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Michigamme iron district: [specimens 22939-22985]. No. 166 1894

Clements, J. Morgan (Julius Morgan), 1869-
[s.l.]: [s.n.], 1894

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U. S. GEOLOGICAL SURVEY
FIELD SECTION BOOK

9-891

LAKE SUPERIOR DIVISION.

INSTRUCTIONS.

1. Ordinarily at least two pages of this book will be devoted to one section. On the left-hand page, place a map of as much of the section as has *actually been seen*. Denote rivers, lakes, marshes, etc., by the usual topographical signs. Denote the ledges of rock, when no structure is made out, by cross-hatching, making the cross-hatching cover as nearly as possible the areas occupied by the exposures. If the rock is a massive one, but still more or less plainly bedded, use the same sign with a dip arrow and number attached, showing the direction and amount of the dip. Denote a shaly or other very plainly bedded ledge by right parallel lines, and a ledge having a secondary structure by wavy parallel lines running in the direction of the strike, with dip arrow and number attached as before. The greatest care must be taken to avoid confusing slaty or schistose structure with bedding, and in all cases where there is the least doubt about the true bedding direction, indicate it by a query. To each exposure on the face of the map attach the number of the specimen representing it. In mapping the section count each of the spaces between the blue lines as 100 paces, and twenty of these spaces to one mile, or 2,000 paces. Usually the southeast corner will be placed at the bottom of the page, or at the first black line above the bottom of the page, and at the right-hand side. If, however, for any reason, it is desirable to show portions of an adjoining section, the southeast corner may be shifted up, or the map may be turned around and the north placed at the left-hand side of the page. The ruling of the left-hand pages is also arranged so that, if desirable, a larger or a smaller scale can be used, eight inches, two inches, one inch, or one-half inch to the mile. With the two-inch scale, the squares outlined in black represent sections, and those in red, quarter sections and "forties," while the space between the blue lines is 200 paces.

2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast corner of the section and the dip and strike when observable, the latter always being expressed from the north; for instance 4025, 250 N., 300 W., *Strike, N. 78° E., Dip 50° S.* Then follow with a full description of the ledge. When topographical maps are used for locations this paragraph applies only in part.

3. Collect a specimen from every ledge, or wherever there is a change of rock on any one ledge, taking care to get fresh material, unless for a special purpose the weathered surface is desired. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be specimened. The position and extent of the ledges not specimened should be marked on the map, with notes that each is of a rock identical with specimen so-and-so. Under the same conditions small-sized specimens, trimmed to a uniform size of $2 \times 2\frac{1}{2} \times \frac{1}{4}$ 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.

r r 8/95 C-A

166

Michigan

Iron District
more especially
the

Fence & Deer River Regions

J. Morgan Clements
1894

Chas. Alley
Comptroller

S. 20

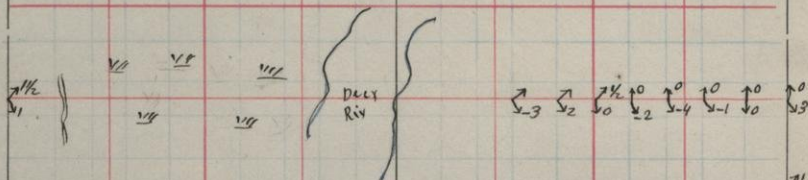
T.

45-

R. 32

NW

NE



No exposures.

7

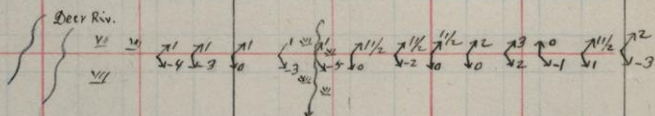
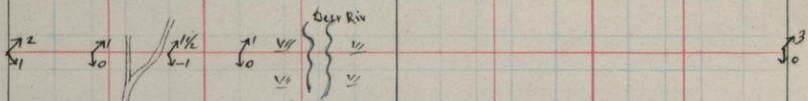
1

NW S. 29

T. 45

R. 32

NE

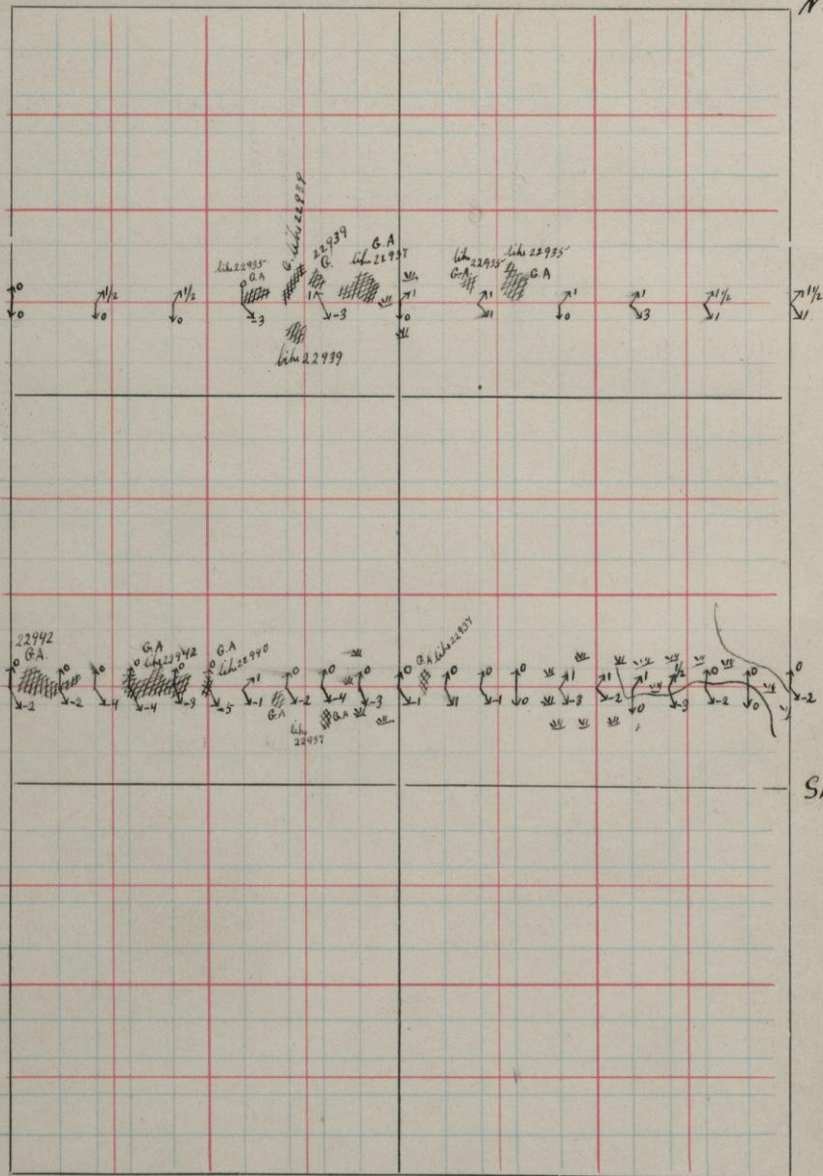


SSW

SE

No. Exposures.

11 NW S. 19 T. 45 R. 32 NE



S SW

SE

22939 1775 N 1250 W SE Cor. Sec. 19-45-32

Exposure of granstone looking like an old flow with here & there blocks of the same kind of granstone in it and around them in places the flow structure showing.

22942 250 N. 1975 W SE Cor. Sec. 19-45-32

Ledge of much altered amygdaloidal granstone. Red feldspar quite conspicuous in it.

S. 24

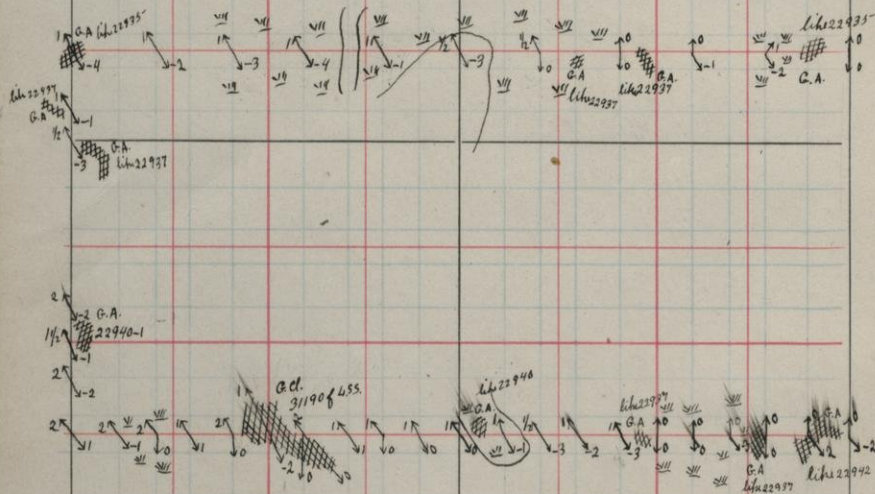
T. 45

R. 33

NW

NE

2



SW

SE

22940-1 560 N 1980 W SE Cor. Sec. 24-45-33

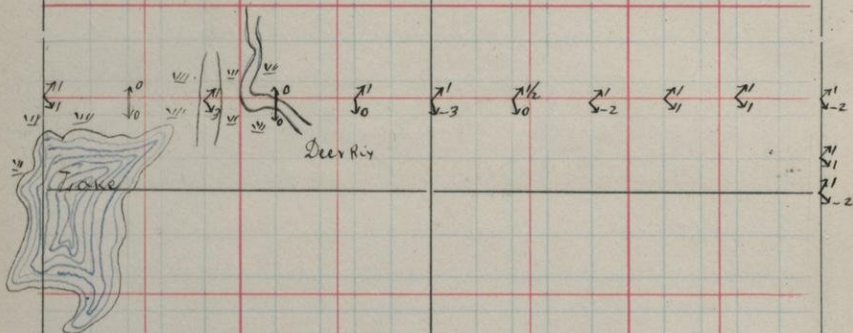
Large exposure of 22940, ^{fine grained} dense amygdaloidal
 gneiss, forming most of outcrop. In one place
 is exposed a volcanic breccia²²⁹⁴¹ with both
 rounded bomb-like pieces and also
 angular fragments, nearly all vesicular.
 Probably surface of a lava flow.
 Almost impossible from hand specimen
 to get correct idea of appearance of surface.
 Breccia lies to NW. of the ~~main~~ amygdaloidal
 rock.

11 NW S. 32

T. 45

R. 32

NE



S. 31

T. 45

R. 32

NW

NE

$\uparrow 0$ $\downarrow 2$ $\uparrow 1$ $\downarrow 0$ $\uparrow 1$ $\downarrow 0$ $\uparrow 1$ $\downarrow 0$ $\uparrow 1$ $\downarrow 0$ $\uparrow 1$ $\downarrow 3$ $\uparrow 1\frac{1}{2}$ $\downarrow 0$ $\uparrow 1\frac{1}{2}$ $\downarrow 0$ $\uparrow 1\frac{1}{2}$ $\downarrow 0$ $\uparrow 1$

$\uparrow 1\frac{1}{2}$ $\downarrow 0$ $\uparrow 4$ $\downarrow 2$ $\uparrow 1\frac{1}{2}$ $\downarrow 0$ $\uparrow 0$ $\downarrow 3$ $\uparrow 0$ $\downarrow 0$ $\uparrow 0$ $\downarrow 0$ $\uparrow 1$ $\downarrow 0$ $\uparrow 1\frac{1}{2}$ $\downarrow 1$ $\uparrow 0$ $\downarrow 4$ $\uparrow 0$ $\downarrow 0$ $\uparrow 0$ $\downarrow 1$ $\uparrow 1\frac{1}{2}$ $\downarrow 3$ $\uparrow 0$ $\downarrow 1$

VII

VIII

IX

X

To Balsam

Lake

SW

SE

NW

S. 21

T. 45

R. 32

NE

$\frac{11}{0}$ $\frac{12}{1}$ $\frac{11}{1}$ $\frac{11\frac{1}{2}}{2}$ $\frac{12}{2}$ $\frac{11\frac{1}{2}}{0}$ $\frac{11}{1}$ $\frac{12}{0}$ $\frac{12}{0}$ $\frac{12}{2}$ $\frac{12}{1}$ $\frac{12}{1}$ $\frac{12}{0}$ $\frac{12}{2}$ $\frac{12}{0}$ $\frac{12}{1}$ $\frac{12\frac{1}{2}}{1}$ $\frac{12}{3}$ $\frac{12}{1}$ $\frac{12}{2}$ $\frac{12}{2}$

$\frac{11\frac{1}{2}}{3}$

$\frac{12\frac{1}{2}}{1}$

$\frac{11}{1}$

$\frac{12\frac{1}{2}}{1}$

$\frac{11}{1}$

$\frac{11}{1}$

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$\frac{11}{1}$

$\frac{12\frac{1}{2}}{2}$

SW

SE

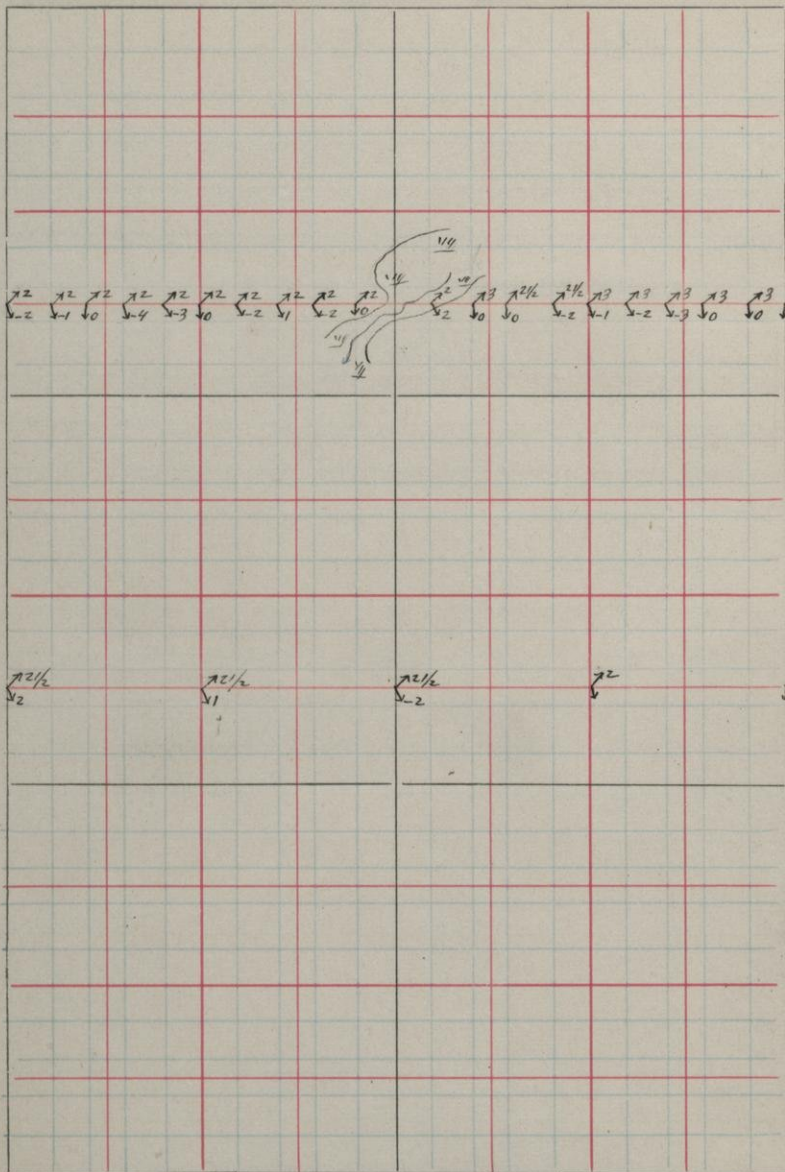
120

S. 22

T. 45

R. 32

NE



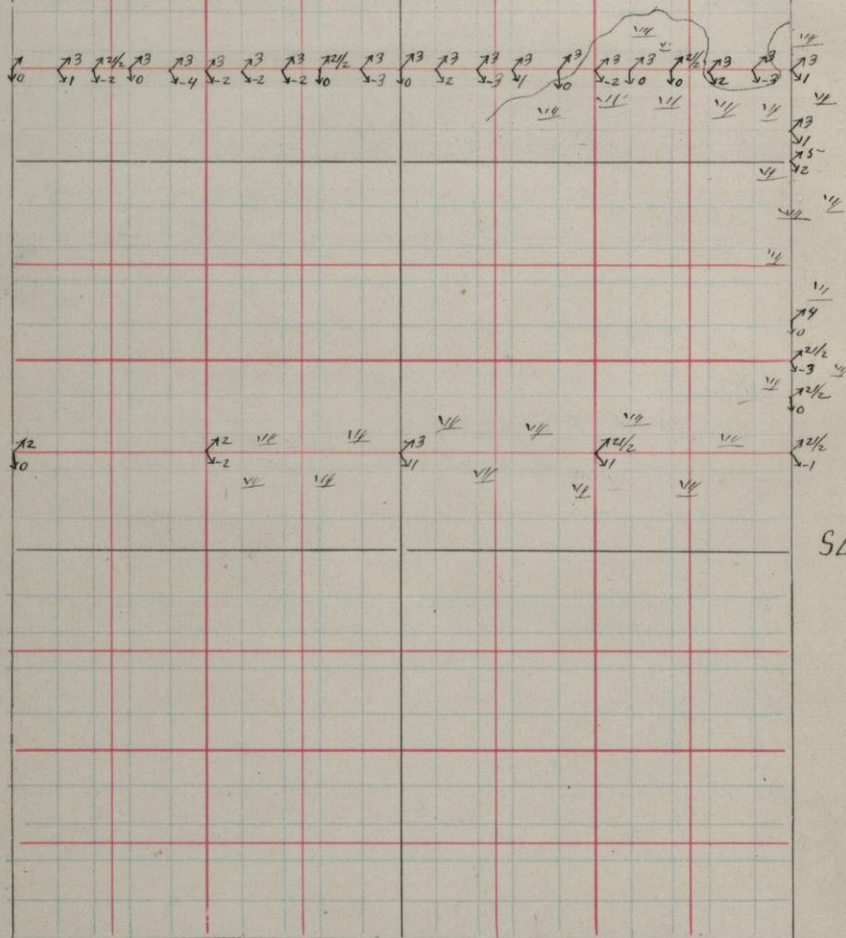
S. 23

T. 45

R. 32

NW

NE



S SW

SE

S.

6

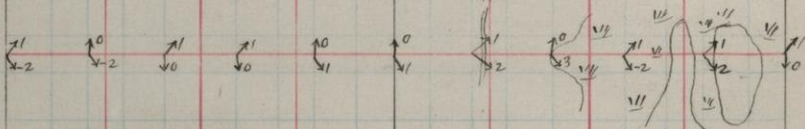
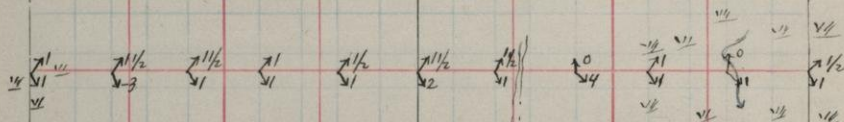
T.

44

R.

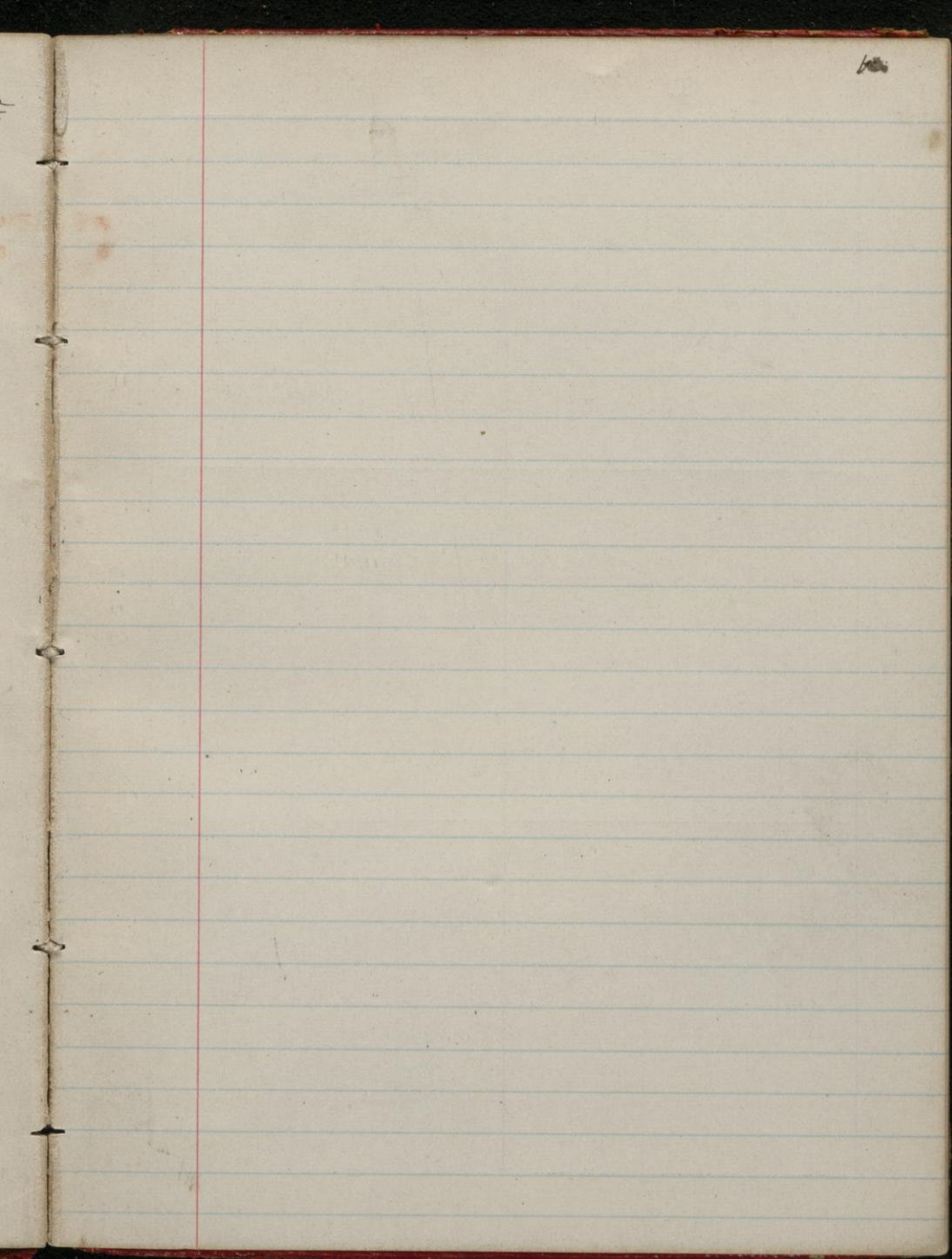
32

NE



SW

SE



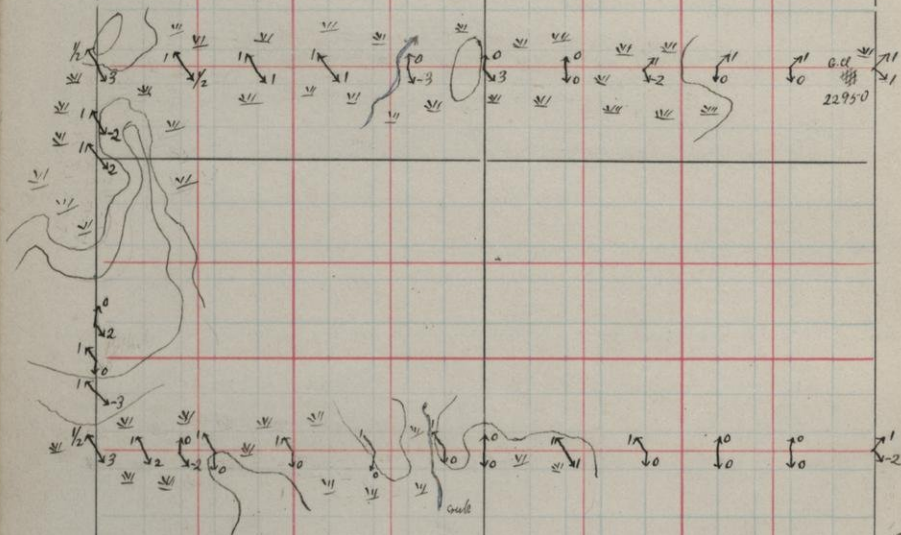
NW S. 1

T. 44

R. 33

NE

22



E

22950

1225° N 50° W. SE Cor. Sec. 1-44-33

Exposure of a volcanic breccia like specimen.
Porphyritic granitoid veins to facies in
matrix as well as in fragments.

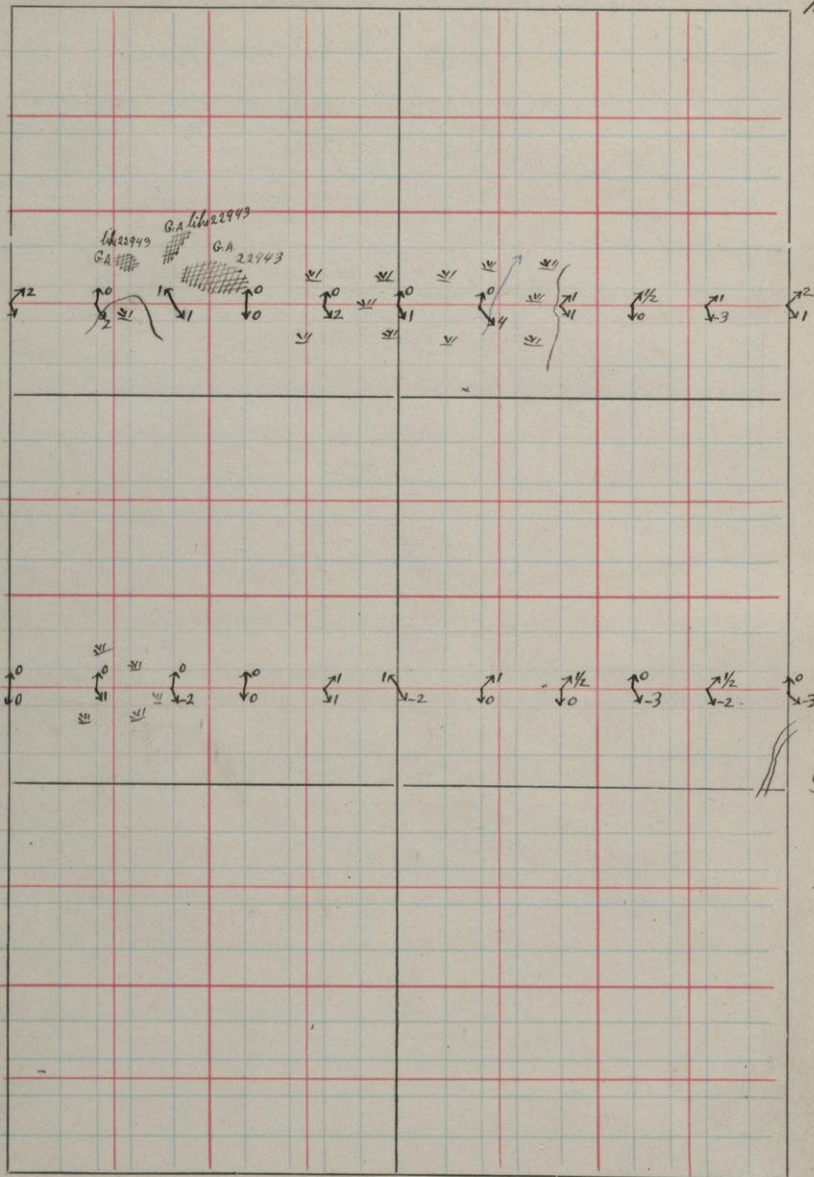
S. 30

T. 45-

R. 32

NE

22



SW

SE

22943

1825N 1500W SE Cor. Sec. 30-45-32

12

Large exposure of a ^{fine grained} slightly porphyritic and in places amygdaloidal granitoid.

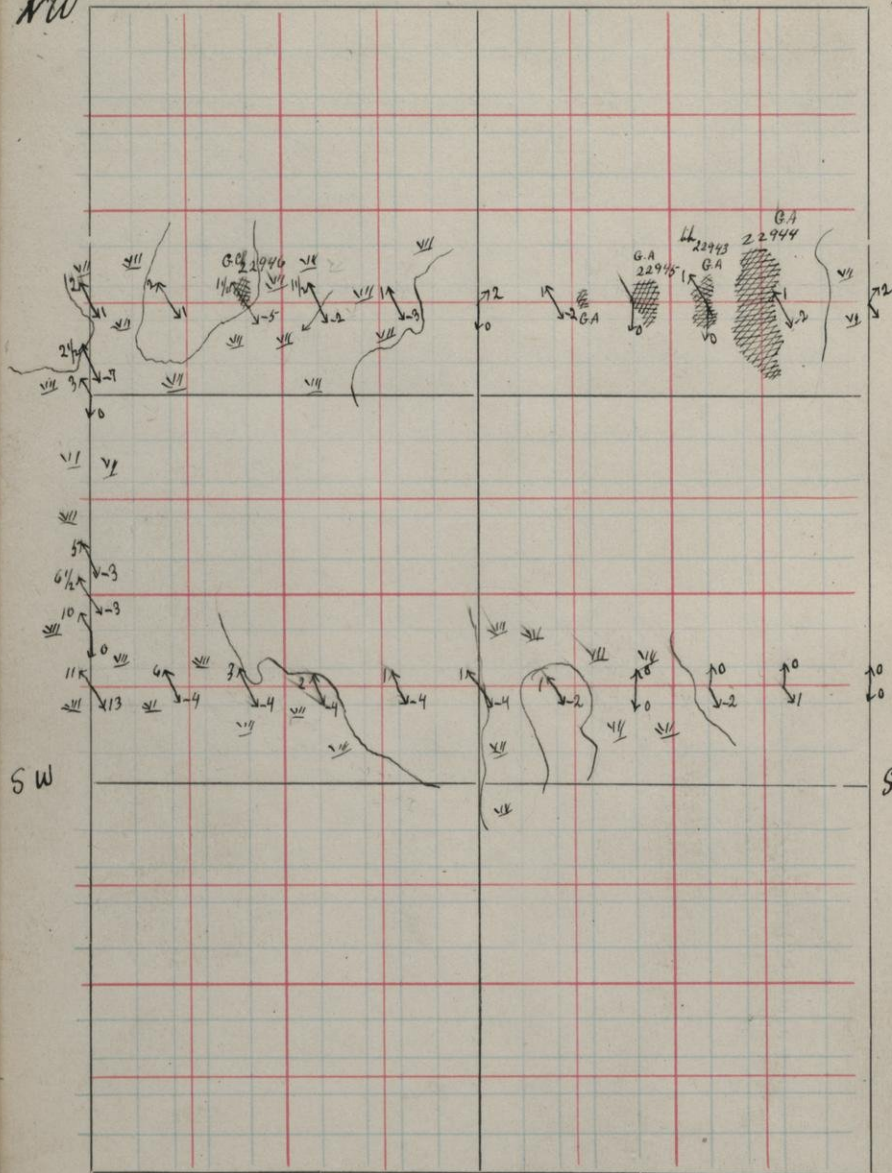
The feldspar phenocrysts show on weathered surface as white spots. In one place the rock shows flowage around included angular fragments of apparently the same rock as the matrix.

S. 25- T. 45-

R. 33

NE

NW



22944

1250 N 200 W SE Cor. Sec. 25-45-33

Knob of medium grained granstone.

In places a fine grained and also an amygdaloidal phase show but the relations of the one to the other can not be seen on exposure.

One portion of ledge shows following structure of the



The long direction of these ellipsoidal bodies of rock agree. Where two bodies meet we find a band two to four inches wide of schistose, usually badly decomposed, rock. The triangular space where three meet is filled with secondary vein quartz. Rock forming the rounded bodies is like 22943 a fine grained granstone. Possible cause of structure is separation on cooling*, subsequent dynamic action sheared edges of blocks which then easily decomposed. Quartz filled the corners. This is western side of exposure of which 22944 forms the eastern side.

* compare with Chaux Grotto, Eifel, Rhine Prussia, Germany.

22945-

1250 N 560 W SE Cor. Sec. 25-45-33

Ridge of amygdaloidal granstone.

22946

1250 N, 1600 W. SEC. S. 25-45-33. Volcanic breccia.

Fragment of fine grained dense + amygdaloidal granstone. Matrix is schistose granstone.

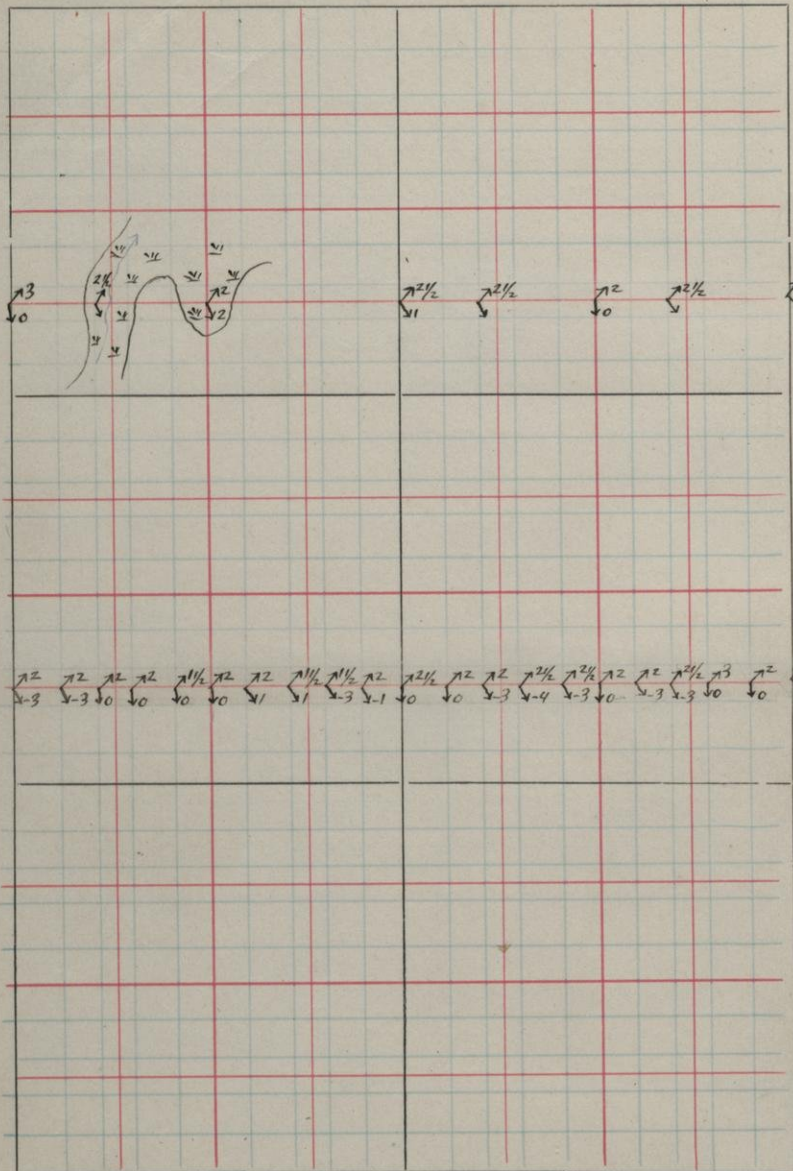
S. 28 T. 45-

T. 45-

R. 32

NE

NW



73
2-2

$$\begin{matrix} & 2 \\ \nearrow & \\ \searrow & \\ & 1 \end{matrix}$$

SE

SW

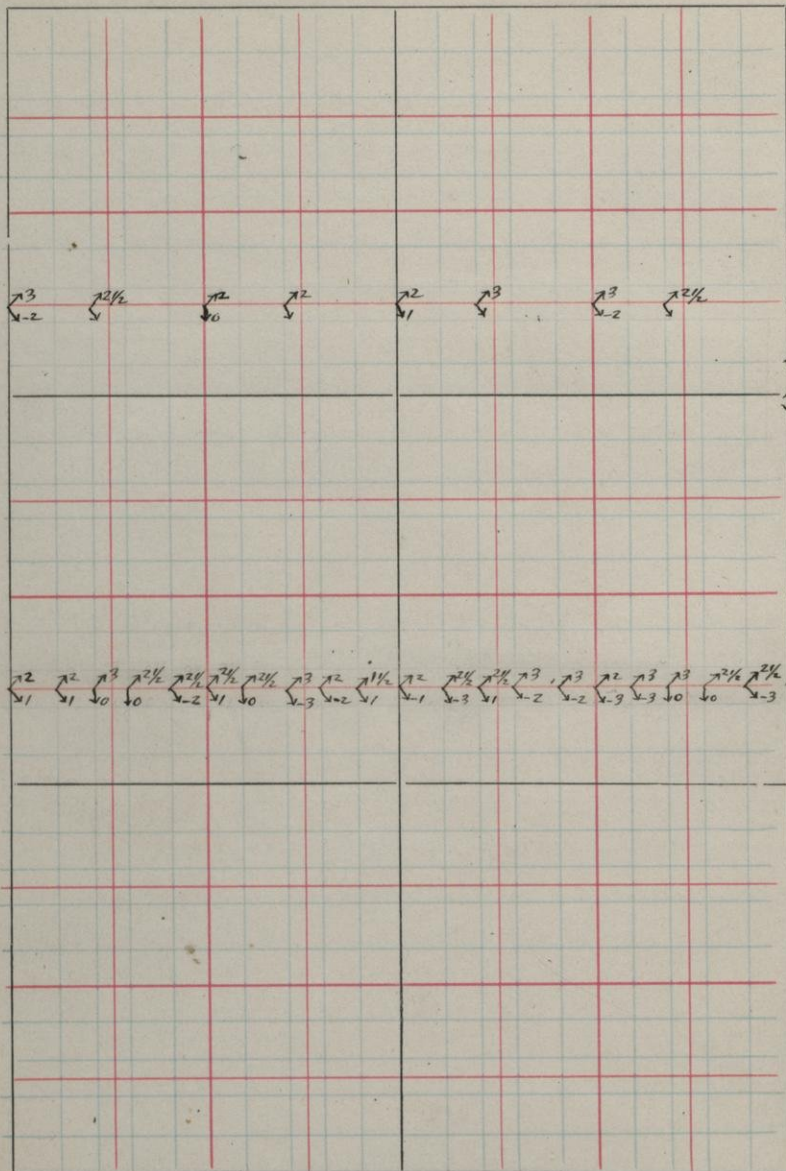
S. 27

T. 45

R. 32

NE

NW



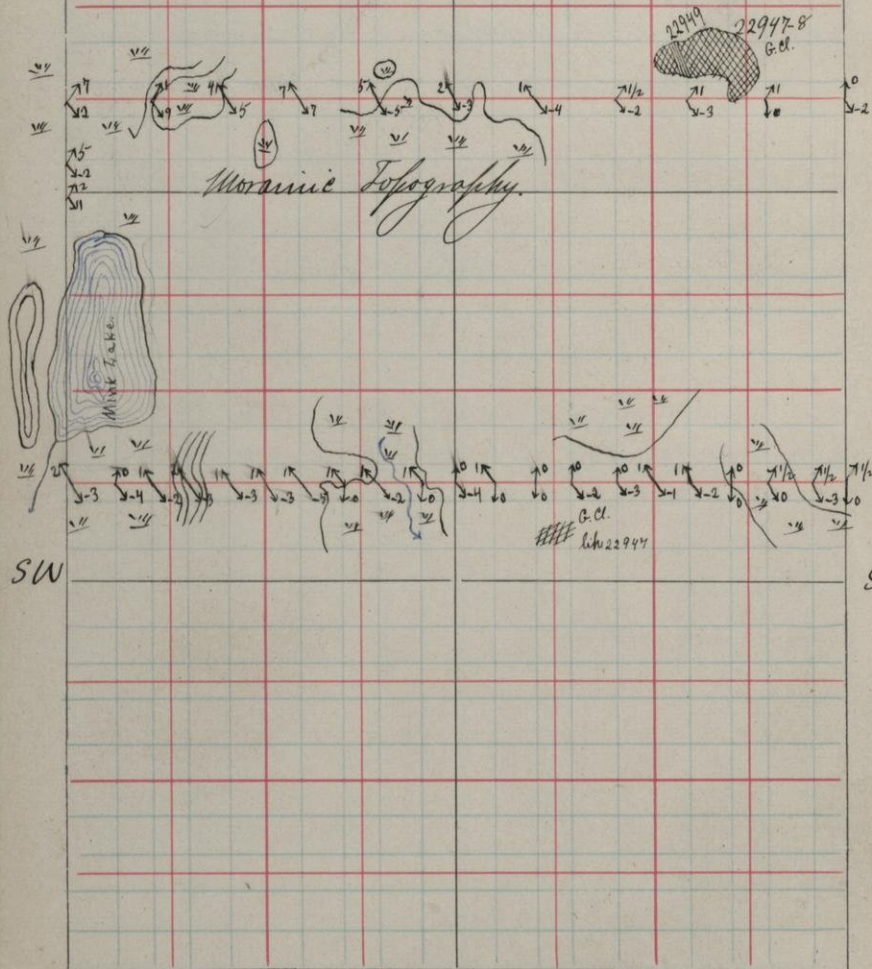
NW S. 36

T. 45

R. 33

NE

22



SW

SE

22947-8-9 1300 N 300W SE Cor. Sec. 36-45-32

Here there is a very large exposure consisting for most part of beds of a volcanic conglomerate 22947 which is now thoroughly silicified. Fragments are for most part small and by no means well rounded. Am not sure in the congl. of any evidence of action of water. At the W. of the ledge we find a bed of rock, like 22948, striking N20°W and dipping 5°W. Lying S W of it, that is above it, and following the irregularities of the old surface is a bed of slaty material like 22949, 30 ft. thick, very well bedded and striking N20W + dipping 78°W. Then comes again S W of it a greenstone conglomerate with fragments of all kinds of diorite + amygdaloidal greenstone in it. Matrix seems to be greenstone also.

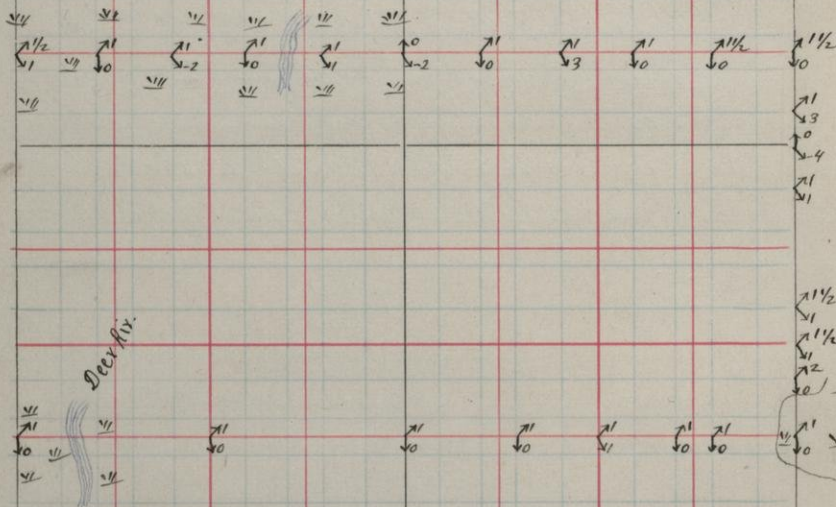
S. 5-

T. 44

R. 32

NE

NW



22967

275 N 1750 W. SE. Cor. Sec. 18-44-32

Small exposure, almost hidden, of mottled
diabase. No relations.

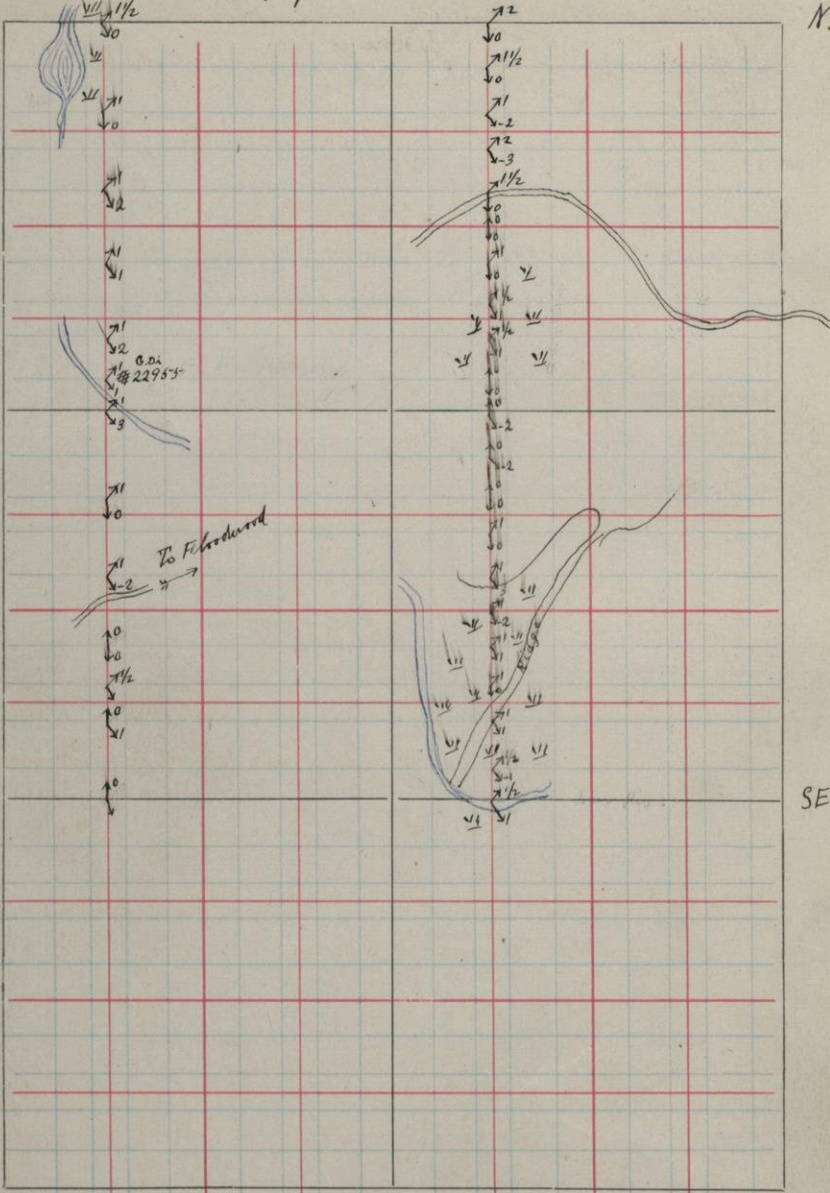
S. 8 T. 44

R. 32

NE

SW

SE



2295-5-

1100N 1700W SE Cor. Sec. 8-44-32

Small ledge of granstone. No relations.

22962

2000 N 750 W SE Cor. Sec. 9-44-32

Large ledge of coarse diabase extending NW-SE.
 Specimen shows medium grained variety with
 same structure as coarser grained portion.
 In a few places is seen some ^{of a} very coarse grained
 variety, hornblende crystals 1 inch or in length
 but this is now weathered almost to a loose, ^{grainy} rock.

22964

1350 N 650 W SE Cor. Sec. 9-44-32.

Ledge of medium grained diabase.

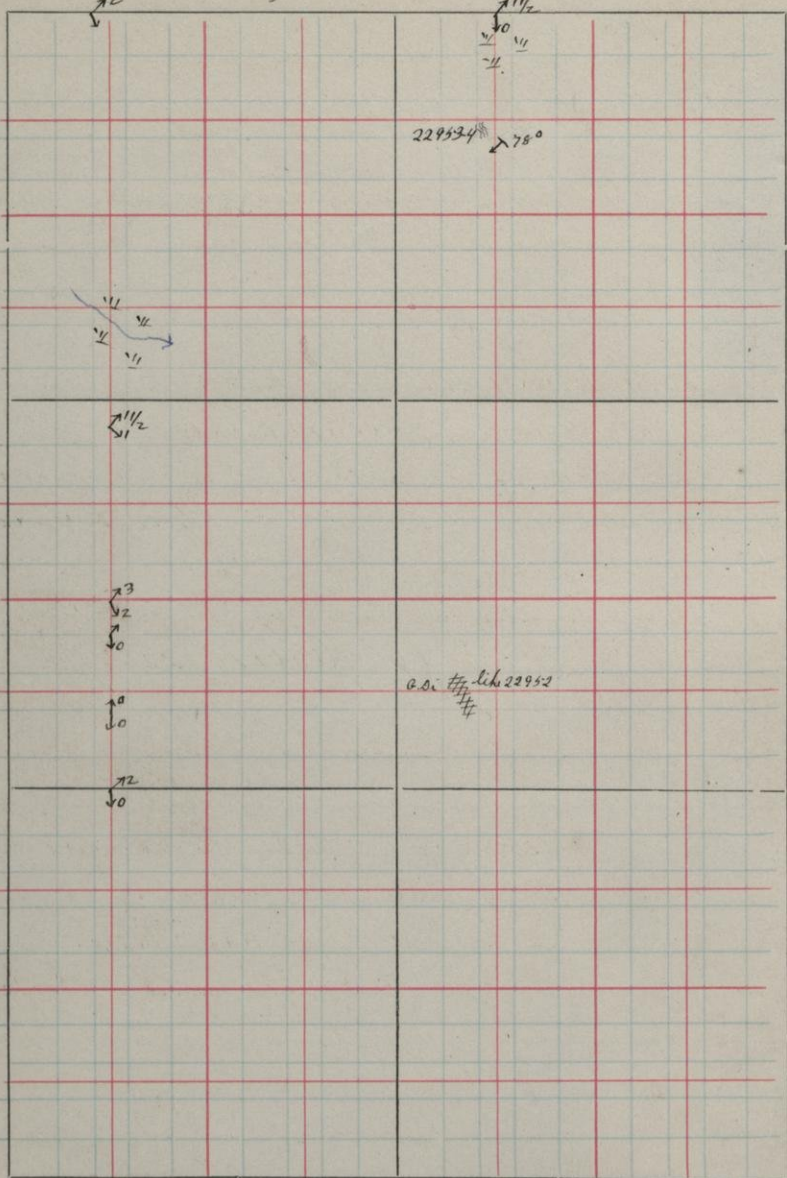
S. 4

T. 44

R. 32

NW

NE



22953-4 1725 N 775 W SE Cor. Sec. 4-44-32

Ledge of sericitic schist. Exposure is quite small
+ so moss covered that it can't be very well studied.

22953. Strike N 20° W, dip 78° SW.

Part of the ledge seems to be very quartzitic 22954
and also seems to contain some siderite.

22965-6 400 N 250 W SE Cor. Sec. 4-44-32.

7-8-9-10- To the N.W. of the lake, forming the hill
21 overlooking it, occurs a very large
exposure of a variety of rocks illustrated
by specimens No. 22965-9 which represent
in my opinion altered phases of an acid
flow, pitchstone porphyry perhaps and
tufa beds cut by diabases 22970-1. No relation
between these two.

22965- is a pumiceous portion of flow.

Some of the specimens show the beautifully
layered nature of the beds. The various phases
grade directly into each other so that there
is no sharp line between them.

See Prof. Culver's notes for more details.

NW S. 33

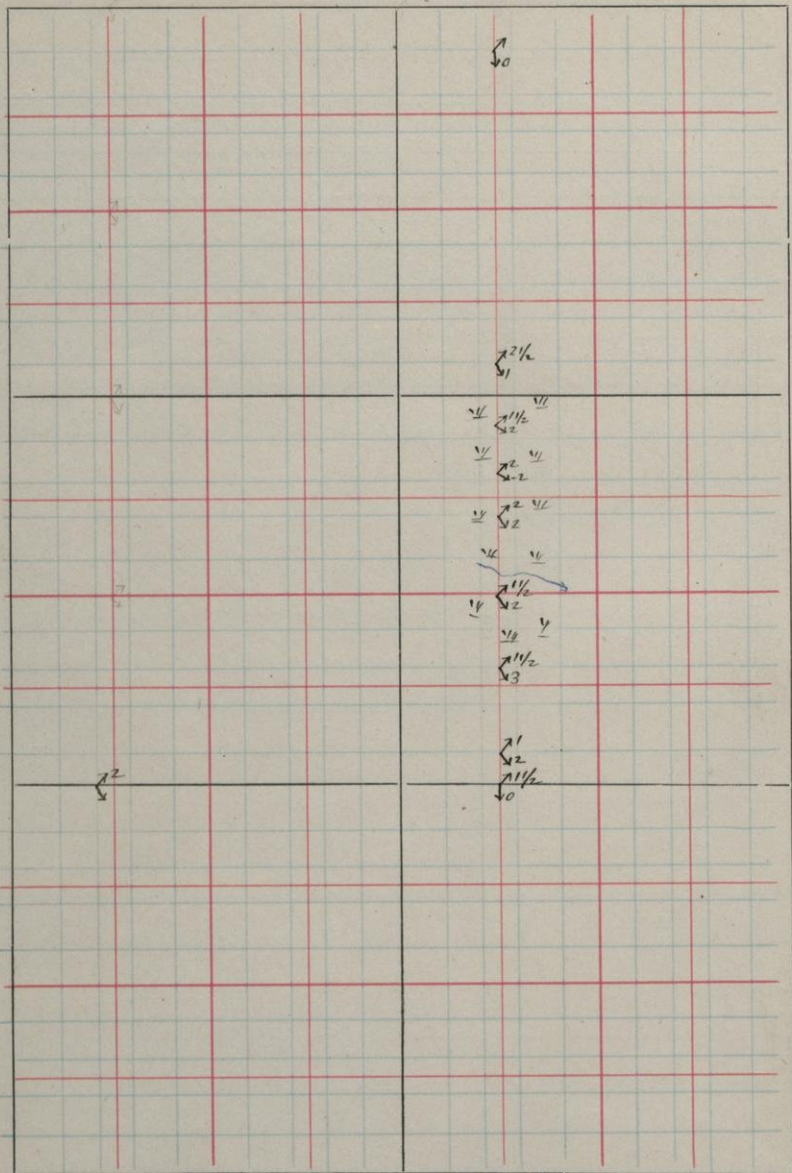
T. 45

R. 32

NE

SW

SE



S. 17 T. 44

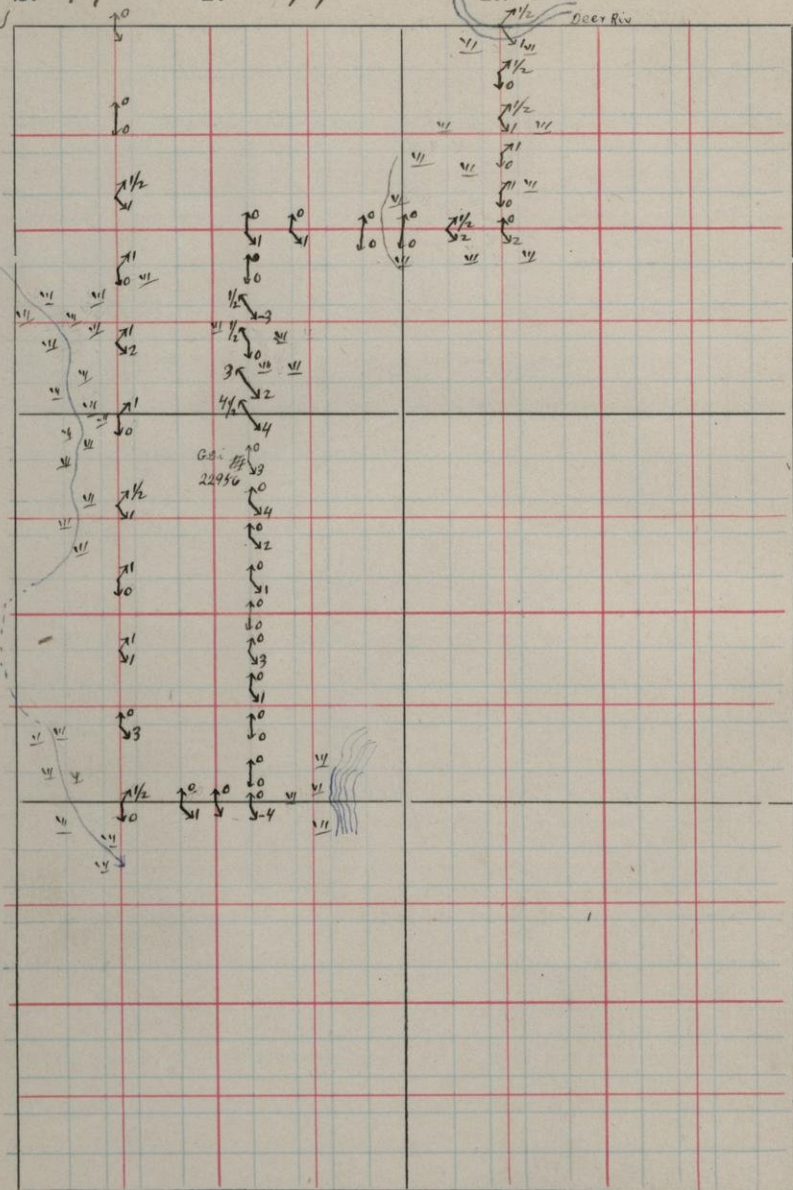
R. 32

NW

NE

SW

SE



22956

900 N 1430 W SE Cor. Sec. 17-44-32

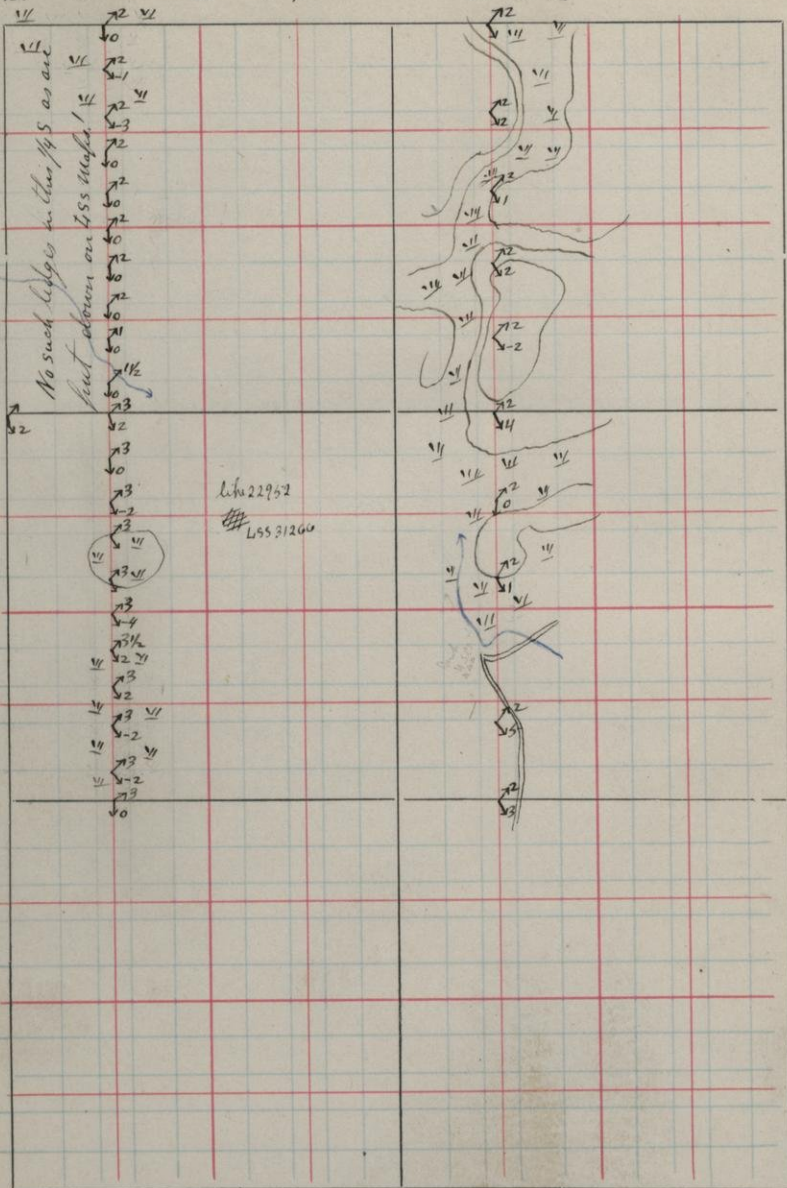
Small exposure of granite.

NWS. 3

T. 44

R. 32

NE



- 22957 1360 N 1400 W SE Cor. Sec. 10-44-32
Large ridge of diabase like specimen.
- 22958 1360 N 1350 W SE Cor. Sec. 10-44-32
Exposure of light greenish slates striking N. 16° W and dipping 85° E. So near vertical that one can't be very sure. Slight crumplings are noticeable.
- 22959 1380 N 1290 W SE Cor. Sec. 10-44-32
Exposure of somewhat lighter colored slates than those immediately to W. Strike N 29° W, dip 55-90° W.
- 22960 1540 N 850 W SE Cor. Sec. 10-44-32
Coarse grained diabase outcrop.
- 22961 700 N 970 W SE Cor. S 10-44-32
Ledge of rather fine grained diabase.
- 22962-3 800 N 1000 W SE Cor. S 10-44-32
Outcrop of a diabase(?), 22962, 20 ft across followed to W., after passage through very much decomposed phase of 22962 filled with reing quartz, by a band about 3 ft. thick of green chloritic schist, ⁽²²⁹⁶³⁾ very much crumpled. Strike is N 20° W dip 90°. Then occurs again to W. of the schist 22962. Is 22963 an altered amygdaloid?

NW S. 35

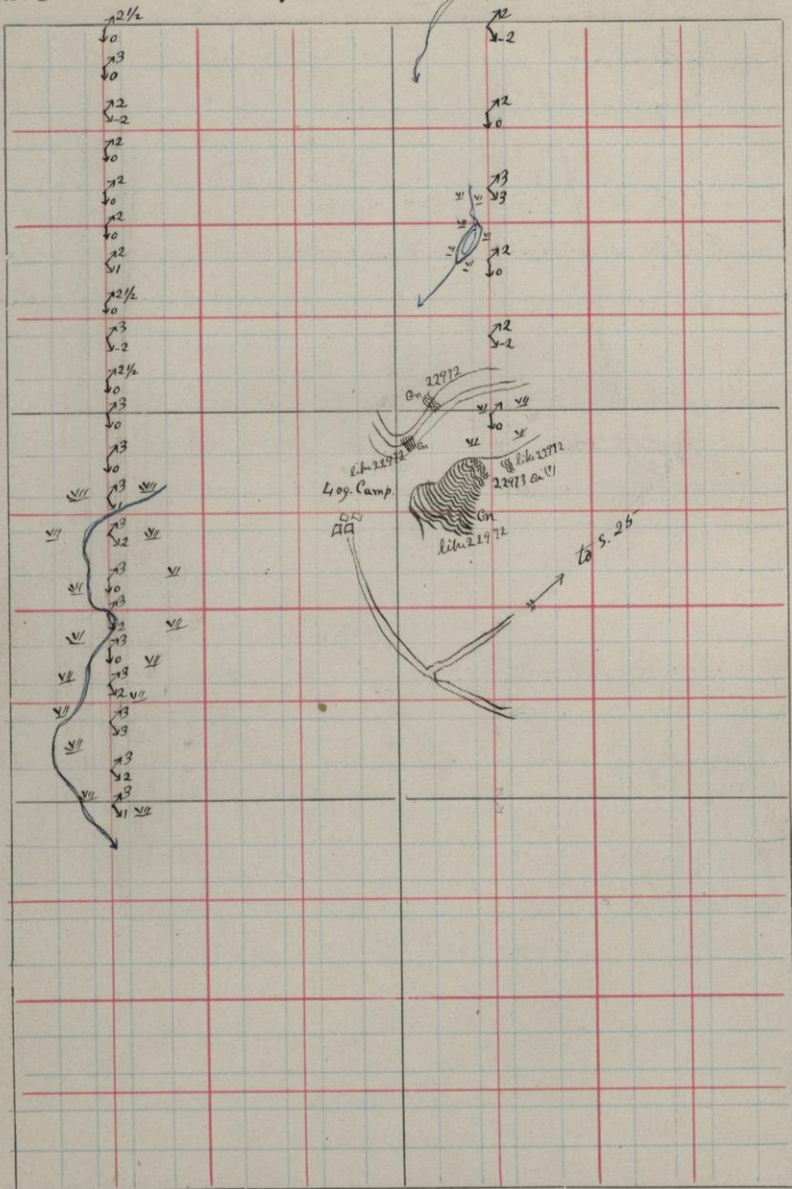
T. 45

R. 32

NE

SW

SE



22972

1030 N 900 W SE Cor. Sec. 35-45-32

Exposure of ^{gray} gneiss overlooking valley.
Banding strikes NW-SE.

22973

870 N 870 W SE Cor. Sec. 35-45-32

Bed of hornblende rock, probably squeezed diabase
dyke, lying in ledge of gneiss. Follows banding
of the gneiss.

NW S. 11

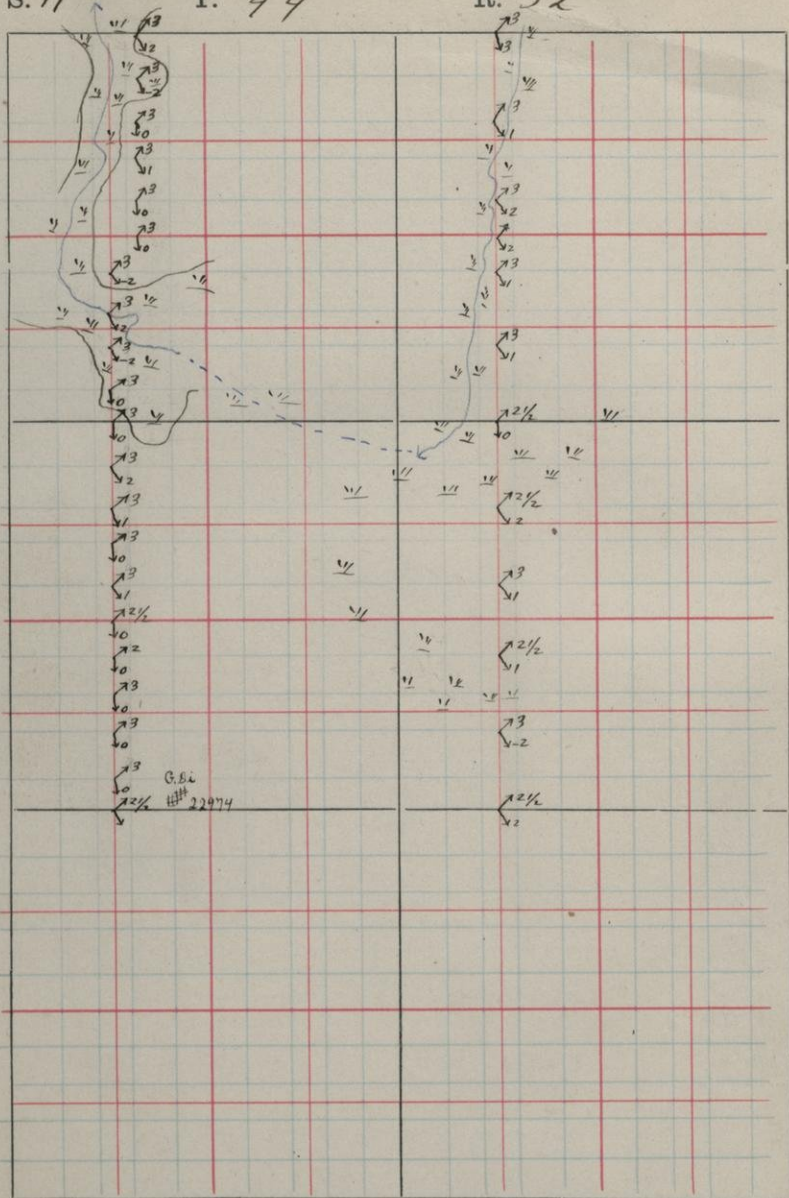
T. 44

R. 32

NE

SW

SE



22974

100 N 15-90 W SE Cor. Sec. 11-44-32

Outcrop of knob of coarse diabase.

NW S. 14

T. 44

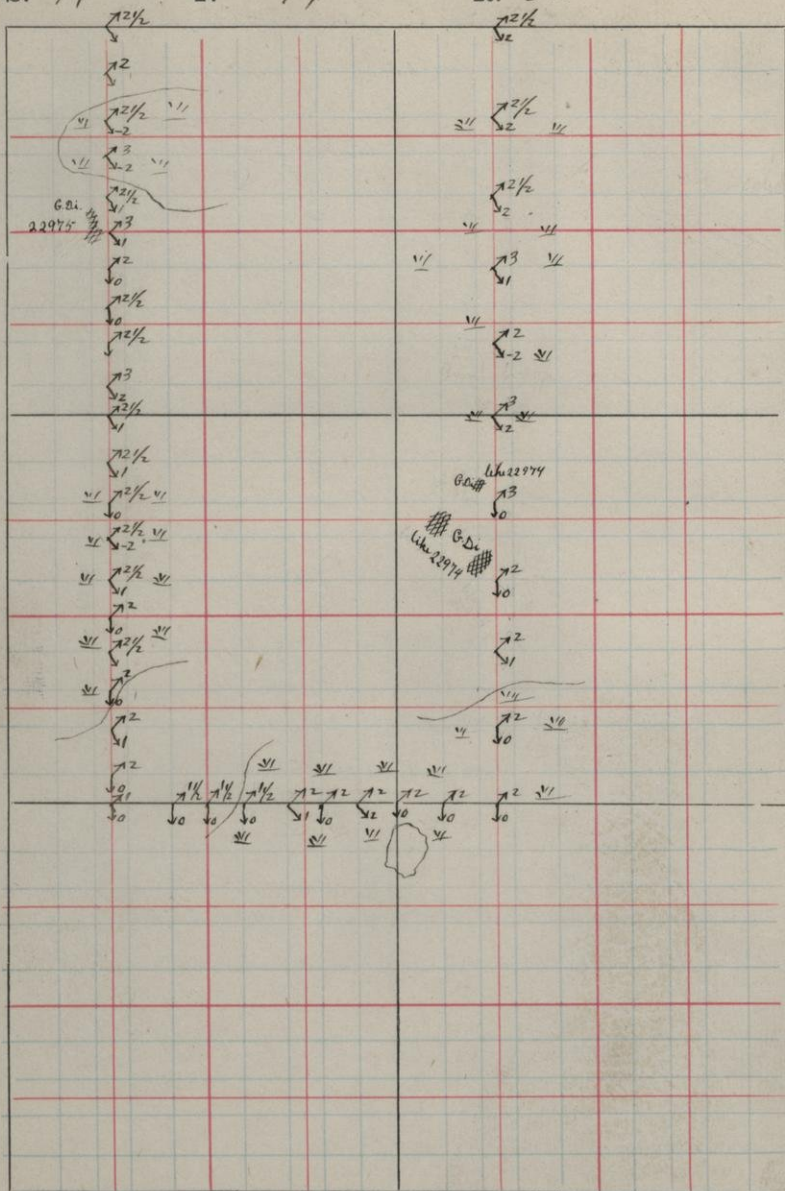
R. 32

NE

22

SW

SE



22975

1500 N 1775 W. SE Cor. Sec. 14-44-32

Knob of coarse diabase.

22977

1000 N 800 W SE Cor. Sec. 1-44-32

Large exposure of greyish coarse grained granite which continues to show on south + north sides of small valley for nearly 600 paces to W. It is quite altered + in places slightly inclined to be schistose.

22978

1000 N 965 W SE Cor. Sec. 1-44-32

Bed of micaceous schist in the granite Runs N 8° E, schistosity is inclined 60° E. Probably an altered diabase dyke.

22979

1050 N 950 W SE Cor. Sec. 1-44-32

Ledge of rock like 22979. Altered diabase dyke? It is somewhat schistose striking about E-W. Weathers easier than granite and the stream has followed it in cutting the valley.

22980

1000 N 1340 W SE Cor. Sec. 1-44-32

Exposure of micaceous schist striking SW-NE, schistosity off 90° Altered dyke?

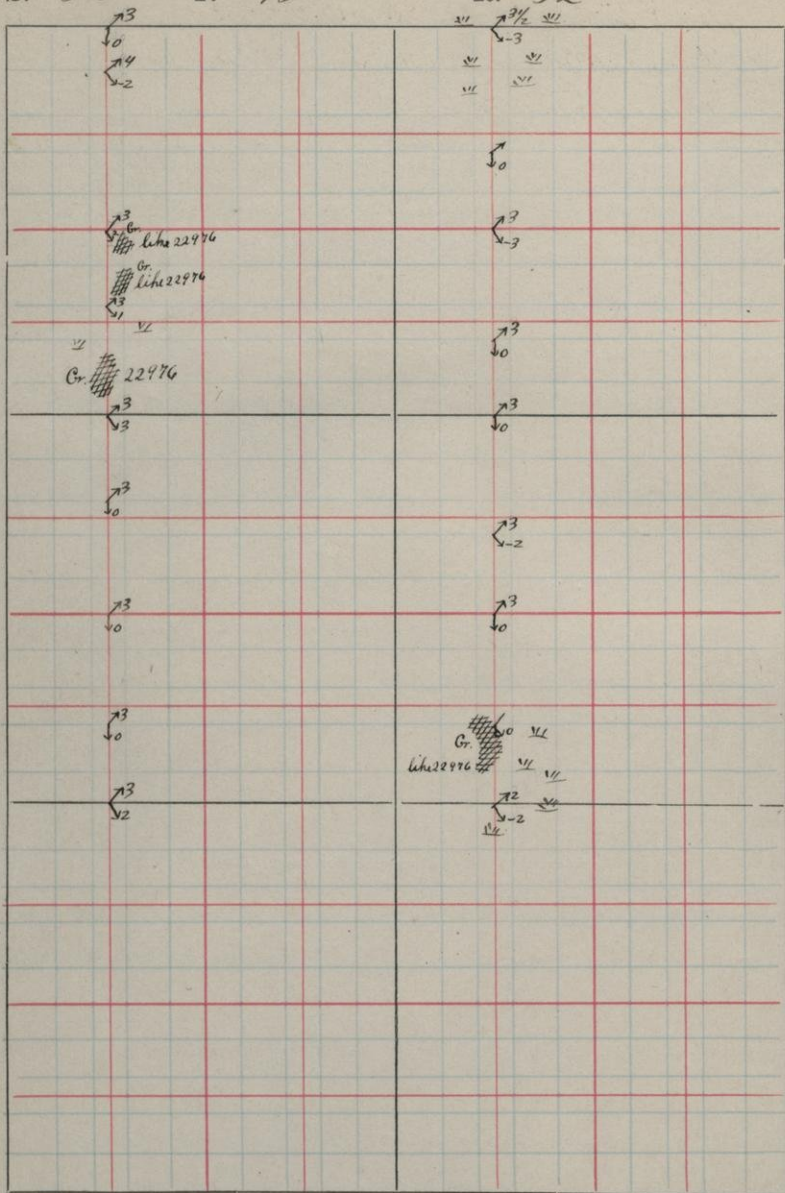
S. 36

T. 45

R. 32

NW

NE



SW

SE

22976

1100 N 1750 W SE Cor. Sec. 36-45-32

Large exposure of medium grained granite with
large phenocrysts of feldspar.

S. 25-

T. 45

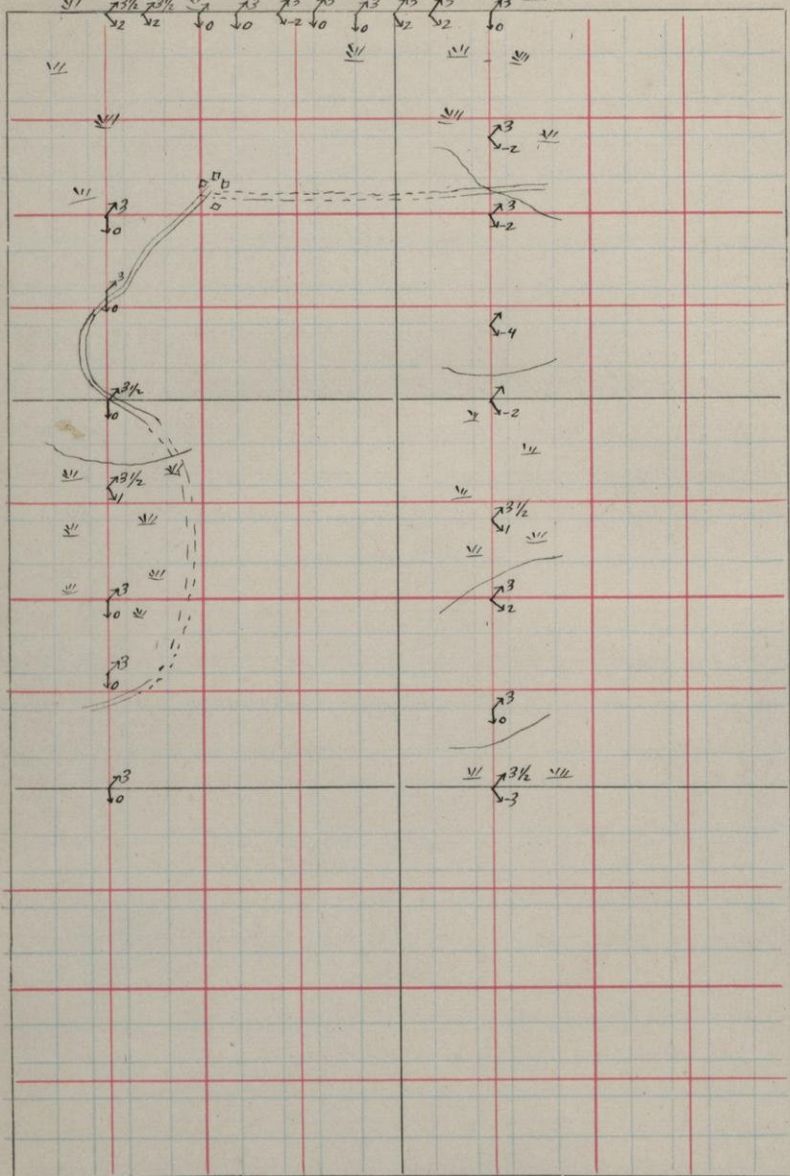
R. 32

NW

NE

SW

SE

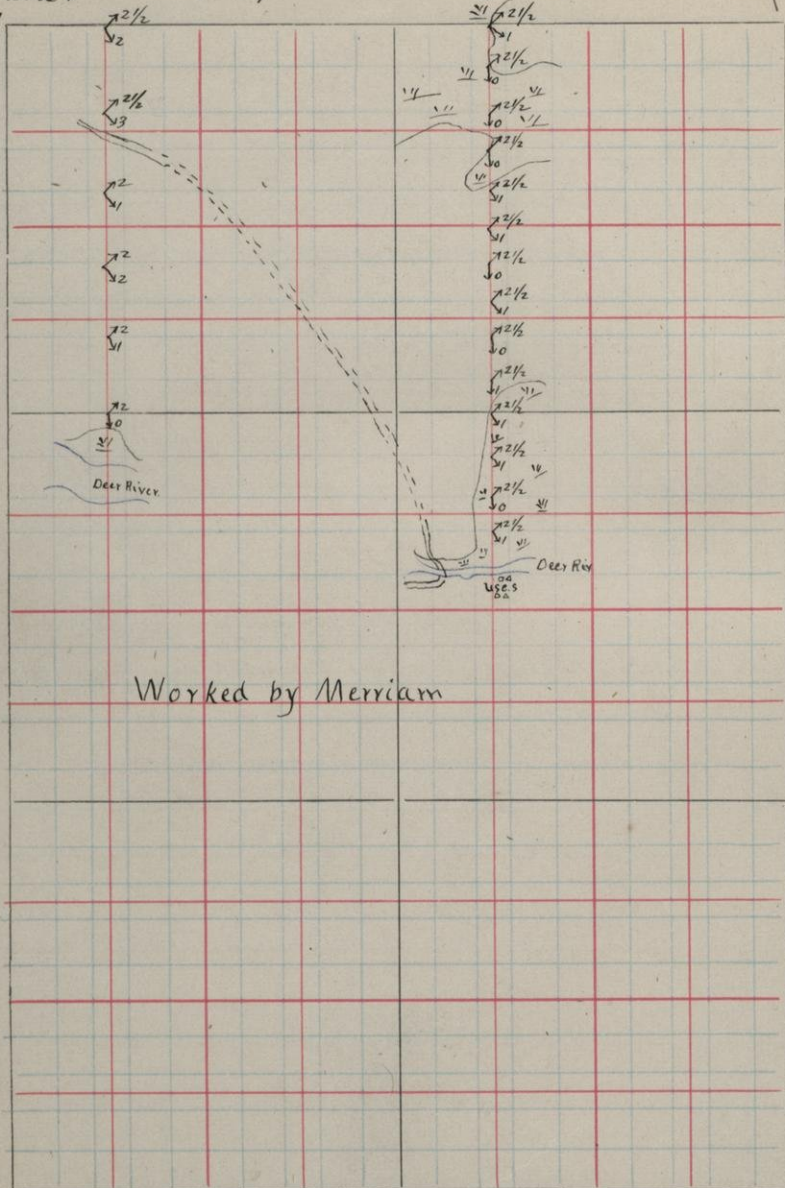


NW S. 27

T. 44

R. 32

NE



Worked by Merriam

SW

SE

22981

1930 N 780 W SE Cor. Sec. 22-44-32

Ledge of rock which seems to be the cause of the
large variation + dip here.

22982

1090 N 750 W SE Cor. Sec. 22-44-32

Ledge of coarse granstone.

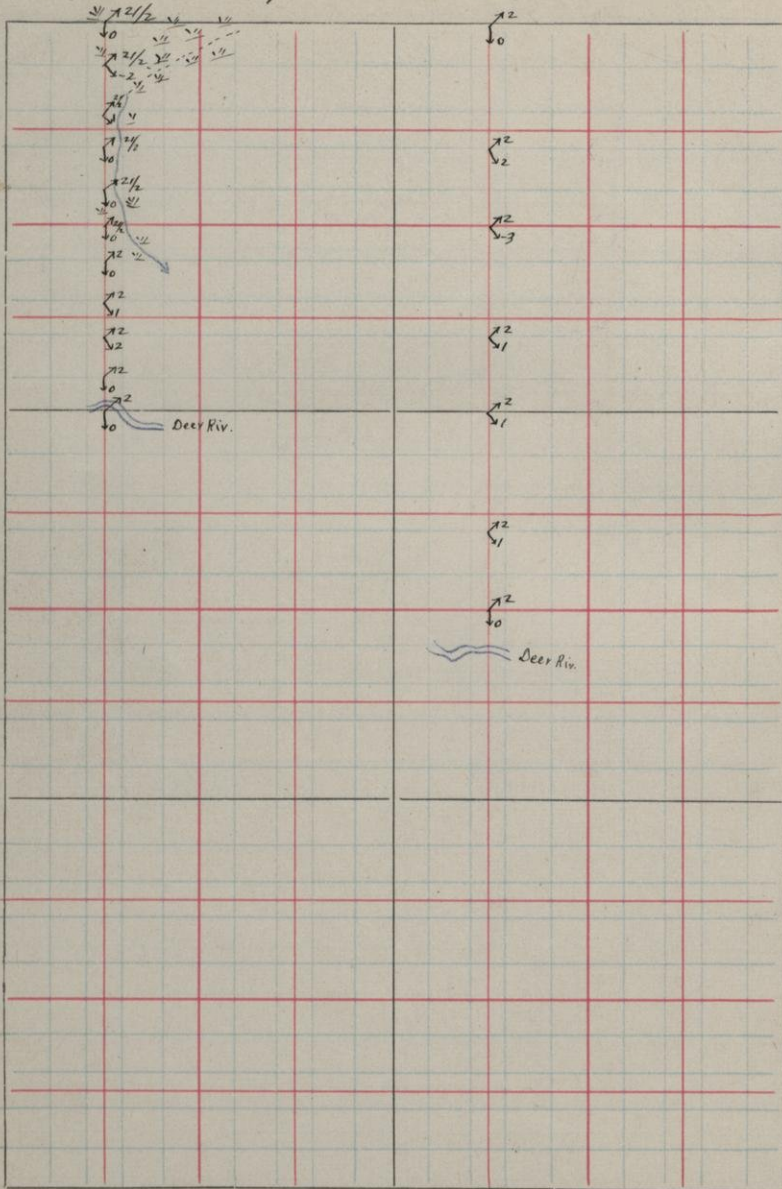
NW

S. 23-

T. 44

R. 32

NE



SW

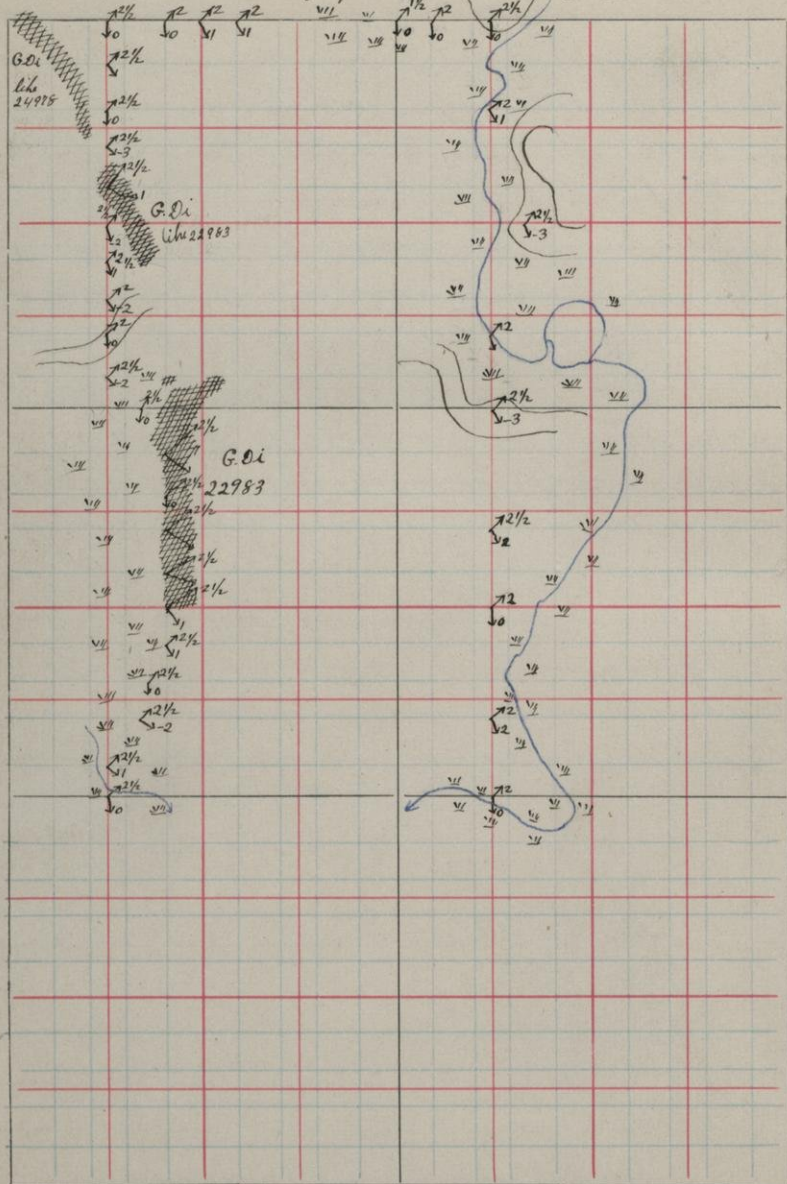
SE

S. 24 T. 44 R. 32

NE

22

NW



22983

530 N 1525 W SE Cor. Sec. 24-44-32

Large exposure of coarse greenstone 22983,
beginning at above location and extending
around W. side of hill to 1040 N 1600 W.

Compare U.S.S. specimens No. 30318-21

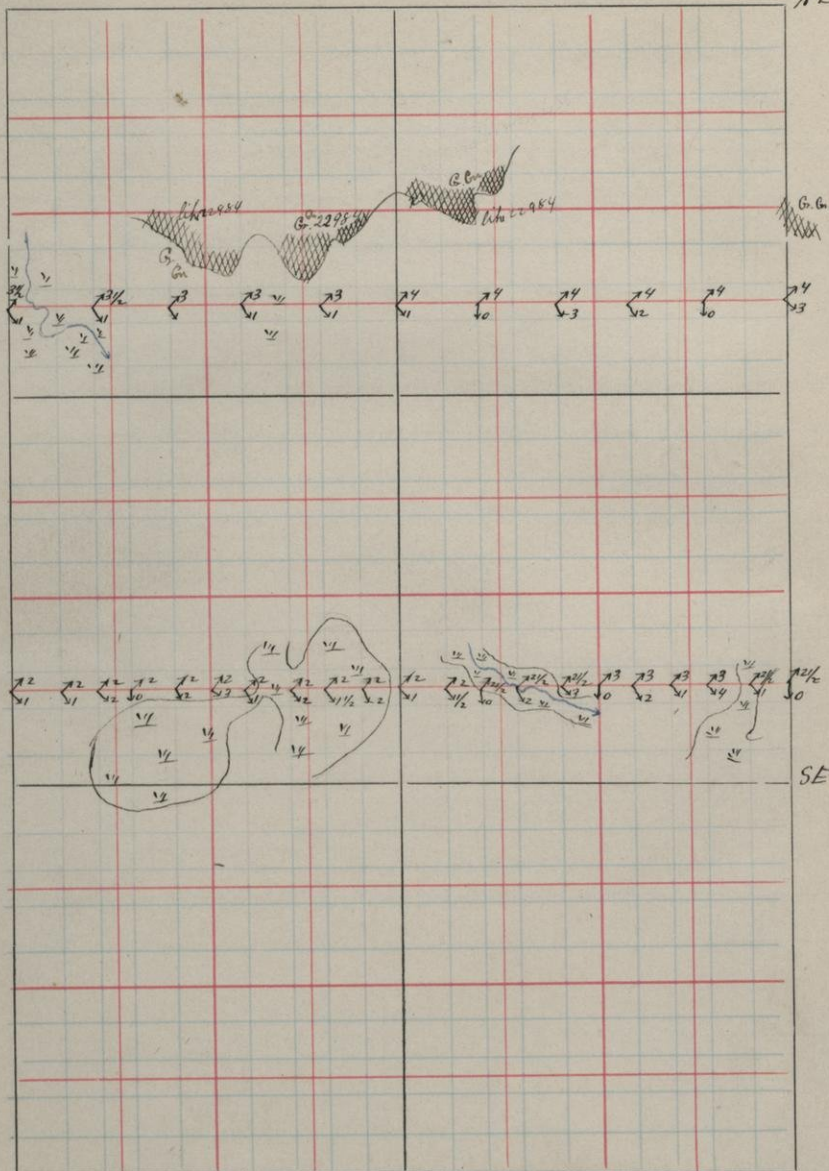
Shearing has in a few places made the
rock slightly schistose but just near the
shearing plane.

NW S. 20

T. 44

R. 31

NE



S SW

SE

22984

1340 N 1200 W SE Cor. Sec. 20-44-31

Southern edge of a ridge of granite gneiss
extending as shown on map.

Compare Smyth's notes L.S.S. and G.A. Smith's
notes U.S.G.S.

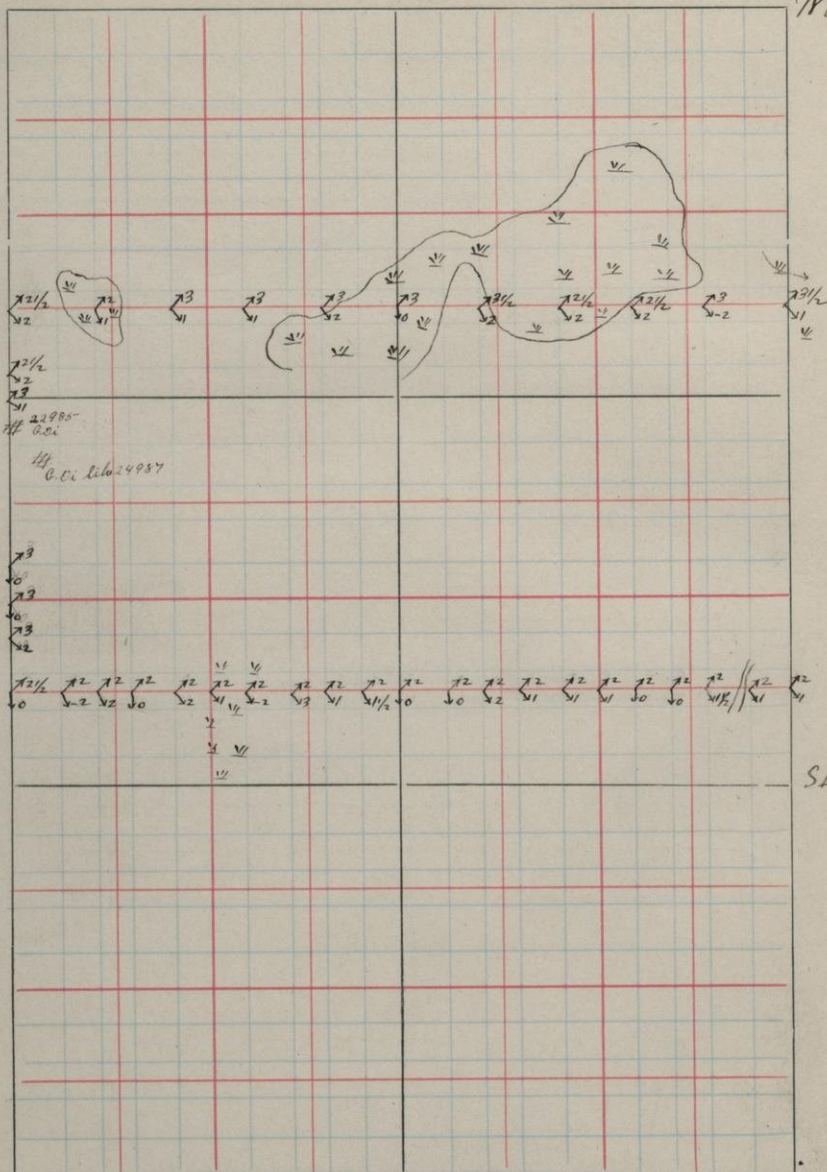
S. 19

T. 44

R. 31

NW

NE



22985

960 N 2000 W SE Cor. Sec. 19-44-31

ledge of coarse granstone.

S. 21

T.

44

R. 31

KW

NE

Gr. Cu

$$\sqrt[3]{74}$$

Worked by Smythe, H. L.

S

SW

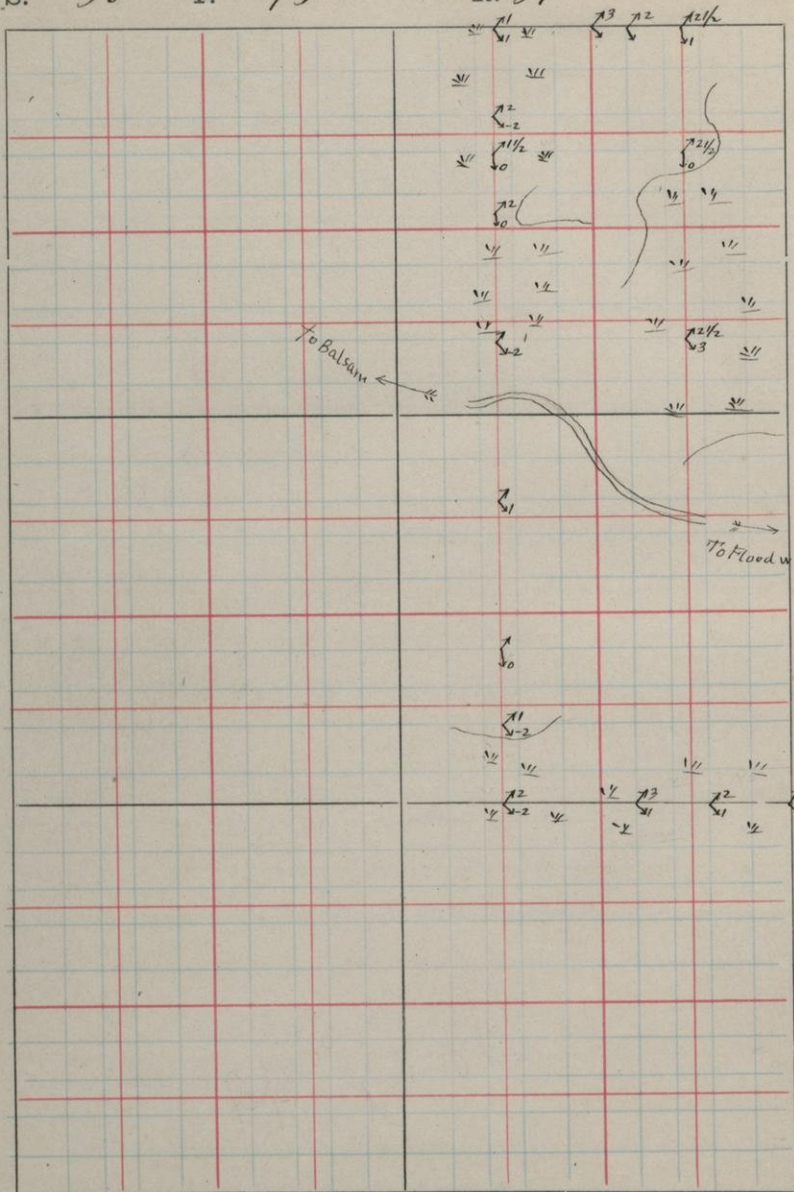
 SE

S. 30 T. 45-

R. 31

NE

NW



S SW

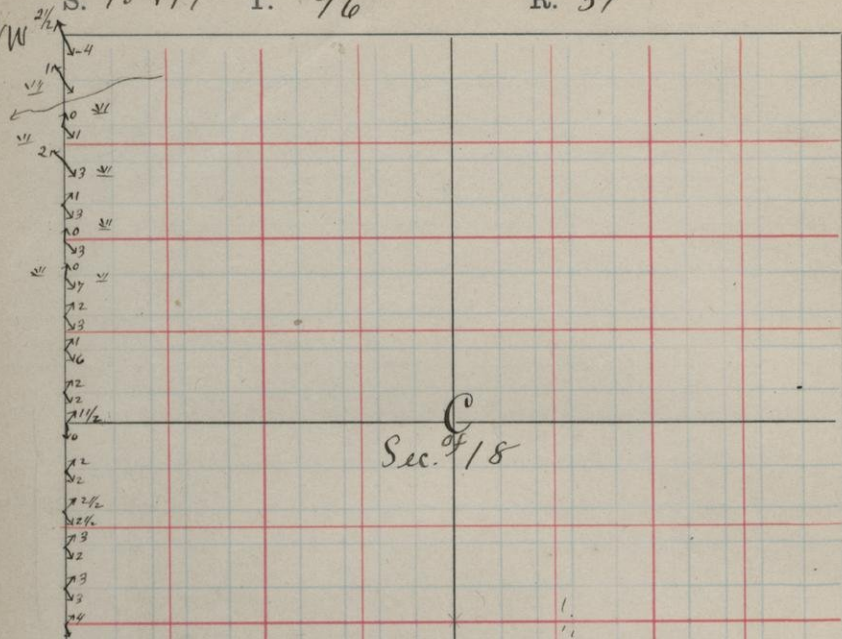
SE

S. 18+19 T. 46

R. 31

NE

NW



Sec. 18

To Balsam

SW

SE

Sec. 19

W 1/4

6-747

Fence
NW
E 1/4

Smith's work for Sept. and of 26 m
9 3/4 linear miles in Secs. 5-7-8-15 46-31
Sec. 12 46-32

Etirlate

34. John Hopkins Manning
Baltimore Md.

