts. The easternmost of these cliffs shows clearly the axis of which is ~~not~~ ^{parallel} to the valleys or approximately so, with flat dips nearly ~~zero~~ ^{zero} although the axis as a whole pitches to the north corresponding with the main folding but the front of the ledge appears

S.

T.

R.



to be almost flat and ready
to take on a southern dip
along the axis.

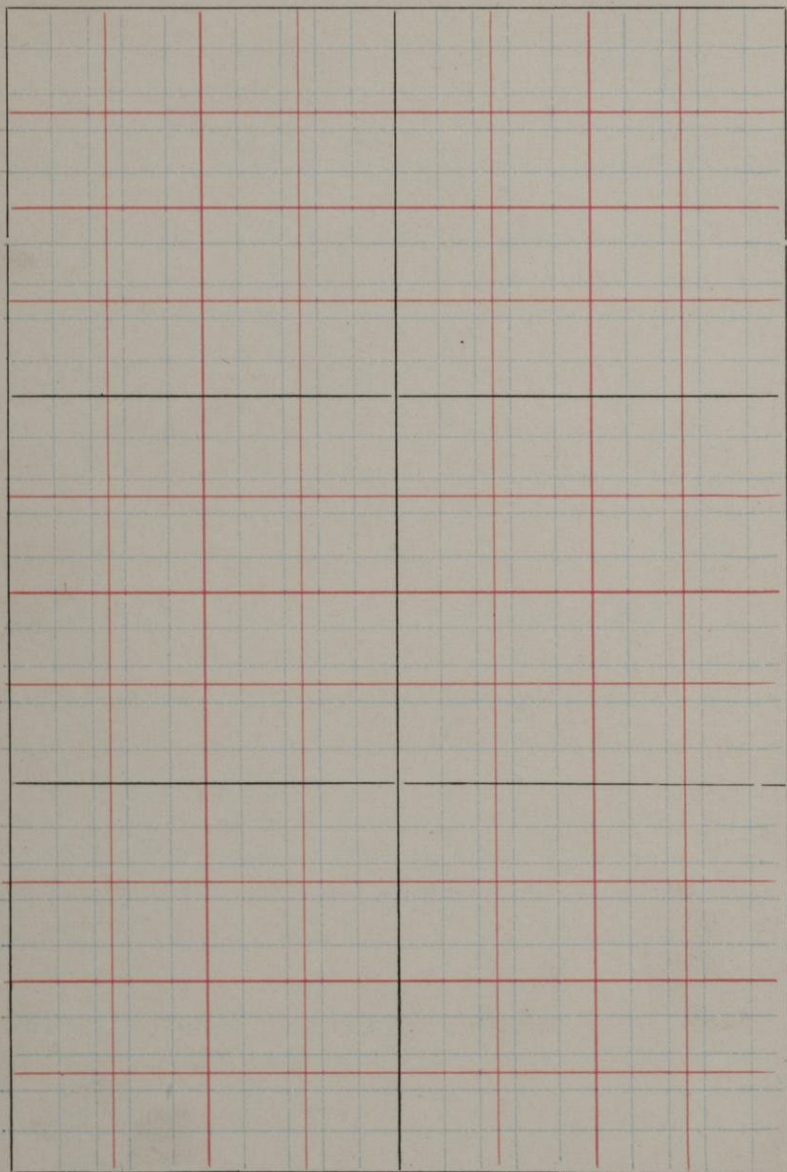
Common along the track
from Goose Lake to section house
found a ledge of cherty quartzite
which clearly shows the
double folding of the district.
One fold is parallel with the
track, i.e. $\Delta N 60^{\circ} W$ and pitches
to the N.W. while the other
line its axis at right angles
to the track and dips off
to the northwest. Below
the cherty quartzite is
black slate cleaved and
exactly like the black
slate between the ordin-
ary quartzite and cherty
quartzite in N.E. part of
Sec 24.

From Hawthorne ~~from Grant~~
to the Gilmore mine and
from that point followed rail-
road track to Bayley's camp
in Sec 28-47-26. Found

S.

T.

R.



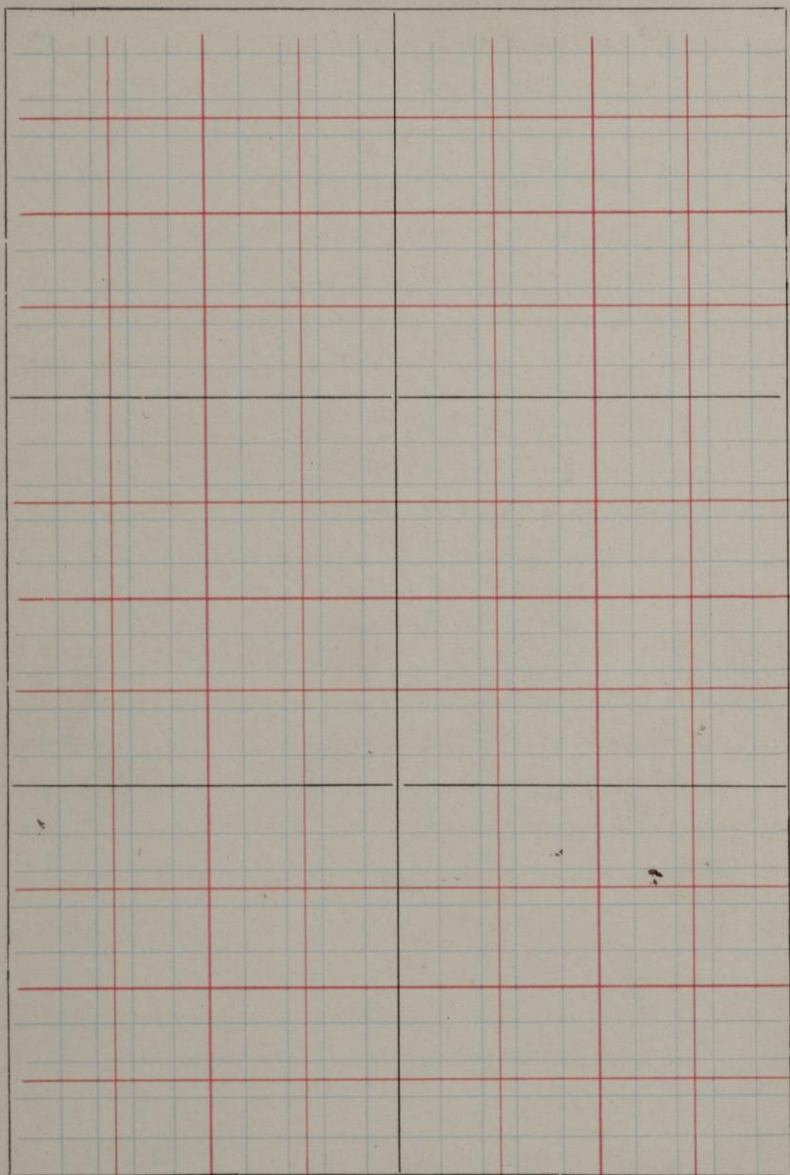
the ore material of the Gilmore
to be merely a ferruginous
quartzite, the most of the
ore being plainly a second-
ary infiltration material
along the veins and cracks.
From the Gilmore to the
west side of Sec. 27 outcrops
of slate, quartzites and fer-
ruginous and cherty slates
more or less along the rail-
road track. These are all
clearly Upper Huronian.

Visit in again the test
pits in east $\frac{1}{2}$ of S. 28 north
of the railroad. Found the
25337 material to be calc. pink chert
25338 and Jasper with banded with
25339 grains of specular ore. In one
pit specimens not taken was
regularly banded black
specular hematitic slate.
These specimens are very
different from any thing
seen along the railroad and
are certainly like Lower

S.

T.

R.



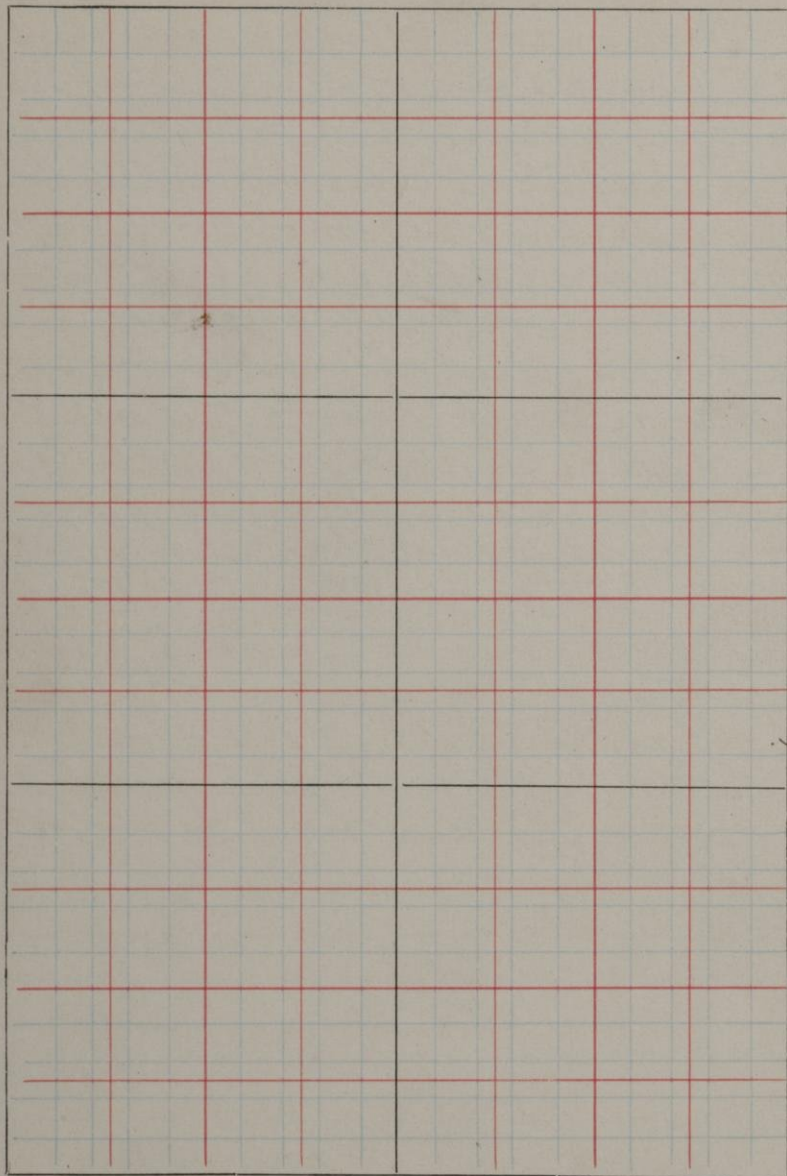
Huronian cherts and gneisses.
 The open pit of the Wheat mine
 was examined, which is clearly
 Lower Huronian, and a set
 of the cherts and gneisses was
 taken. Some of these are
 identical with those of E¹/₂ of
 Sec. 28 and others have are
 cherts with bands of and slates
 of ore (25343-344) which re-
 semble very closely Upper Hu-
 ronian Panokwa cherts. It
 seems probable that the Lower
 Huronian extends to some
 where near the line between
 Secs 27 & 28 along the rail-
 road track although it may
 pass to the west south of
 the track.

25340
 to ✓
 25344

S.

T.

R.



Negamuc. Thurs. July-20.

Drove north across the
green schist area to point
near east 4 Sec. 13-48-26

In passing through the green
schists, ^{some} feldspar crystals were
observed in them at one place.

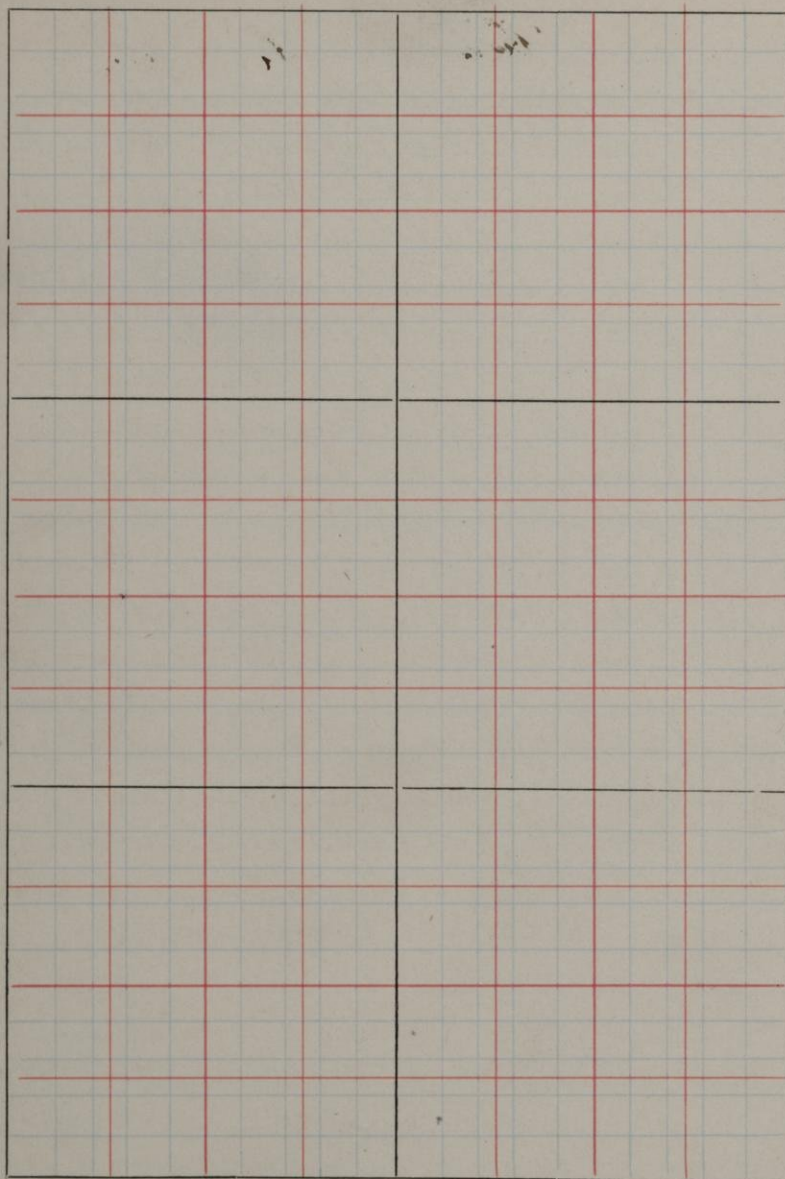
25345 In Sec. 13. the green schists are
cut through in an intricate
way by the dykes of the
syenite range. Narrow veins
and dykes three and four
feet in thickness were seen.
Nearly all the ledge of
green schist does after con-
tact being cut by the syenite.

25346 In Sec. 25346, no more
dykes of syenite ~~about~~ four
feet across from which small
dykes branched and from
these small stringers. Both
the syenite and schist are cut
by dykes from a foot in di-
ameter to small stringers.
of red granite which is iden-
tical in character in each
and is plainly an intrusive

S.

T.

R.



25347 later than the syenite
 Specimen of ~~red~~ granite from
 dyke in schist.

25348 Red granite from dyke in
 syenite. Specimen shows
 contact and a portion of
 the syenite ~~there~~

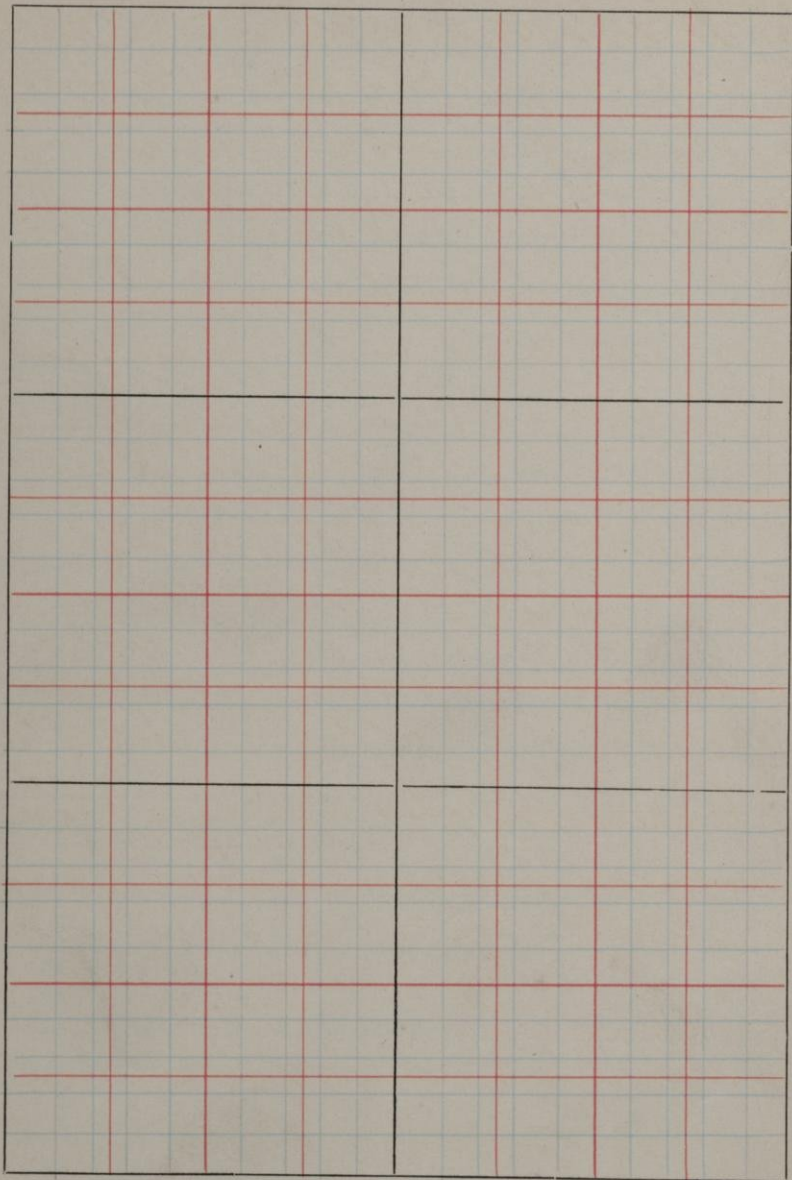
The slates and quartzites
 north of the syenites be-
 long in to the Silver Lake
 area ~~area~~ ~~area~~ ~~area~~. On the
 edge of syenite was found

25349 a boulder three to four feet
 in diameter of coarse con-
 glomerate containing pebbles
 and grain boulders of the
 syenite, red granite and schist.
 It doubtless is from a basal
 conglomerate of the ~~up~~
~~plate~~ Silver Lake area
 which rests unconformably
 upon the granite, syenite -
 schist complex.

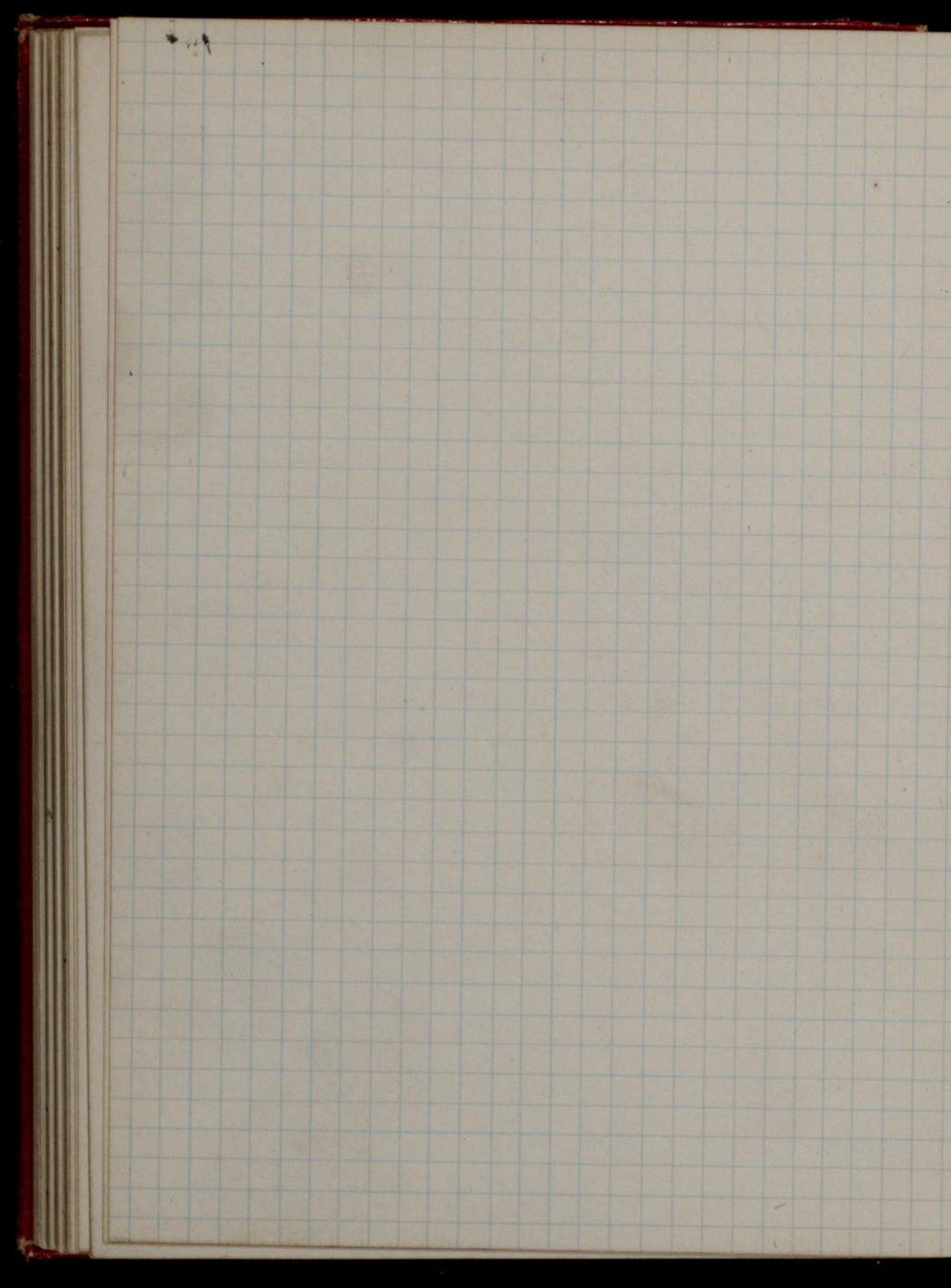
S.

T.

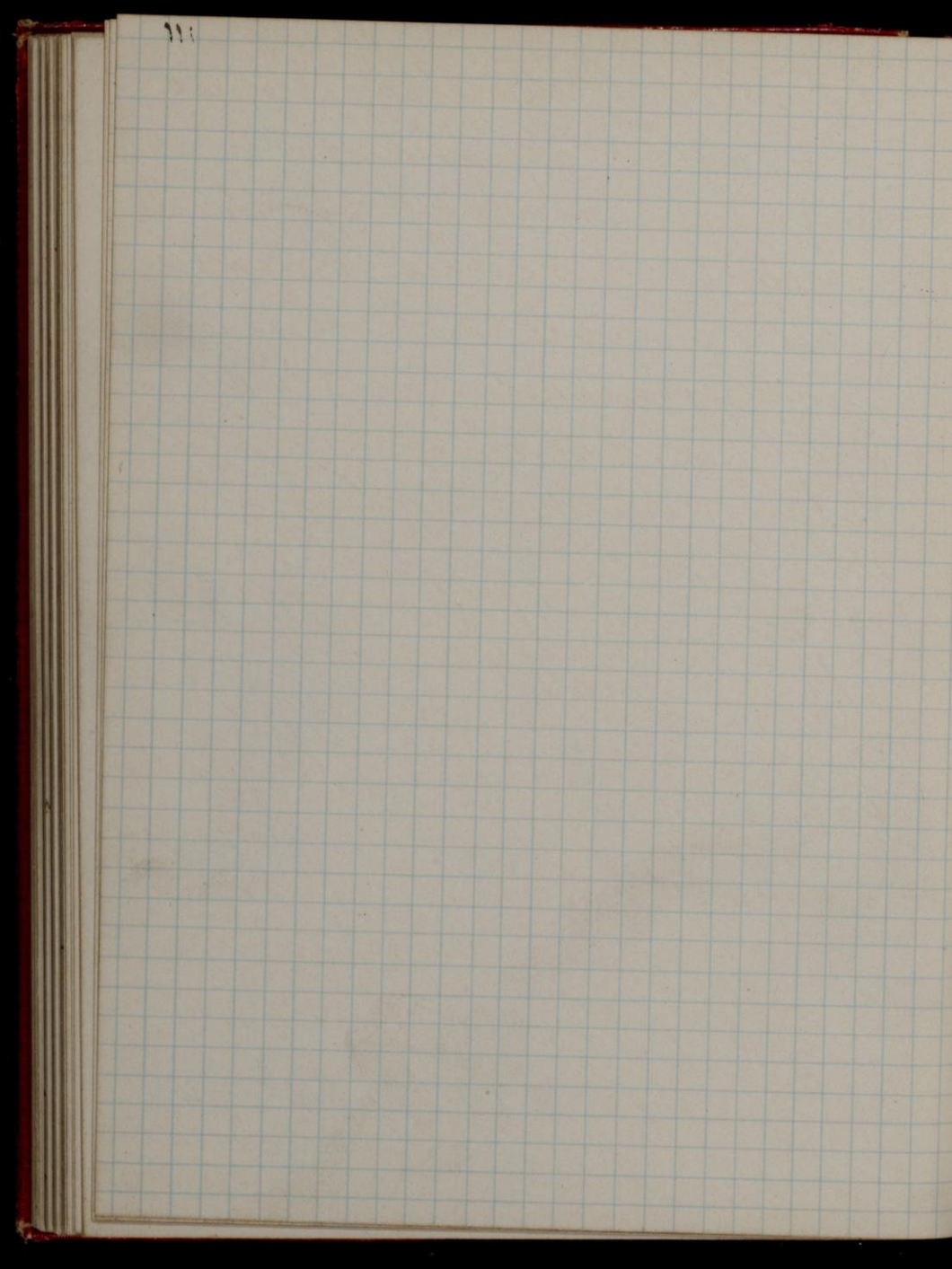
R.



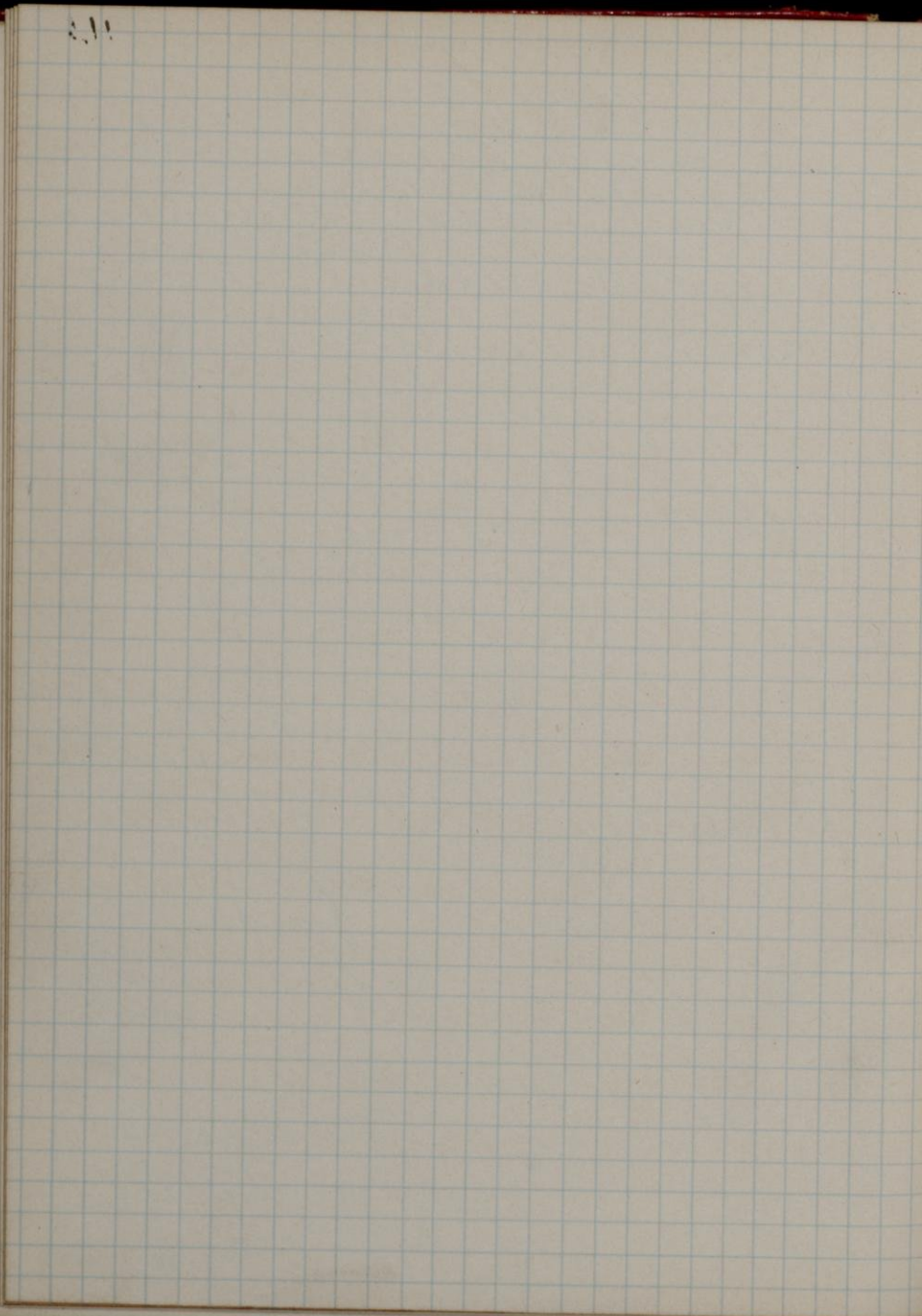
Made a traverse across
 the quartzite range from
 south to north in Sec 3248.
 Found the upper $\frac{3}{4}$ or $\frac{5}{6}$ of
 the series to consist of
 reddish and greenish
 slates intercalculated
 with occasional beds of
 quartzite and cherty look-
 ing quartz. It is also much
 veined with white quartz
 as result of the shearing
 it has in the slates in
 many places take a rather
 crystalline aspect and they
 might be mistaken for the
 green slates to the northward
 In the latter however there
 is never over the alterna-



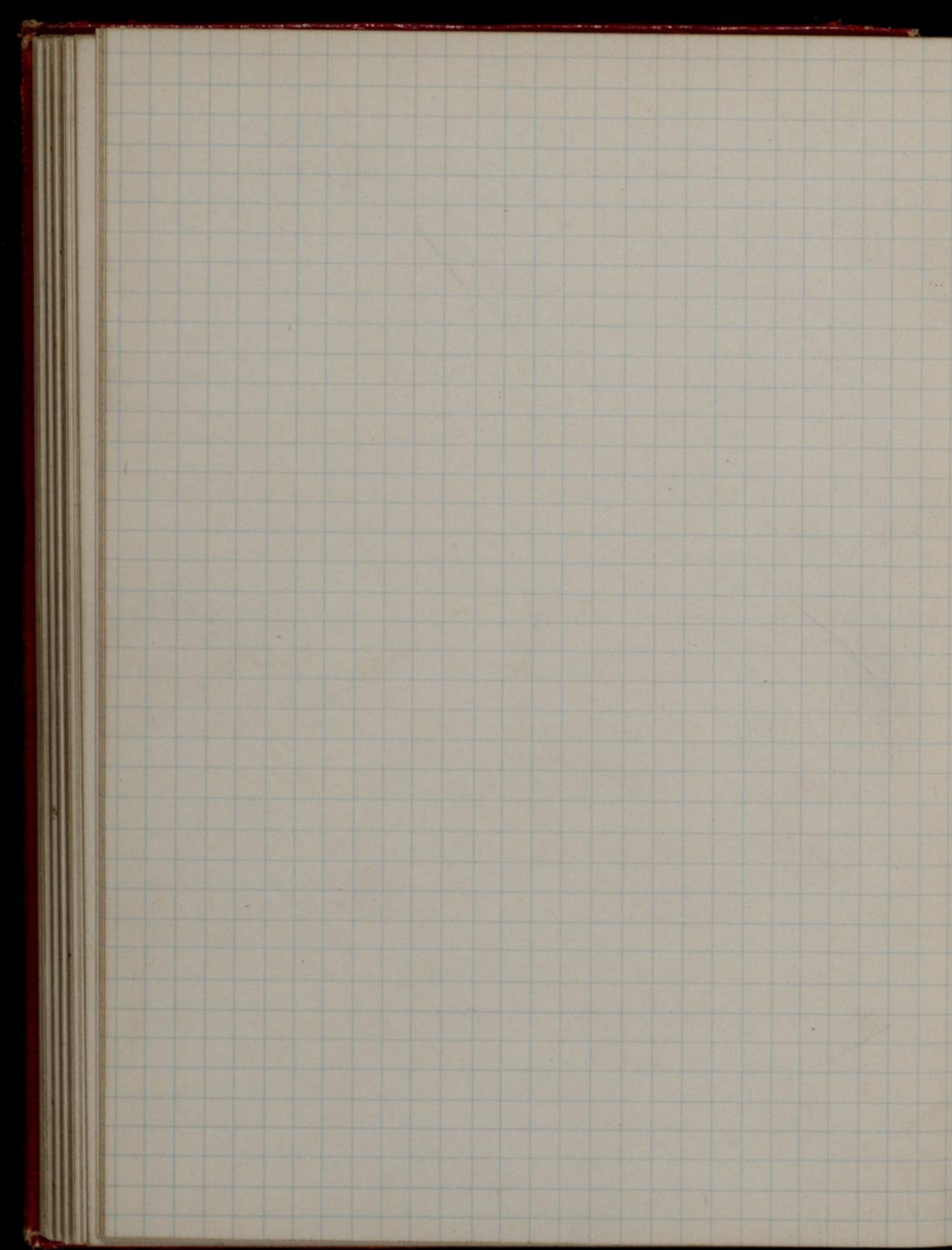
train of beds of different
 character. If the granitic
 injections along the schist
 osity are excluded. In the
 slate series you may have
 in a single ledge black
 slate, red slate, noraculite,
 fine grained red quartzite
 and cherty quartzite all
 in ^{regular} layers. While in the case
 of the schists there is fine
 lamination or schistosity
 in a material all the
 beds of which are of like
 character. North of the slate
 is a belt of red graywacke
 which has developed within
 it to some extent a cleav-
 age and this on account



of its uniform character very similar closely resembles the schist in external aspect. However immediately to the north of the reddish graywacke or fold of the quartzite and dipping under it is a broad belt of regularly bedded typical quartzite which very plainly shows the round grains of quartz under the lens. The slaty cleavage ~~has~~ and even schistosity have developed parallel to the bedding. Probably as a result of the accommodations required in the folding taking place between



the beds of different characters. The series of red and black slates with inter laminated quartzites and cherty quartzite and thin quartz in all of these particulars remind one strongly of the Grooved Lake slates which are probably near the same horizon. Upon account of the folding in two directions in the Grooved Lake area the rocks are there more shattered and brecciated having a minor cleavage cutting across the major.



Wednesday - July 21 - 1893

Went south from the Good
rich mine open pit to pit near east
and west quarter lines Sec 19-47-27

We have found vitreous, granu-
lar quartzite which certainly
belongs to the Devonian. We next went to
the hill S.E. of this and in
another open pit found fer-
ruginous quartzite which
belongs to the same ~~series~~ series.
Now went N.E. to the promi-
nent hill just N.E. of Sec. 19.

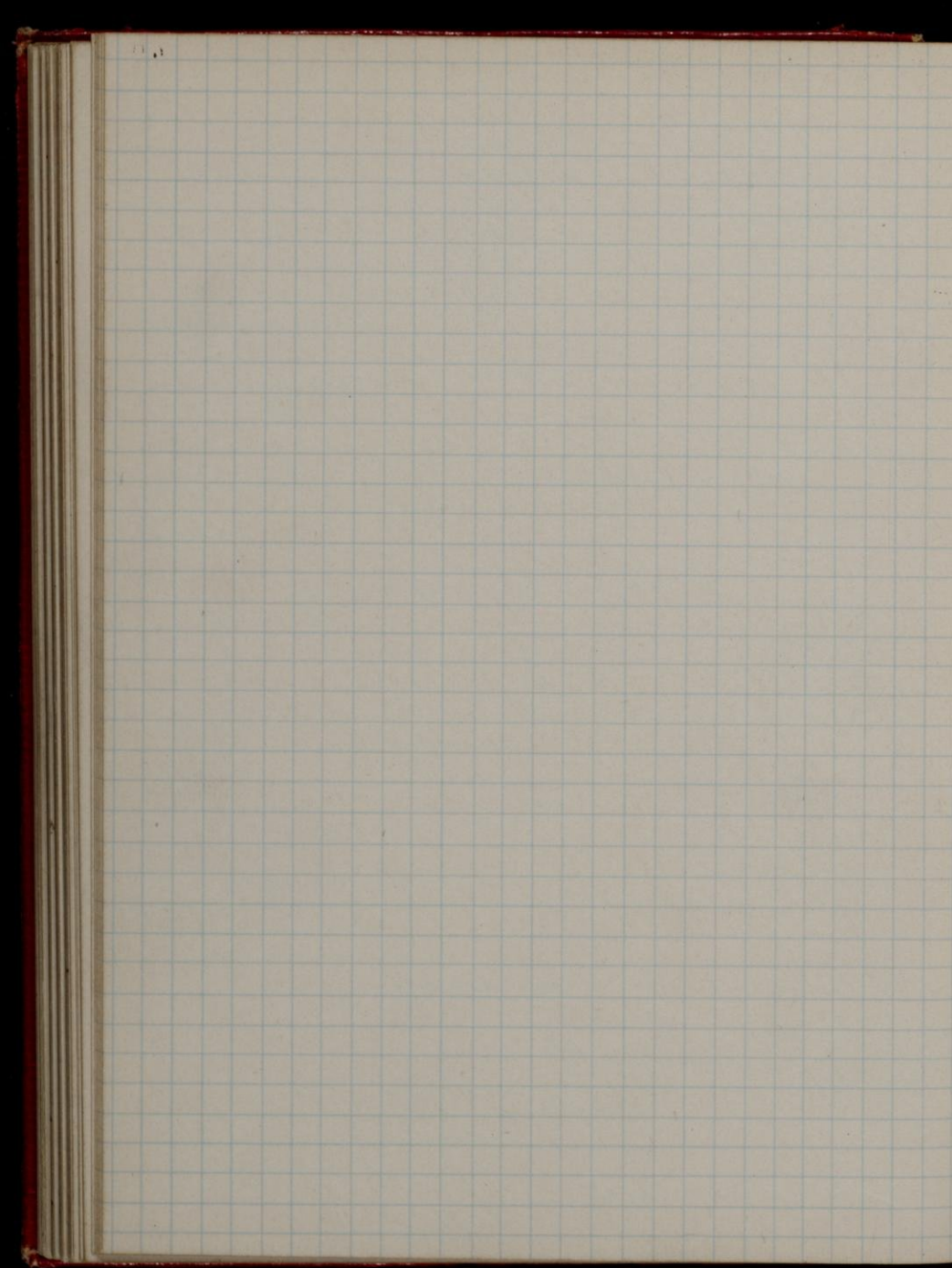
Here on S.W. slope and crest
of the hill are typical expo-
sures of petroschist slate, spec-
imens shown for papers.

In all the regularly laminated
parts of the ledges we have

25350

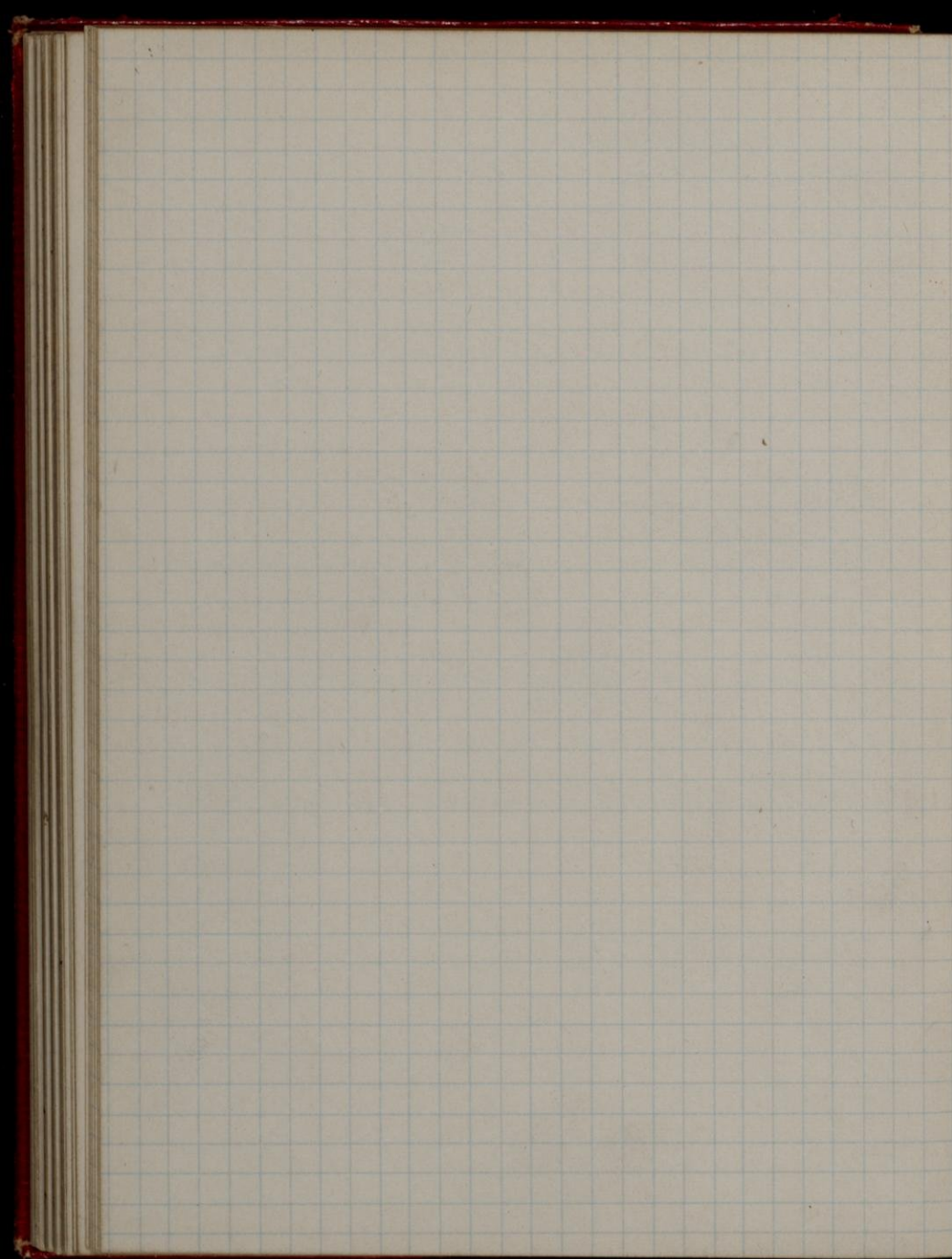
to

25353

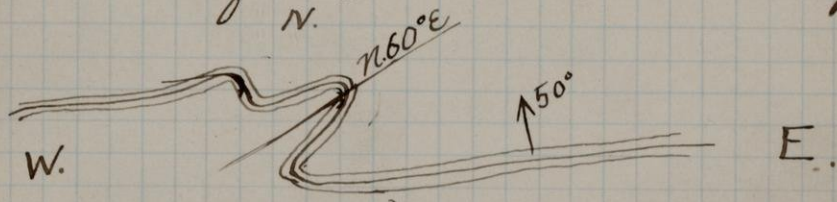


Strike $N 80^{\circ} E$ and dip $55^{\circ} N$.

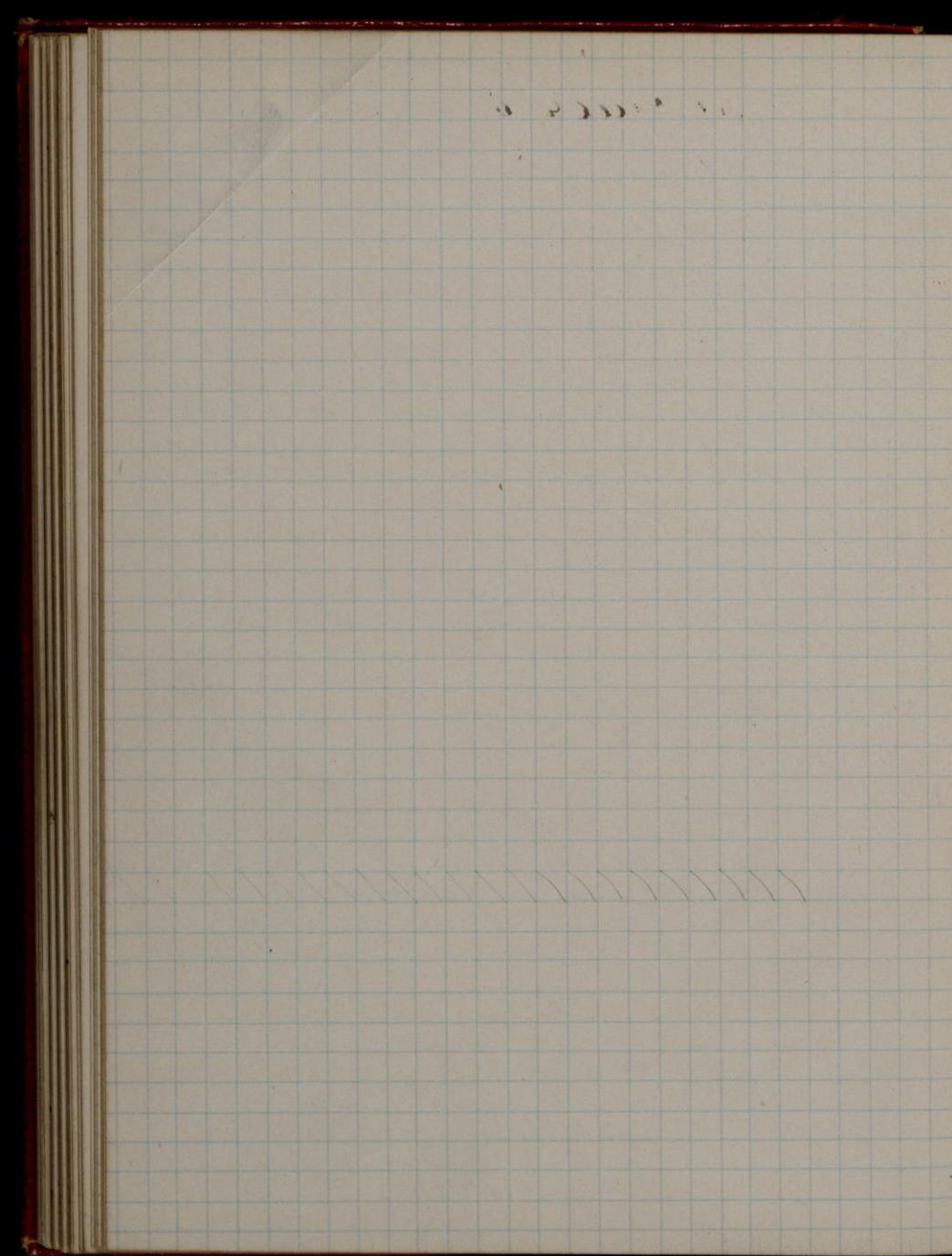
The ledge has however been depressed in an ~~ex~~ direction producing sharp folds three of which plunge to the north or northwest. If strike and dips are taken at these points almost any result can be reached depending upon the point of observation. The northerly pitching axes here about the same inclination as the regularly laminated slates. Going north a test pit is found where the material thrown out resembles gneiss in some respects and the typical iron actinolite in other respects. Only to the north slope of the hill other exposures of typical iron actinolite are found.



strikes and dip of which are the same as before. However there are even in places little or stunted folds with axes pitching north 60° east. With a horizontal plane the folds are as shown below and both sides of the more acute folds have northern dip.



Going down the slope of the most northeasterly ledge the typical micaceous slate seems to grade into jaspery rocks. No discordance between the two could be observed. The jasper phase appearing



to be at places of minor folding
In a trap pit just below is also

25338 a rock of jaspery character. How-
ever it is not certain that

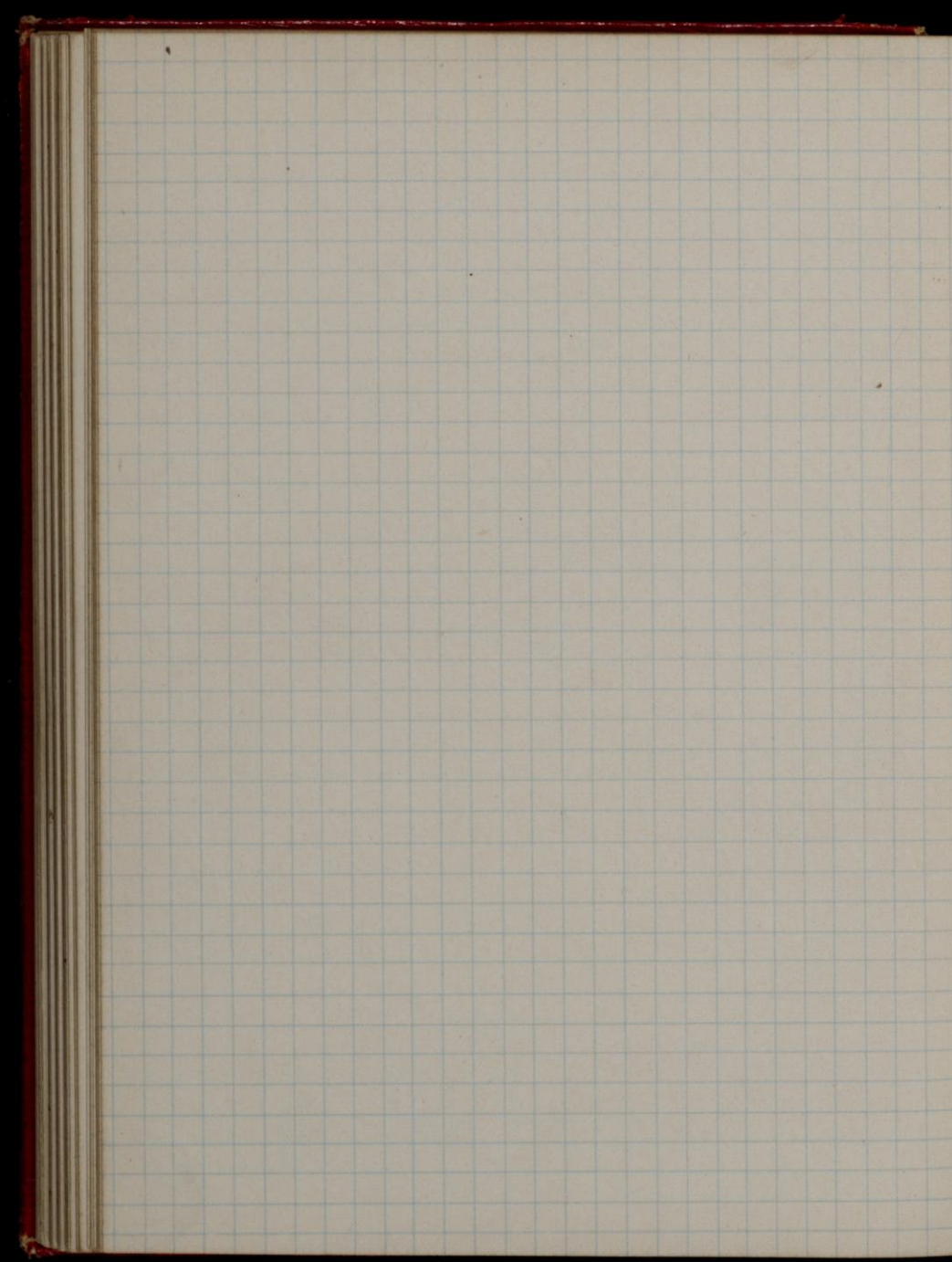
any of this is true jasper. Going
now the mine immediately
to the north we find chert

25360

pale pink

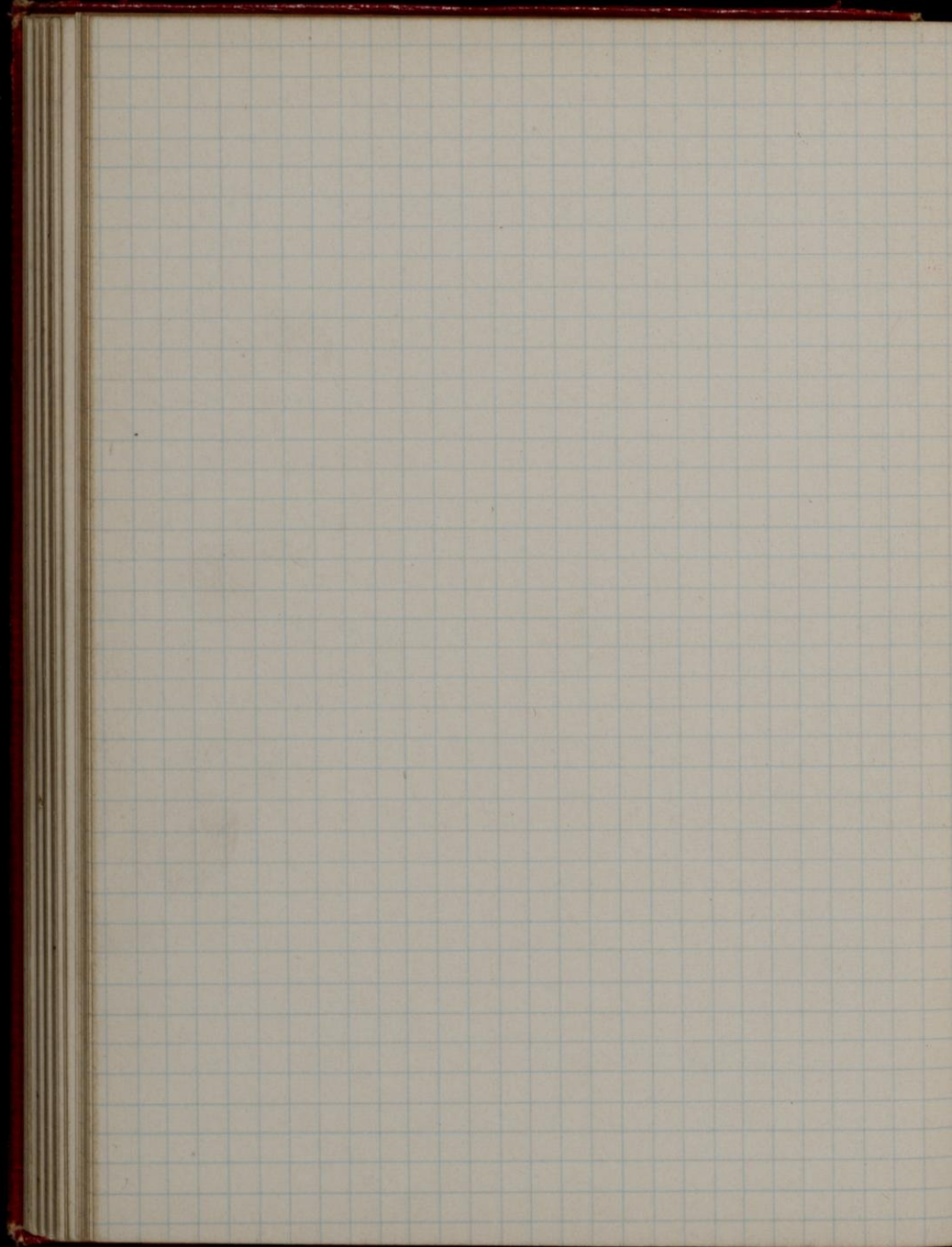
25361

and jasper with bands and
shots of ore which is over-
lain unconformably by the
great Huronian basal con-
glomerate. This latter may
be seen capping the jasper
at certain places as though
nearly ready to pass over
the hill to the south. The
chert and jasper while usu-
ally rather regularly lamin-
ated and not dipping great



ly in strike and dip from the original position, it is in places banded into coarse granular rolls, as though it had been turned back upon itself, although the usual inclination is to the north at an angle of $^{\circ}$. At one place along the open pit the quartzite comes across to the south side and is fine grained becoming a ferruginous
 25362 Graywacke. etc

As a result of the former work it cannot be asserted either that the Upper Permian rocks in the N.E. part of S.W. $\frac{1}{4}$ of Sec. 19 grade into the actinolite slates nor that the latter



grade into the genuine jasper
to the north

Charley Schur { N 50° W
D 20° S 50 W

halfway G.L. & Grallin { S N 60° W
D 28° SW



