Notes on Menominee Iron Range I: [specimens 23870-23965]. No. 186 1896

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 x 2½ x ¾ inches will be allowed, but in all other cases *large-sized specimens*, trimmed to a size of 3 x 4 x 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.

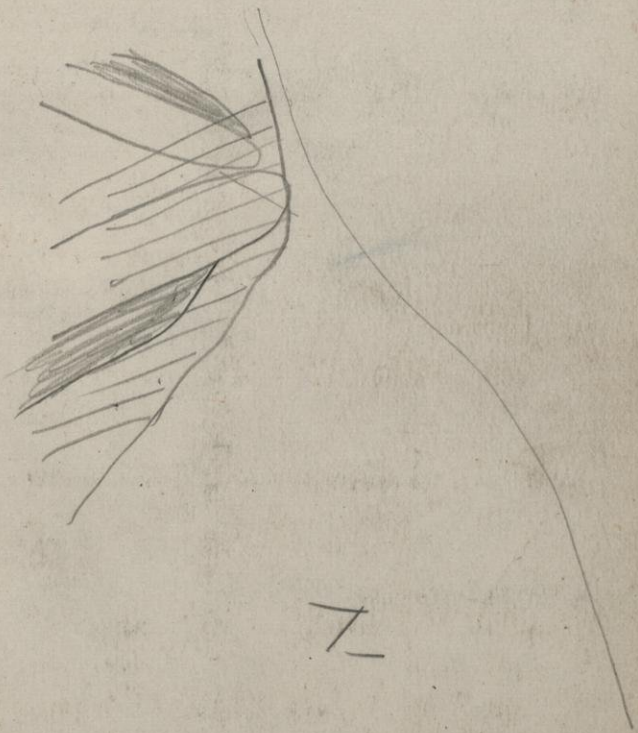
4. On the last twenty-five pages of the book give, as may seem desirable, a general account of the examination of the region mapped in the previous pages, correlation of observations, sketches, cross sections, etc.

5. Forward this note book as soon as filled as registered mail matter to C. R. Van Hise, U. S. Geologist, Madison, Wis.

6—747

Notebook 186

Nov 13, 1896



I

NOTES
on
MENOMINEE IRON RANGE
MICHIGAN

by

J. Morgan Clements.

1896.

Legend

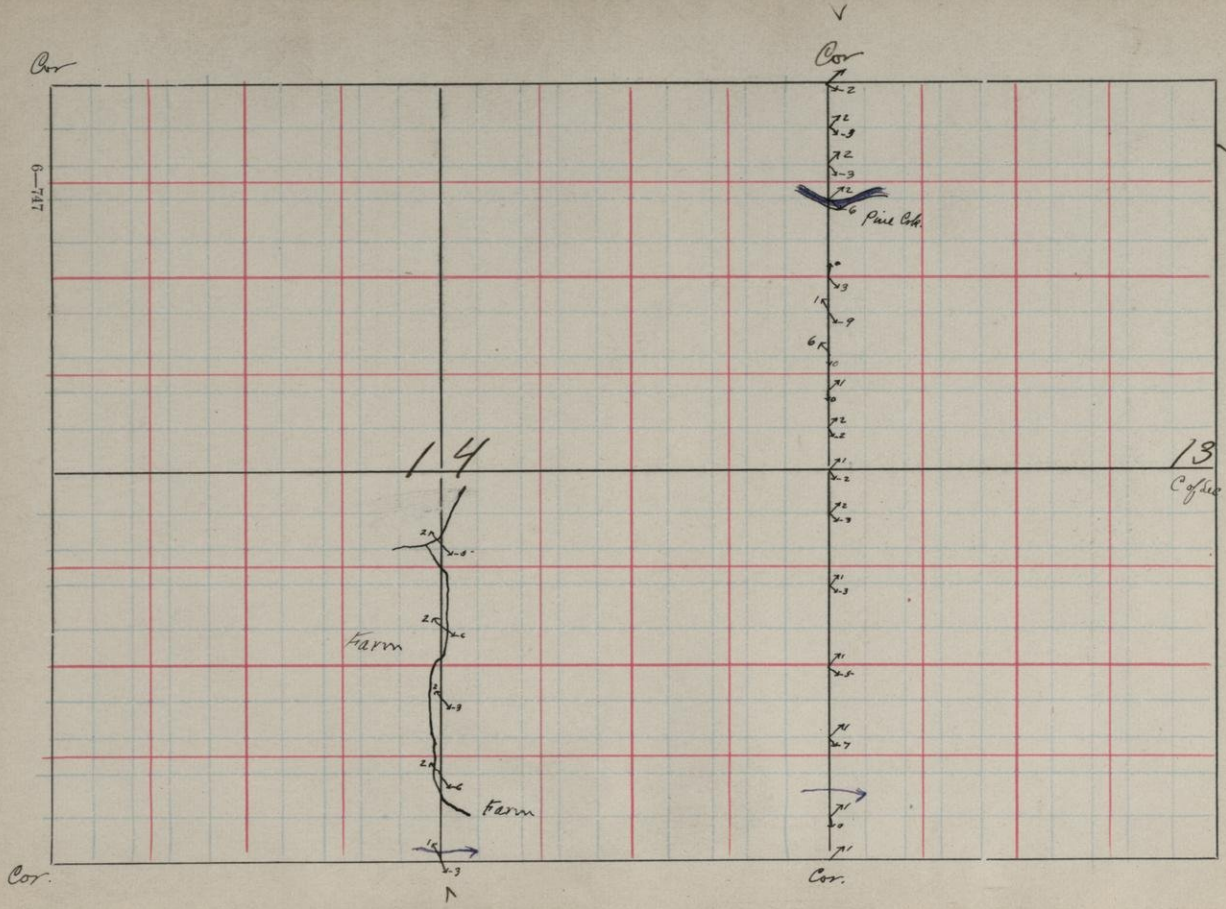
—— = Wagon roads

-+-+- = R.R.s.

→ = Stream showing direction of flow

v ^ = Indicates lines followed in traversing.

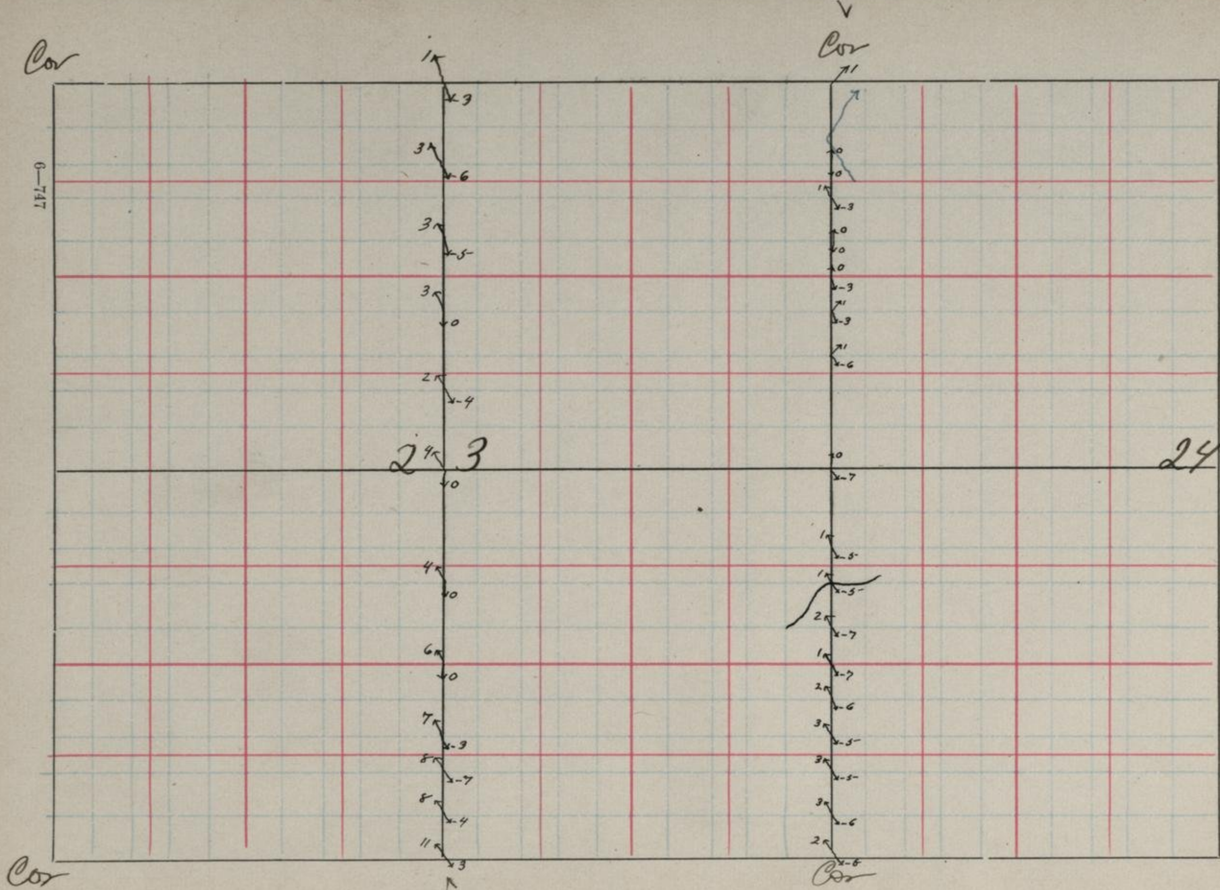
Scale 4" = 1 mile unless otherwise stated.



S. 14/13 T. 40 R. 30

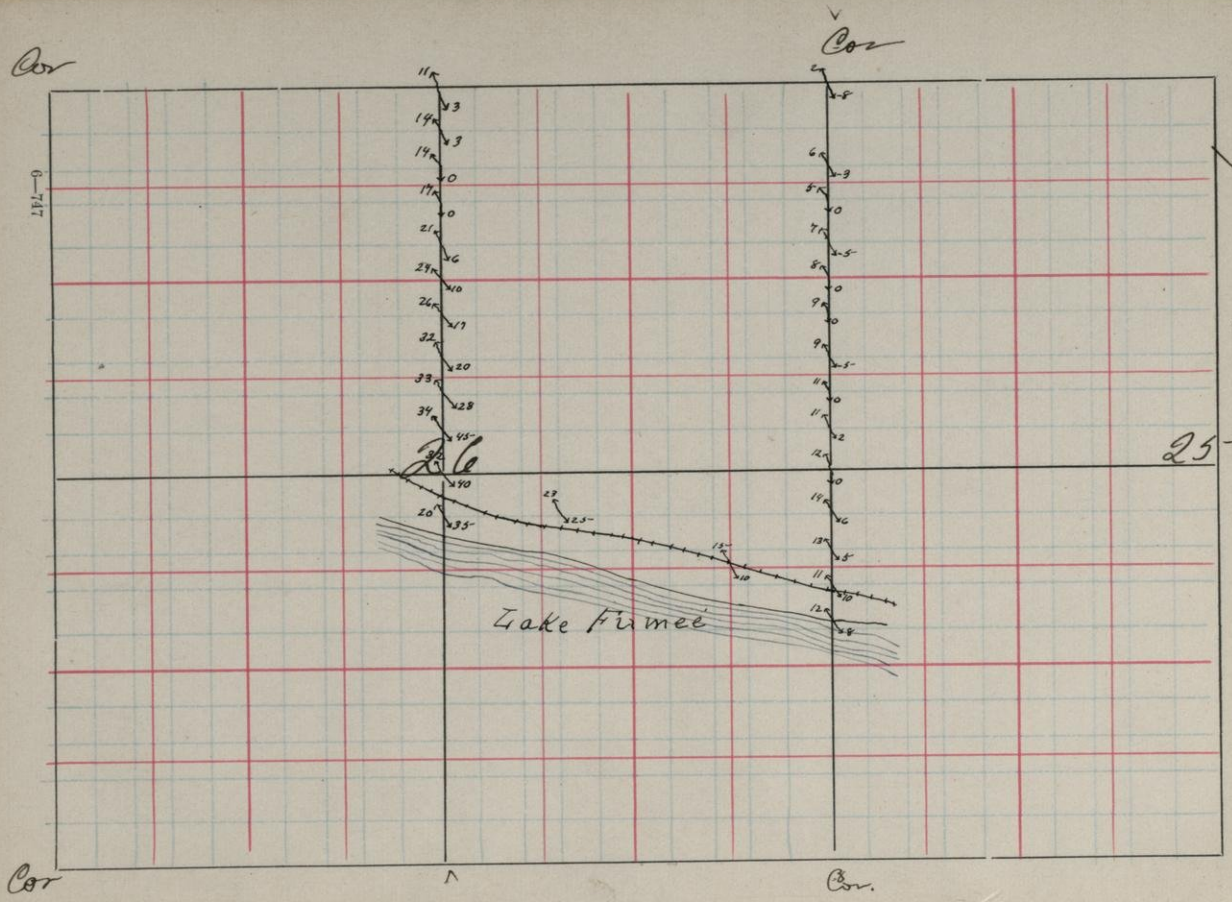
July 2, 1896.

Began the season's work at NE Cor. S. 14-40-30 just across Pine Creek from Hamilton & Merryman's Camp 6, and ran south to Lake Fannie. Crossed Pine Crk. at 13 00 N and then began ascending hill. The ¼ P. was near top of it. Fresh windfalls are quite numerous making traveling very difficult. No outcrops found. At 6 50 N on the section line a few small fragments of a grey slate were seen. They were not in situ - therefore no specimen was taken - but looked nevertheless as though they might have been brought up from a ledge below by the overturning of trees. Of the quartzose limestone seen near the H & M lumber camp 6. N W of this point - has a south dip it is probable that this slate overlies it & forms the impervious bottom for the iron ores. & the south of the limestone exposed in the pits in the field S W. of the same lumber camp.



S. 23/24 T. 40 R. 30

6—747



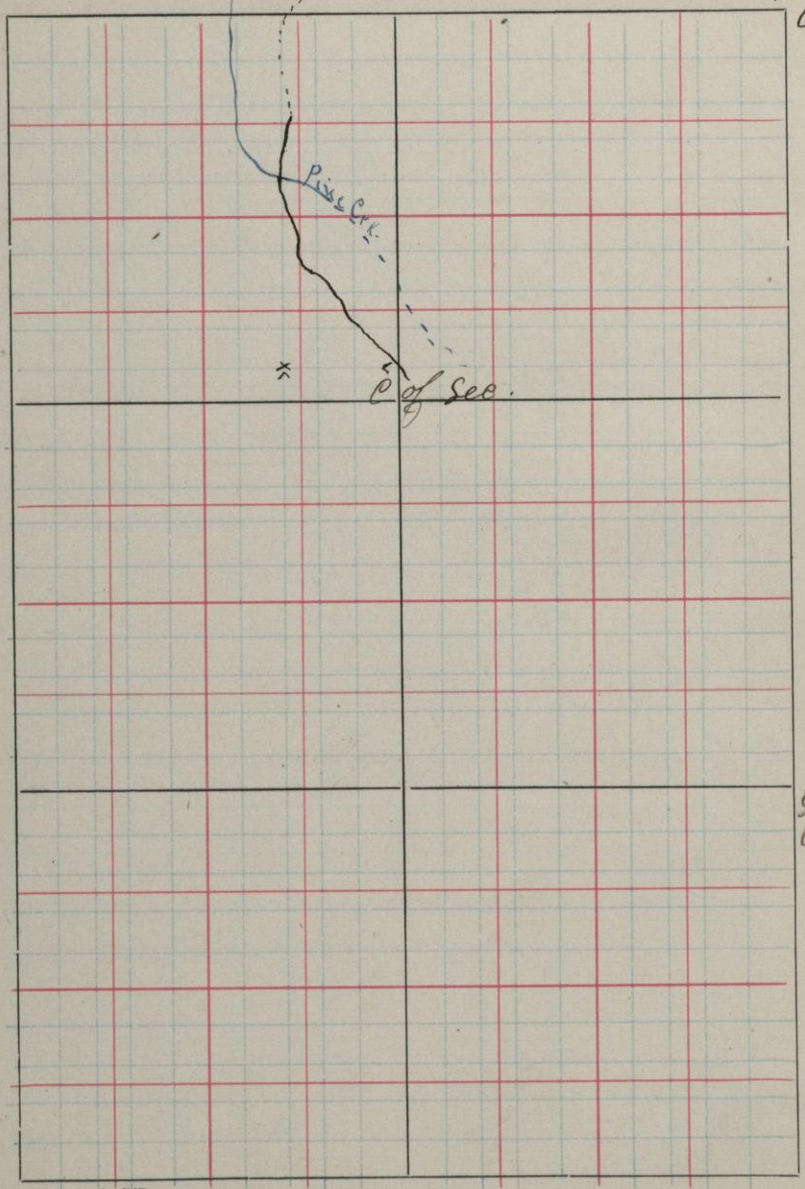
S. 26 25 T. 40 R. 30

7

S. 11 T. 40 R. 30

NW Cor

NE Cor



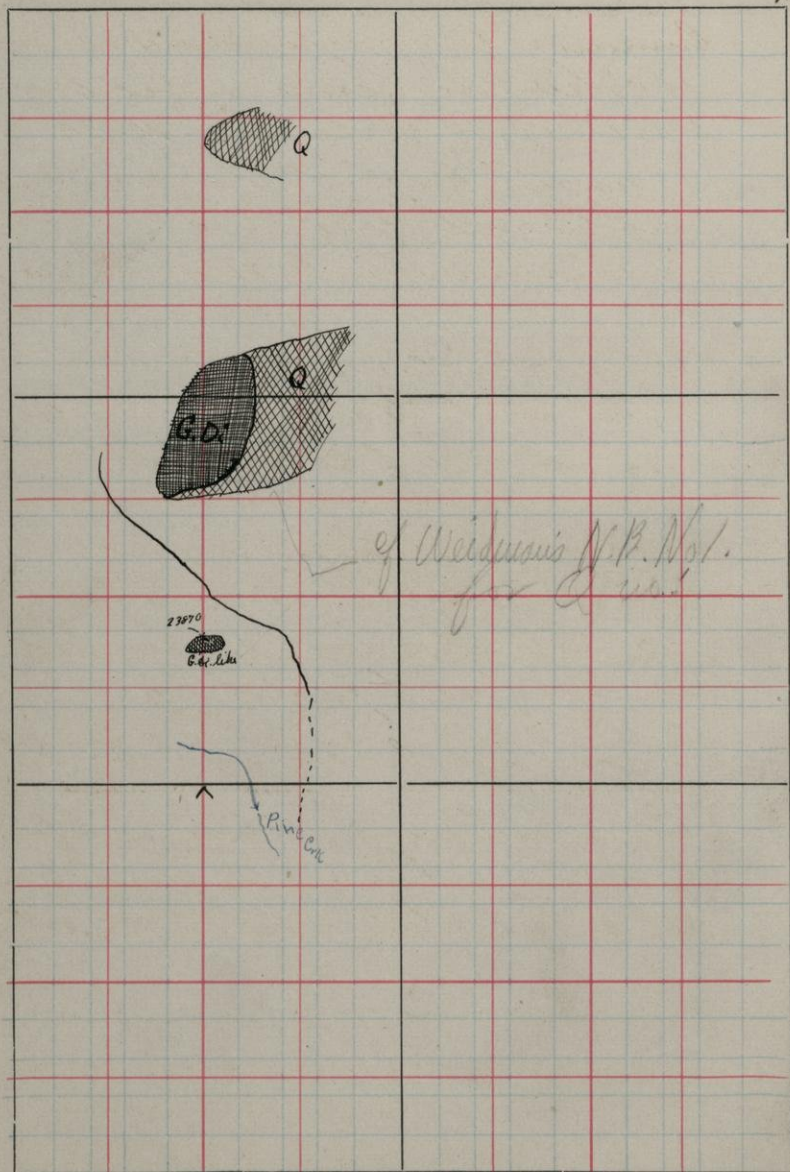
SW Cor

SE Cor.

6—747

S. 2 T. 40 R. 30

NW Cor NE Co.



SW Cor. SE Cor.

6—747

July 3, 1896.

Running N through Secs. 11 & 2 on 1500 W we reach in Sec 2 at

like 2 N 350 W 1500 SE Cor Sec 2-40-30
a small knob of the grey hornblendic eruptive rock like specimen taken by Weidman just NE of this point.

23870 N 390 W 1500 SE Cor Sec 2-40-30
At this point the above eruptive is cut by a 12 inch dyke of aplitic light colored rock.

like N 750 W 1500 SE Cor. Sec. 2-40-30
Reach at this location the south foot of a high hill whose low eastern part is composed of white quartzite like . The western flank is capped by a hornblendic eruptive like . This exposure was studied yesterday by Weidman who found the eruptive intrusive in the quartzite. He did not obtain strike or dip of quartzite.

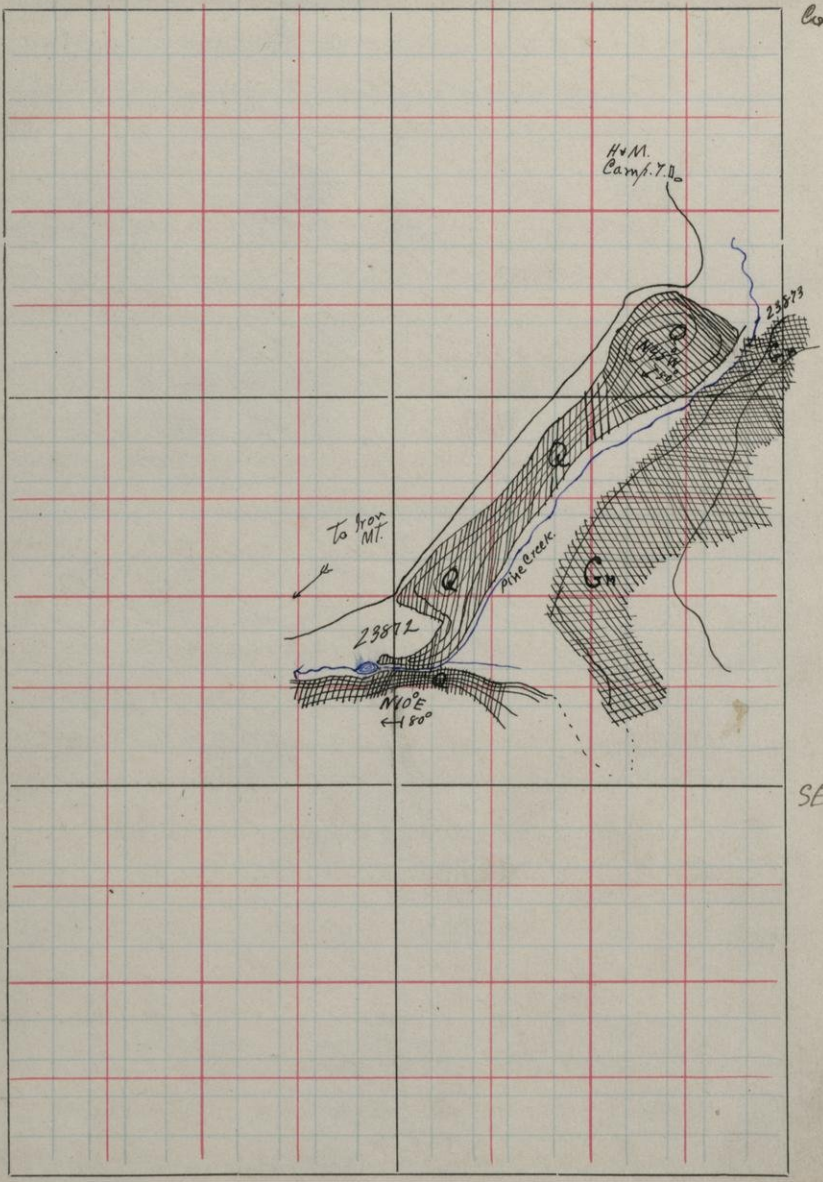
23871 N 1675 W 1500 SE Cor Sec. 2-40-30
Extreme western part of E-W trending ridge shows a reddish-discolored by the iron which is found in it in consid. quantity - more or less saccharoidal quartzite. No strike or dip obtainable.

11

NW Cor.

S. 31 T. 41 R. 29

NE Cor



SW

SE

6—747

In running correction line between Ts. 40 + 41 there is a correction of 2 1/4 mile to W. so that 1500 W of S. 2 - T 40 - R. 30 corresponds to 1000 W of S. 31 - T 41 - R. 29.

23872 N 250 W 1000 SE Cor. Sec. 31 - 41 - 29
We reach at above location edge of high (100') cliff of white to purplish quartzite, somewhat saccharoidal in places.
Pine Crk. flows S-W at bottom of cliff between high walls of quartzite. The so called "rock dam" is located here and it is at this place that mining operations for gold were begun in fall of -96. Free milling gold was found in quartz veins as well as in the quartzite itself. Quartzite is badly fissured, the fissures having been healed with quartz. Strike is N 10° E, dip 80° W.
Specimen shows ripple marks.
N 1050 W 450.
Here strike has changed to N 45° W, dip 50° SW.
Probably due to minor rolls in the quartzite.

23873 N 1150 W 100 SE Cor Sec. 31 - 41 - 29
Dam here. Pine creek flows over gneissoid rock banded with red (23873) + greenish grey bands. Contact between gneiss + quartzite covered by quartzite talus

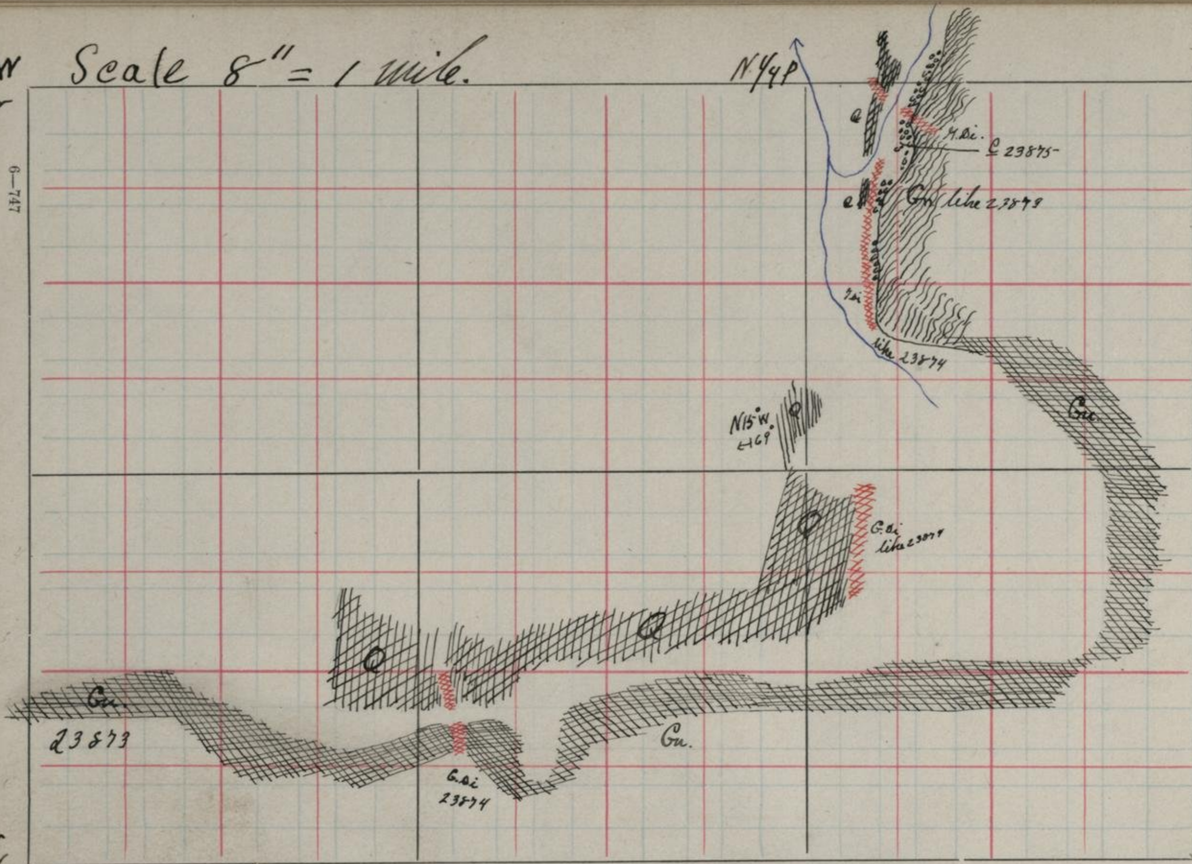
SW Cor

Scale 8" = 1 mile.

N 1/4 P

S. 32 T. 41 R. 29

6—747



W 1/4 P

C of Sec.

but evidently is followed closely by the creek which flows at foot of talus.

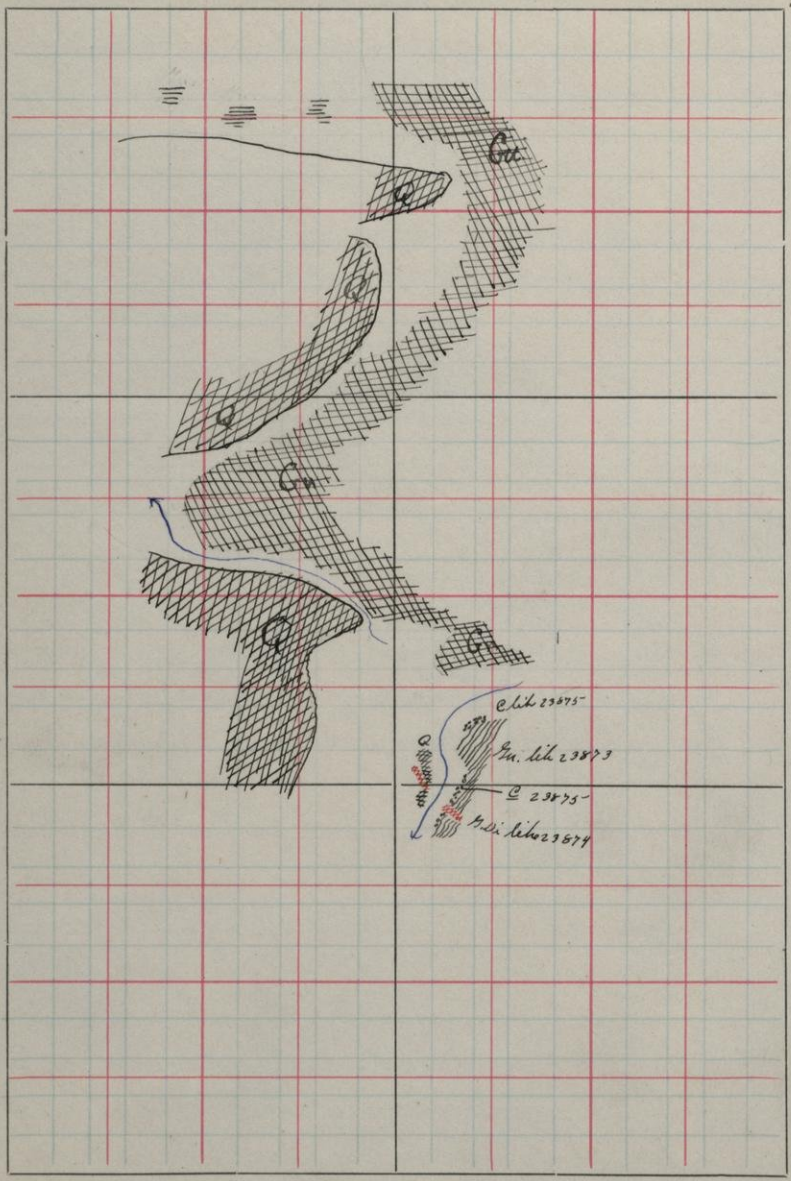
23874 N 1200 W 1470 SE Cor. Sec. 32-41-29
Dyke of hornblendic rock trending little W of N-S cuts quartzite and archaean complex. Narrow valley here marks line of contact between Huronian quartzite & archaean gneiss.

23875 N 1840 W 870 SE Cor. Sec 32-41-29
Here we find an excellent basal conglomerate 23875 composed of well rounded fragments of granite and gneiss. No greenstone or sedimentary rock fragments were found in it. Fragments range in size from pebbles to boulder 1½' in diam. A greenstone (like 23874) is found here also. It in one place follows contact between the congl. and a greenish quartzite above - i.e. to W - it. Sends out dykes into the gneiss & also into the quartzite. Contact between the conglomerate and quartzite was not seen. Separated in one place by greenstone (of above) and at others a valley lies between them. Conglomerate is found in patches adhering to the

15

S. 29 T. 41 R. 29

NW NE

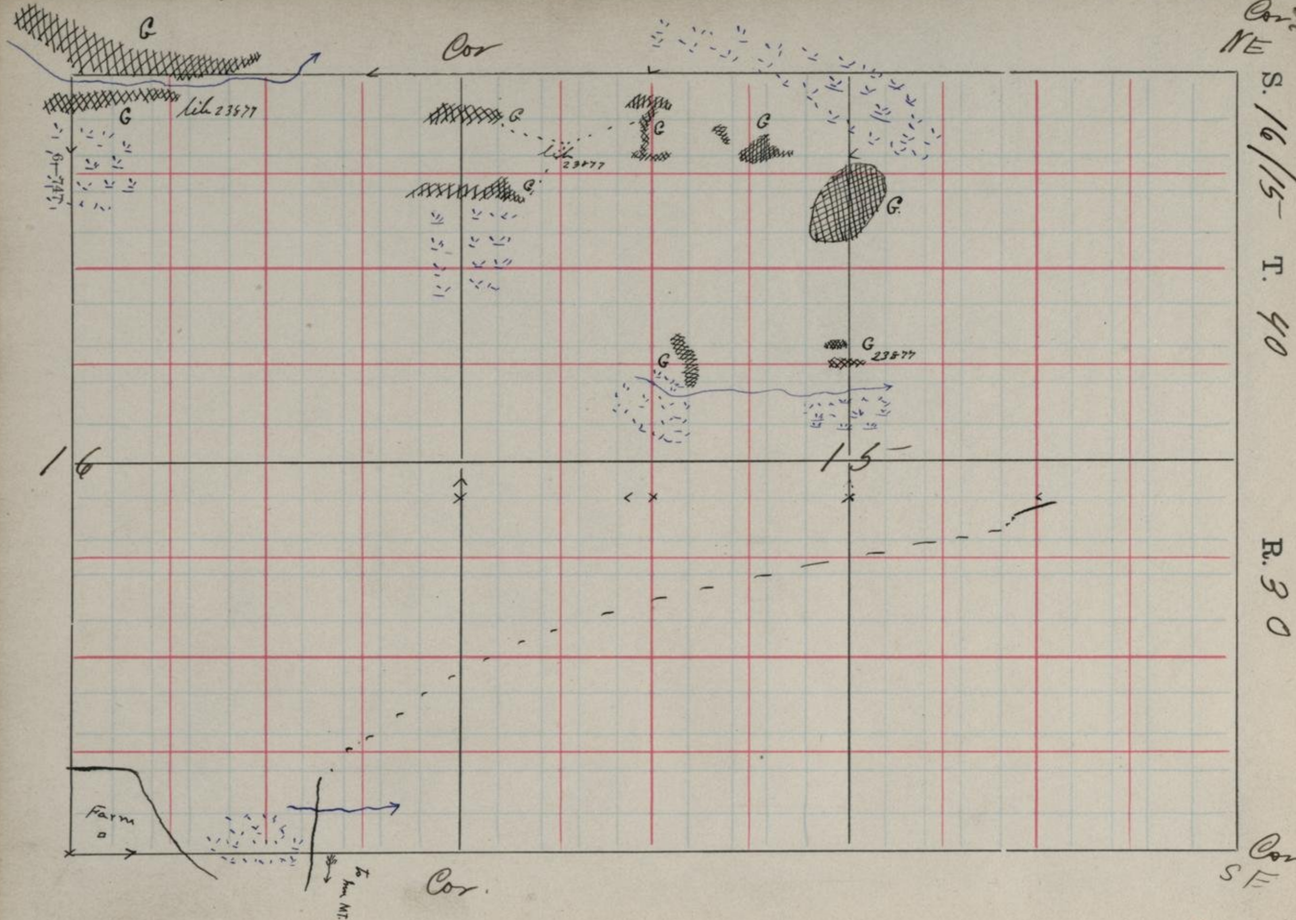


SW SE

6—747

gneiss cliffs which are 50-75' high.
Strike of banding of gneiss is N 15° E.
Quartzite contains numerous small
greenstone dykes. Contact of qtzte +
greenstone is shown in Spec. 23876
taken from point

23876 N 2000 W 840 SE. Cor. Sec. 29-41-29



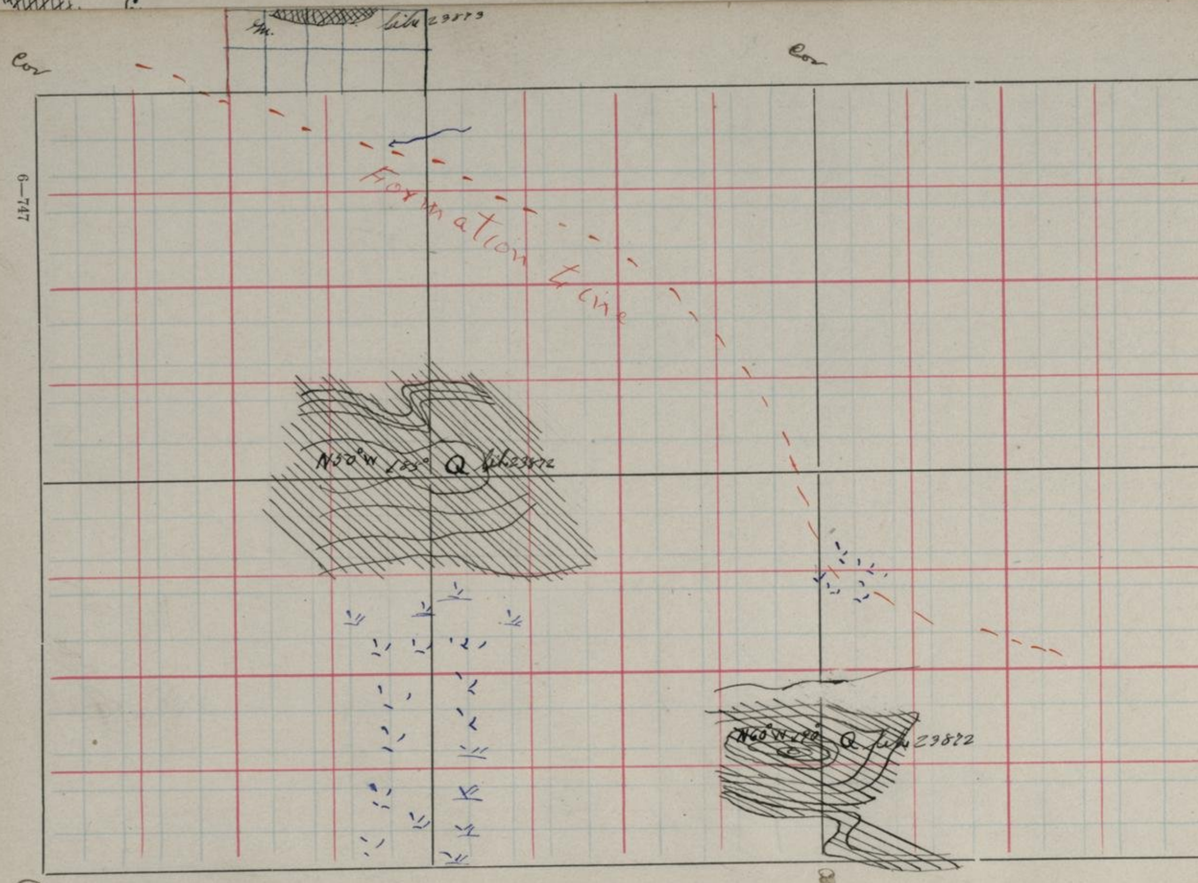
S. 16/15 T. 40 R. 30

23877 N1240 W1000 SE Cor. Sec 15-40-30
Knob of fine grained greenstone.
at N1600 W1000 we reach exposure
of same greenstone which shows
good spheroidal parting similar
to that of the L. S. volcanics of
Michigamme region.
Passed over a number of
outcrops of a greenstone similar
to 23877 in course of the day's work.
They bear strong resemblance to
the Huronian volcanics of other
areas and the fact that they
are at times somewhat schistose
does not destroy it.

19

S. 18 T. 40 R. 29

6—747



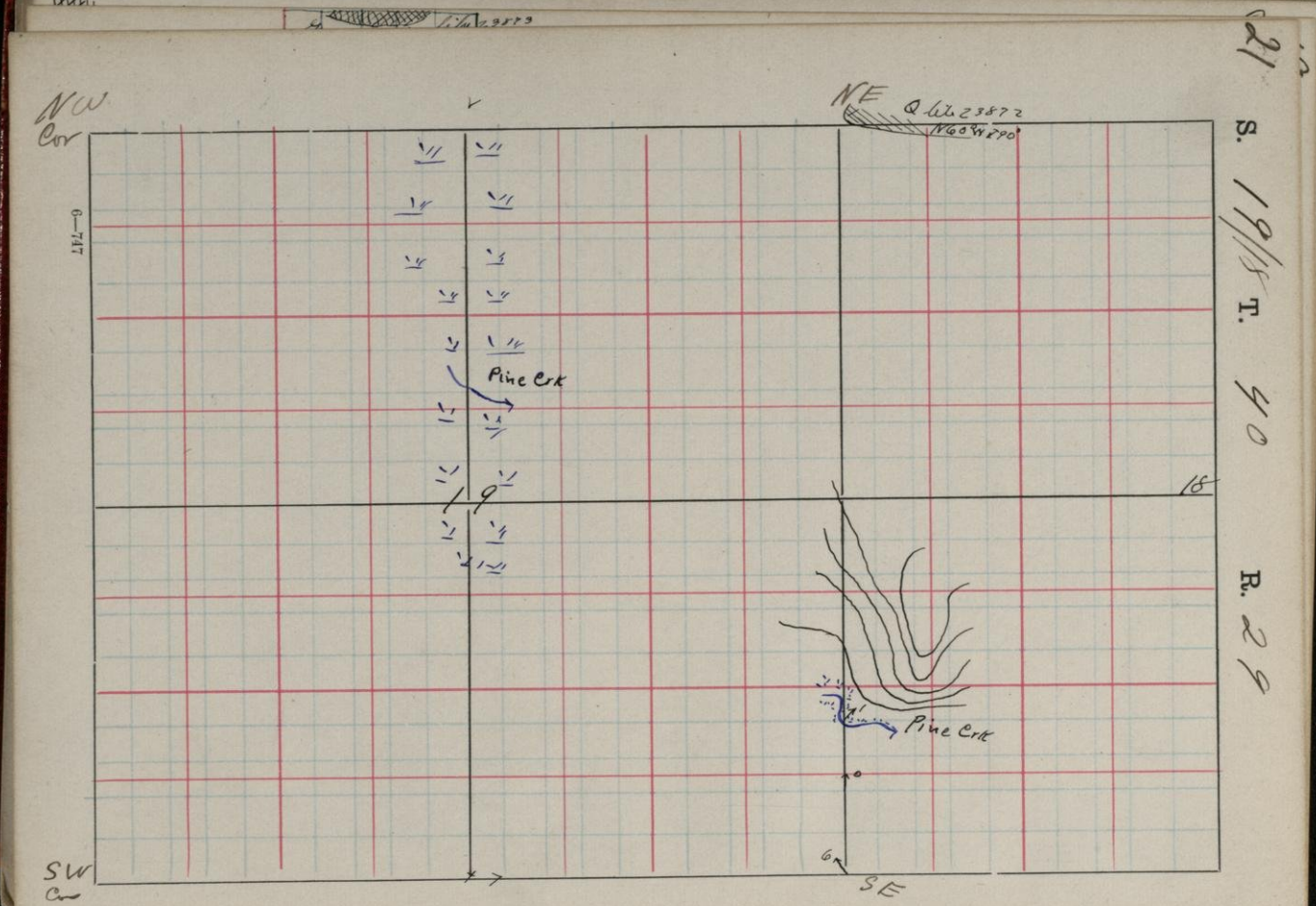
July 9, 1896.

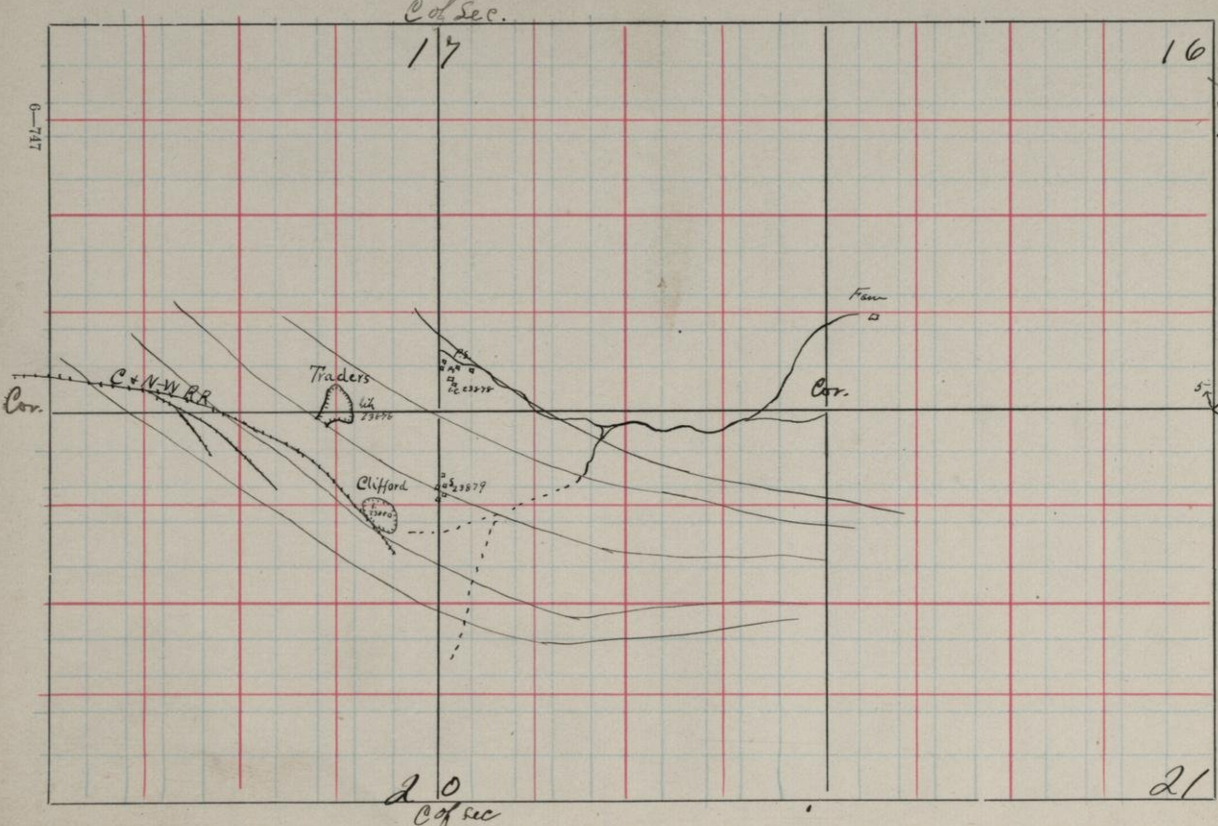
Started to run south from 1/4 P near foot of drift hills. Large granite outcrop shows about 150 paces west + 200 paces north of S1/4 P sec. 7-40-29. Crossing creek we pass over rolling country to foot of high hill of white quartzite which begins at

like 23872 N 1240 W 1000 SE Cor. Sec. 18-40-29 Strike is N 50° W, dip 85° SW.

On the return run we reach high hill of same quartzite at location shown on plat.

At N 700 W 0 SE Cor Sec. 18-40-29 we come to low ground and then after passing it begin to ascend low hills covered with drift and a heavy growth of hardwood. Continue N to N section line but do not find any granite. Am confident the formation line should be drawn at about 750 N the northern foot of the quartzite ridge. To the N.W. all along a valley varying in width has been found to separate the quartzite from the granite-gneiss.


NW Cor
NE
SW Cor
SE
Pine Crk
Pine Crk
S. 19
T. 50
R. 25
21
16
9
6



S. 17/16 20/21 T. 40 R. 30

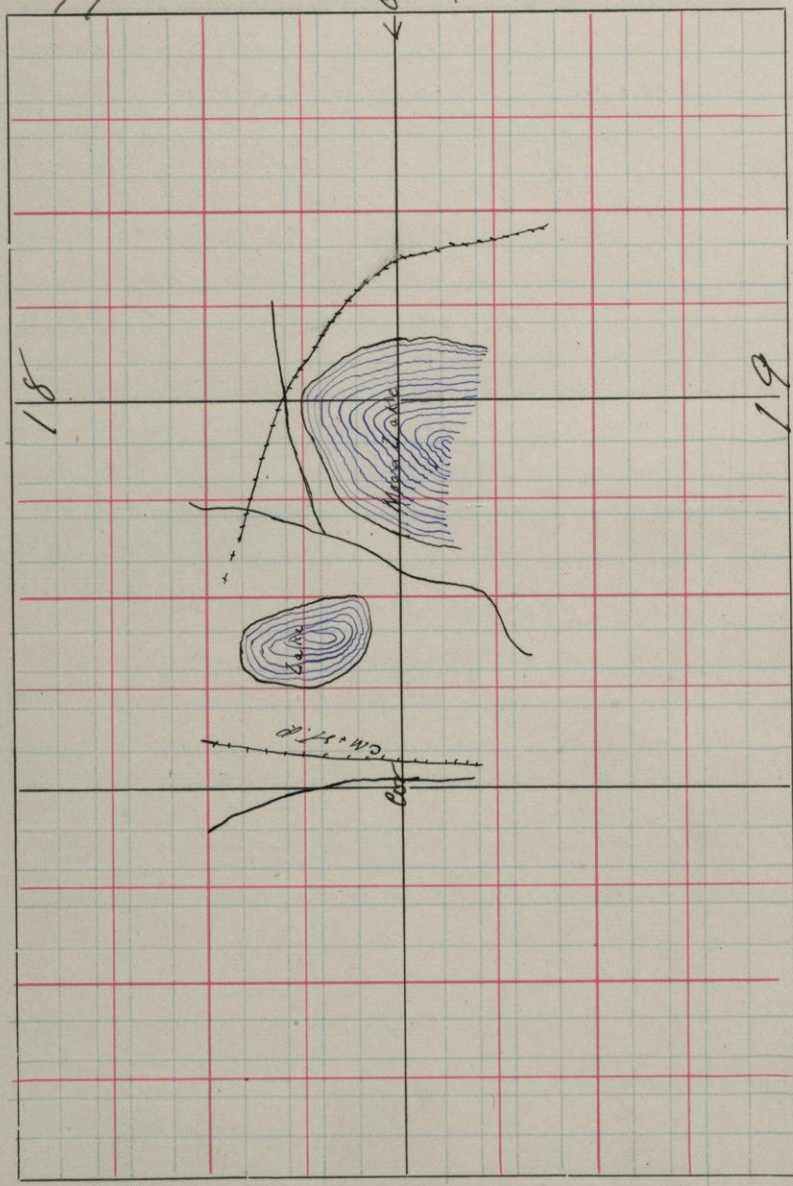
23878 N 76 W 960 SE Cor. Sec. 17-40-30
Just at this location there is a deep shaft which, to judge from the fragments on dumps, has reached a lean gossany ore 23878.
Around this there are several shallow pits and shafts which have only ferruginous Potsdam sandstone on dumps.

like 23878 N 0 W 1200 SE Cor. Sec. 17-40-30
This is the location of the large open pit of the "Traders" mine. The ore is a lean siliceous (gossany) ore much like 23878. except appears richer in iron. Strikes N 90° W dips 68° S W. It was necessary to remove only about 10-15' drift in order to expose the ore surface. The rock beds are traversed by joints which dip flat to NE. This enables an easy working of the ore by terraces.

23879 N 1750 W 1000 SE Cor. Sec. 20-40-30
Slate which lies between Traders + Clifford pits. Exposed on dump of test pits. Strike said by mine captain to be N W!

23880 N 1700 W 1150 SE Cor. Sec. 20-40-30

25 S. 18/19 T. 40 R. 30



6—747

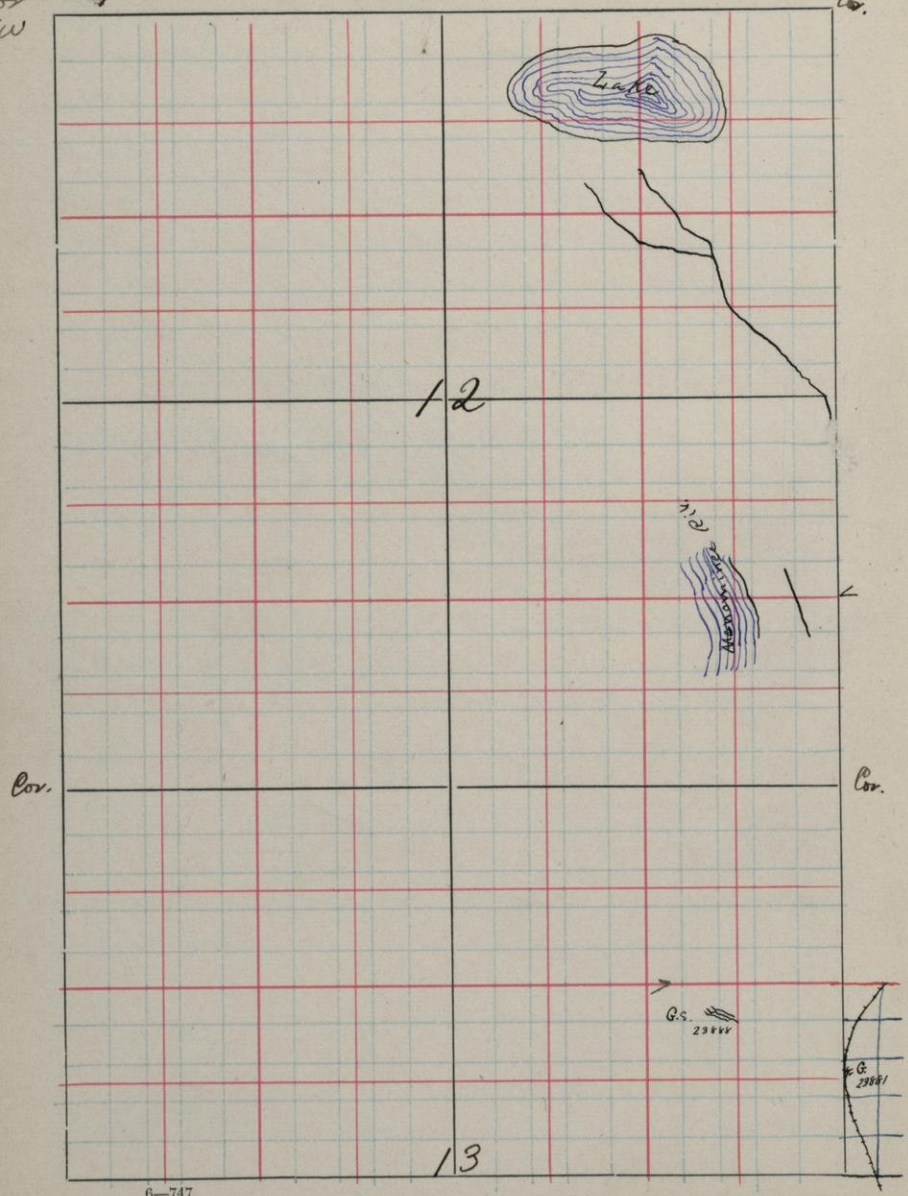
Clifford open pit. Specimen of high silica low phosphorous ore from it. Essentially same as 23878. According to Captain Carver(?) and Eng. Johnson both Traders & Clifford Pits are in slate like 23879 and have same foot & hangend. No drill holes have been put in across strike S or N of ore bodies so do not know what over and underlies the slate.

Capt. Carver told me that a drill hole put in, some years ago, to the N of Cornell pit – SE of Clifford – passed through slate and into quartzite. He also says that the beds dip flatter as they cut them from N to S.

27 S. 12/13 T. 40 R. 31

Cor NW

NE Cor.



6—747

23881 N 1260 W 0 SE Cor. Sec. 13-40-31
Exposure in R.R. cut of imperfectly spheroidally parted greenstone. It is very fine grained.

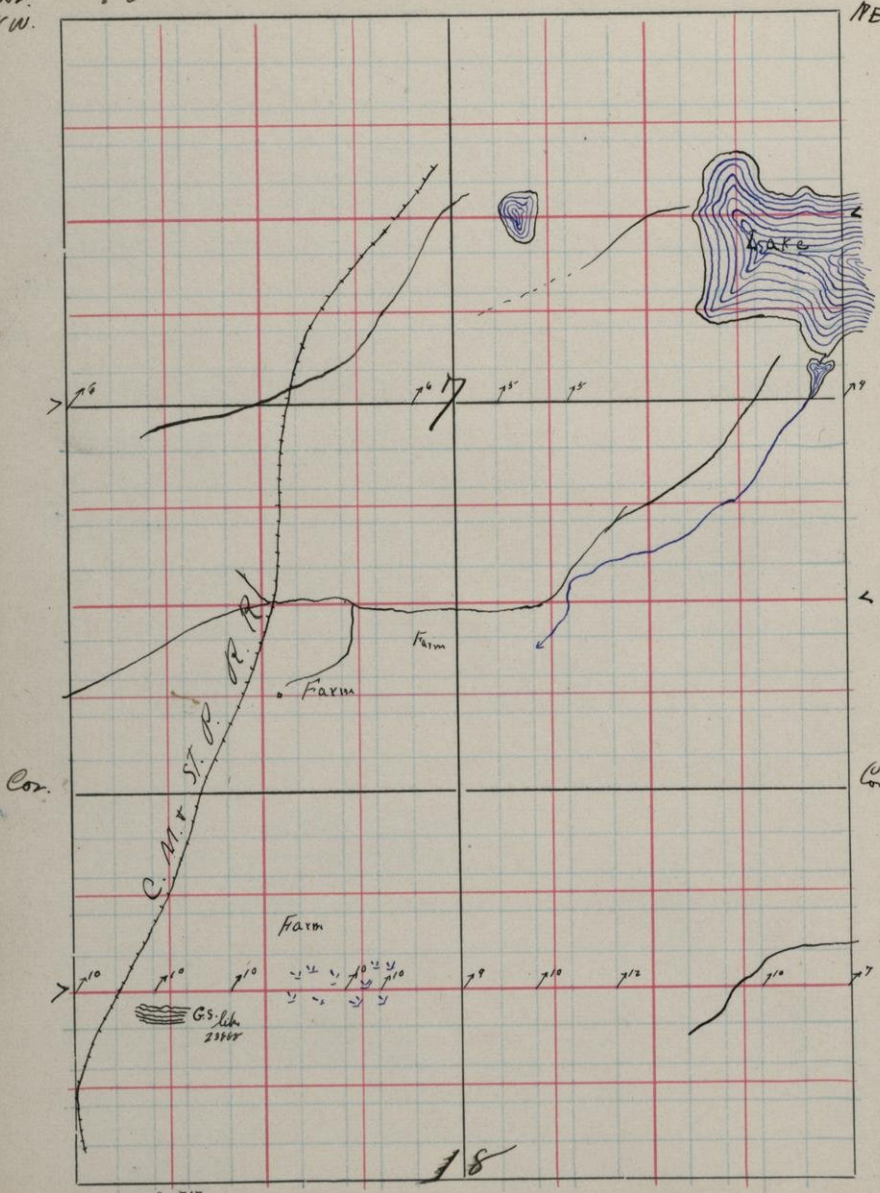
23888 N 1425 W 300 SE Cor. Sec. 13-40-31
Schistose greenstone outcropping on top of lenticular hill. Strike of schistosity is N 80° W. dip 90°

29

Cor. NW.

S. 7/18 T. 40 R. 30

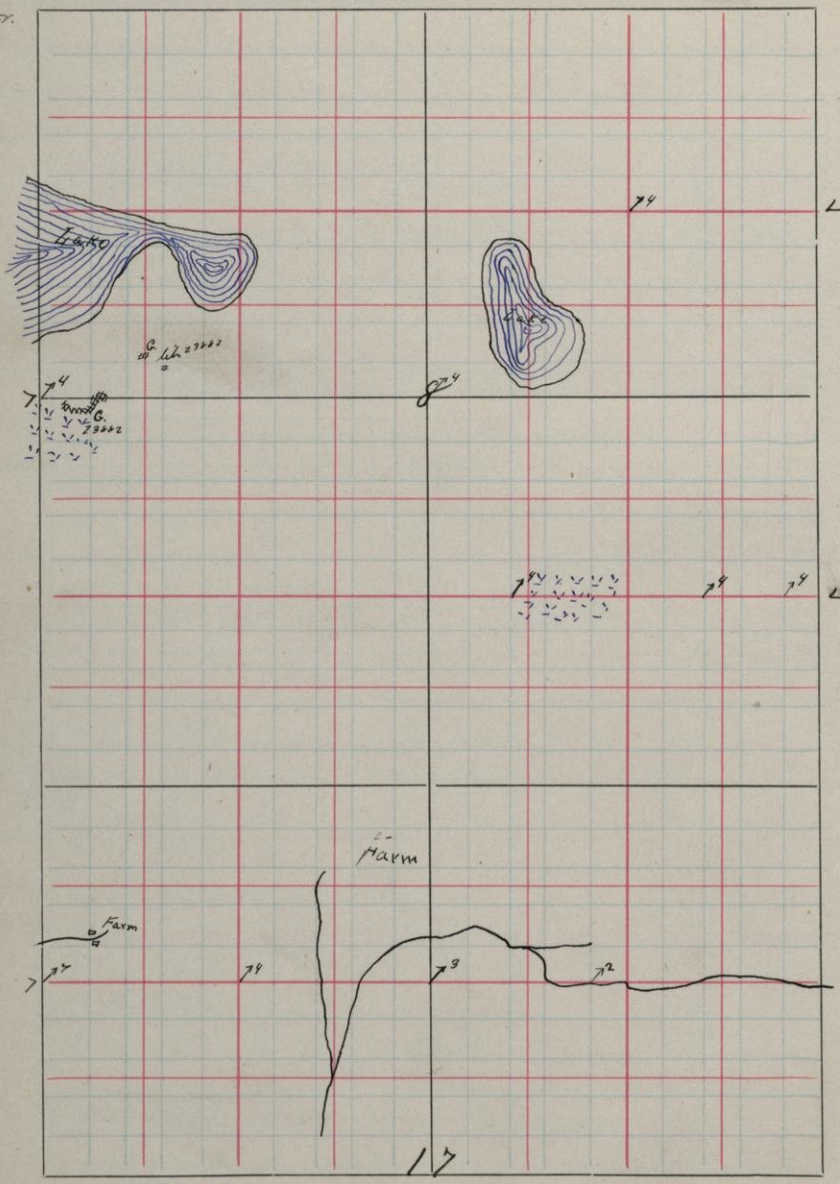
Cor NE



6—747

31

NW Cor. S. 8/17 T. 40 R. 30 NE Cor.



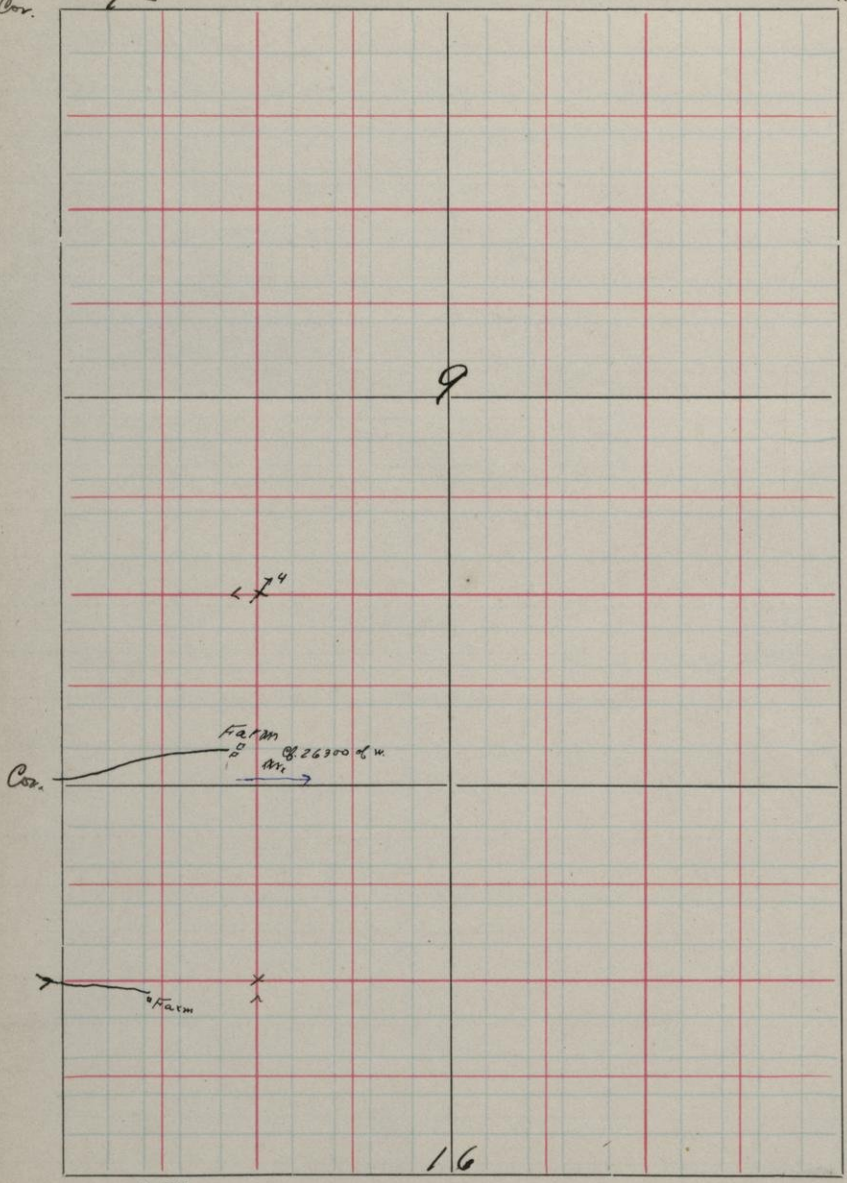
6—747

23882 N 960 W 1960 SE Cor. Sec. 8-40-30

Ledge of fine grained greenstone. It is badly fractured but not schistose.

33

NW Cor. S. 9/16 T. 40 R. 30 NE Cor.



6—747

35

S. 1/12 T. 40 R. 31

Cor. Cor.

Cor. Cor.

12

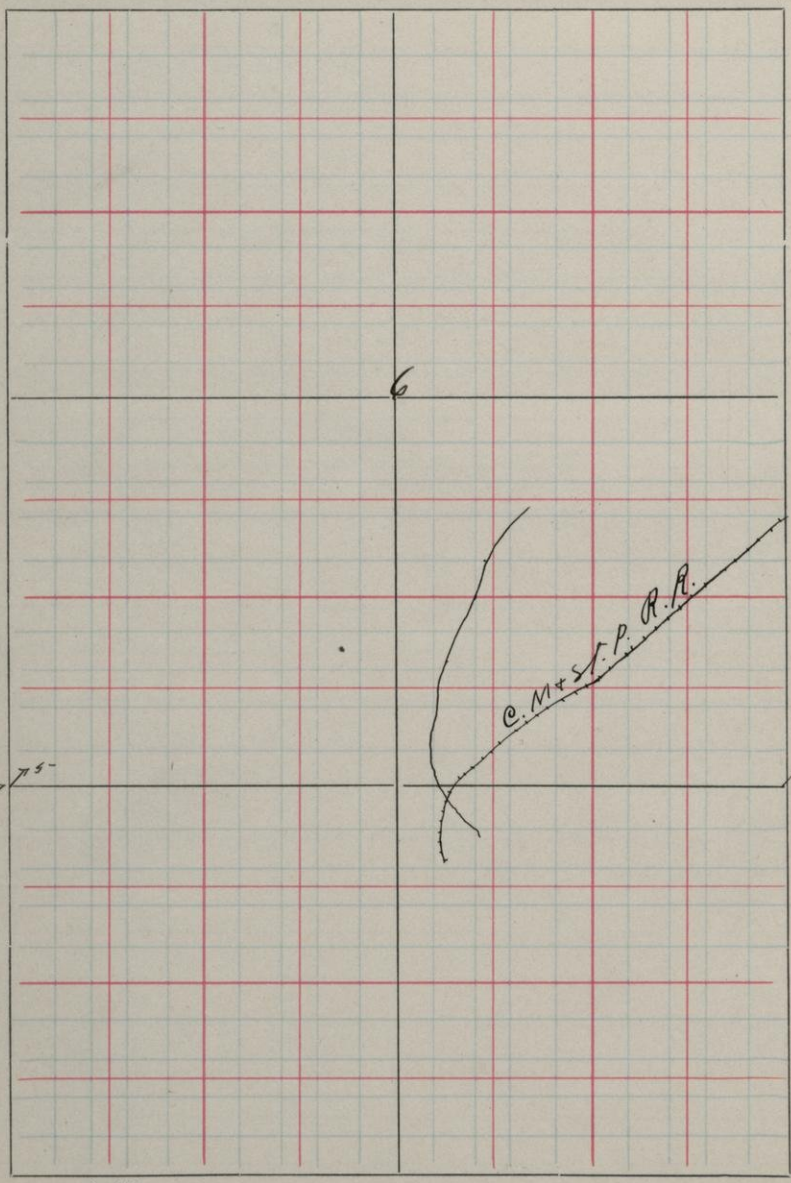
6—747

37

NW Cor.

S. 6 T. 40 R. 30

NE Cor.



6—747

39

S. 5 T. 40 R. 30

NW Cor.

NE Cor.

5

2

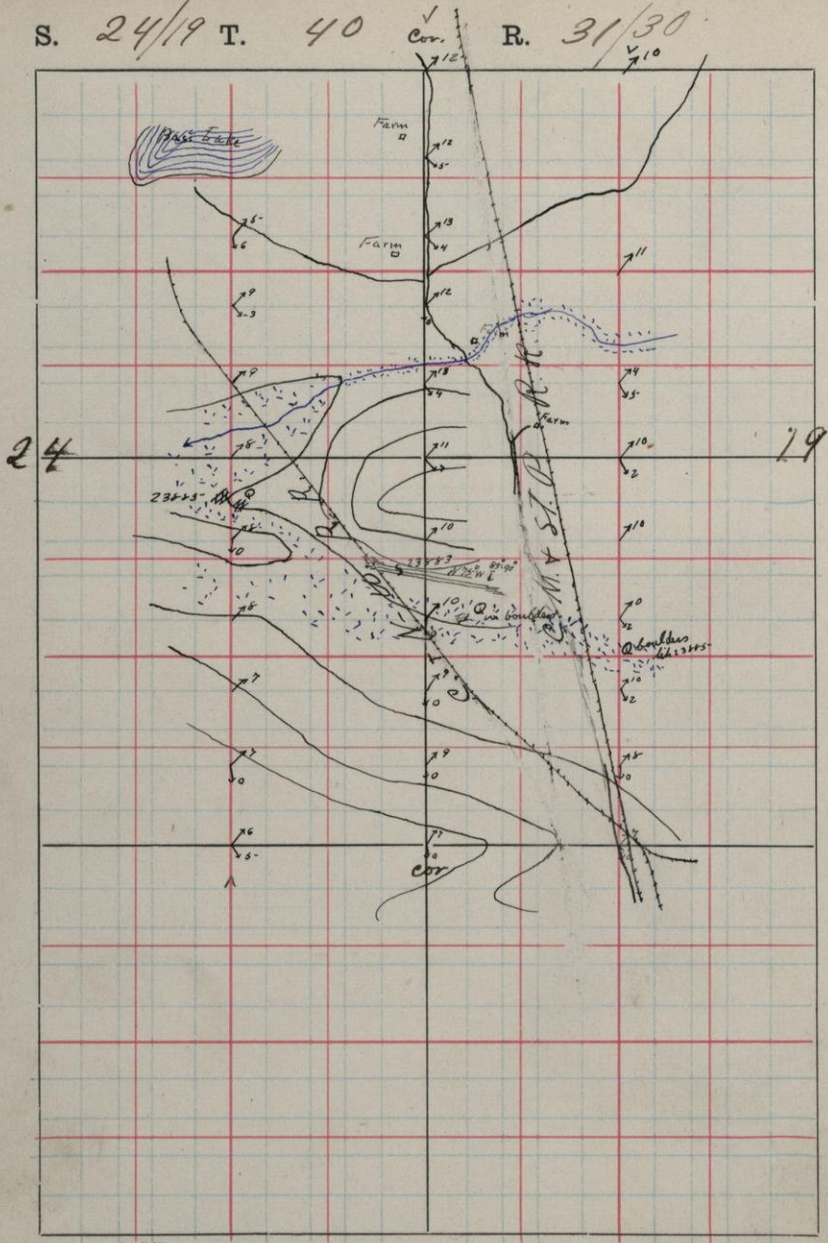
14

SW 7 Cor.

SE Cor.

6—747

41 S. 24/19 T. 40 Cor. R. 31/30



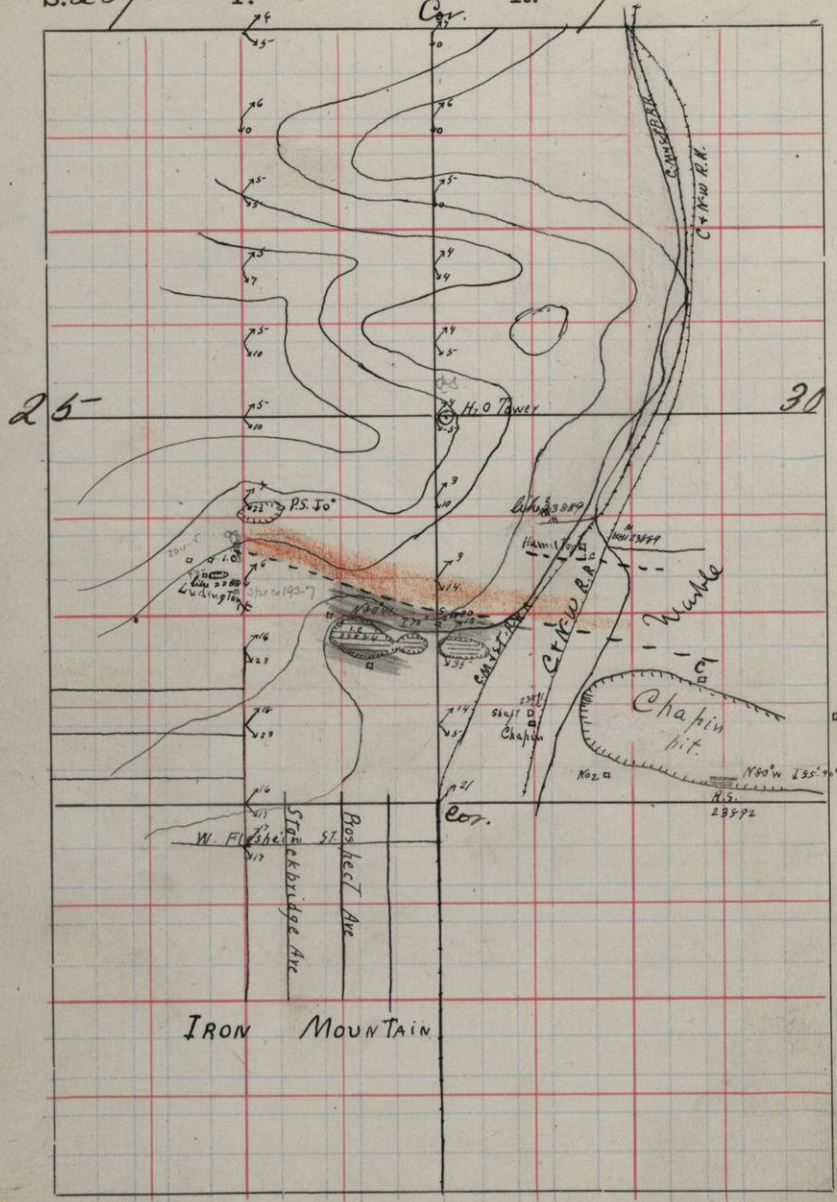
6—747

23883 N680 W0 SE Cor. Sec. 24-40-31
Flat surface exposure on E side of C+N.W. R.R. of thinly bedded grey slates and quartzite. Beds also exposed in R.R. cut. Beds are somewhat crumpled but the general strike is clearly N70-80°W dip 90°. They lie in a small valley with drift hill on which no exposures were found — to N and the high hill of Potsdam S+ Huronian marble to S. Where crumpling has occurred a few small faults have been formed. Slipping along the slate beds has also taken place causing production in slaty bands of fairly good schistosity at angle of about 20° to bedding. Strike of schistosity E-W where beds strike N70°W.

for 23884 & p 44

23885- N900 W 500 SE Cor. Sec. 24-40-31
Several ledges of a massive grey quartzite are found here. No strike or dip observable.
They are in western continuation of slates 23883 and as they have quartzite interbedded this may be an extra thick bed in the slates. To S. of above

43 S. 25/30 T. 40 R. 31/30



6—747

slates I found a great number of quartzite boulders. I believe they are remnants of a ledge at that place and in that case they would correspond to the quartzite 23885, this then lying to S of slates 23883.

23884 N 450 W 100 SE Cor. Sec 25-40-31
Open pit of old Ludington mine now abandoned. In line of western continuation of Chapin open pit. Lean jaspery ore is seen in it with strike N 80° W, dip 78° N.
A grey silicious limestone and also a grey and red mottled slate is seen on old dump piles. Probably—but am not certain of it— came out of some of the shafts. Limestone is like 238 .

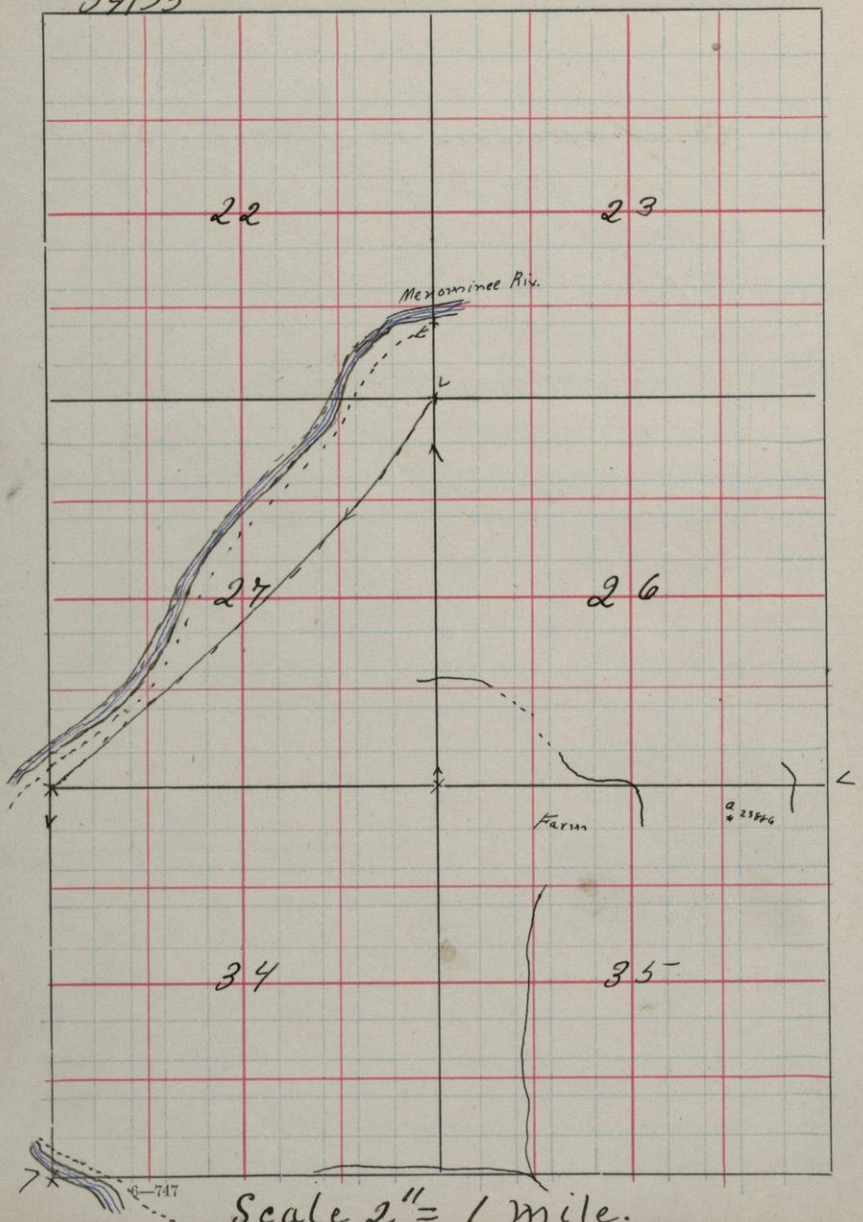
23890 N 475 W 500 SE Cor. Sec. 25-40-31
Grey slate from dump of old Ludington Shaft.

75 26 / 450 150

275 2 / 550 180

45

S. 22/23 27/26 34/35 T. 40 R. 31

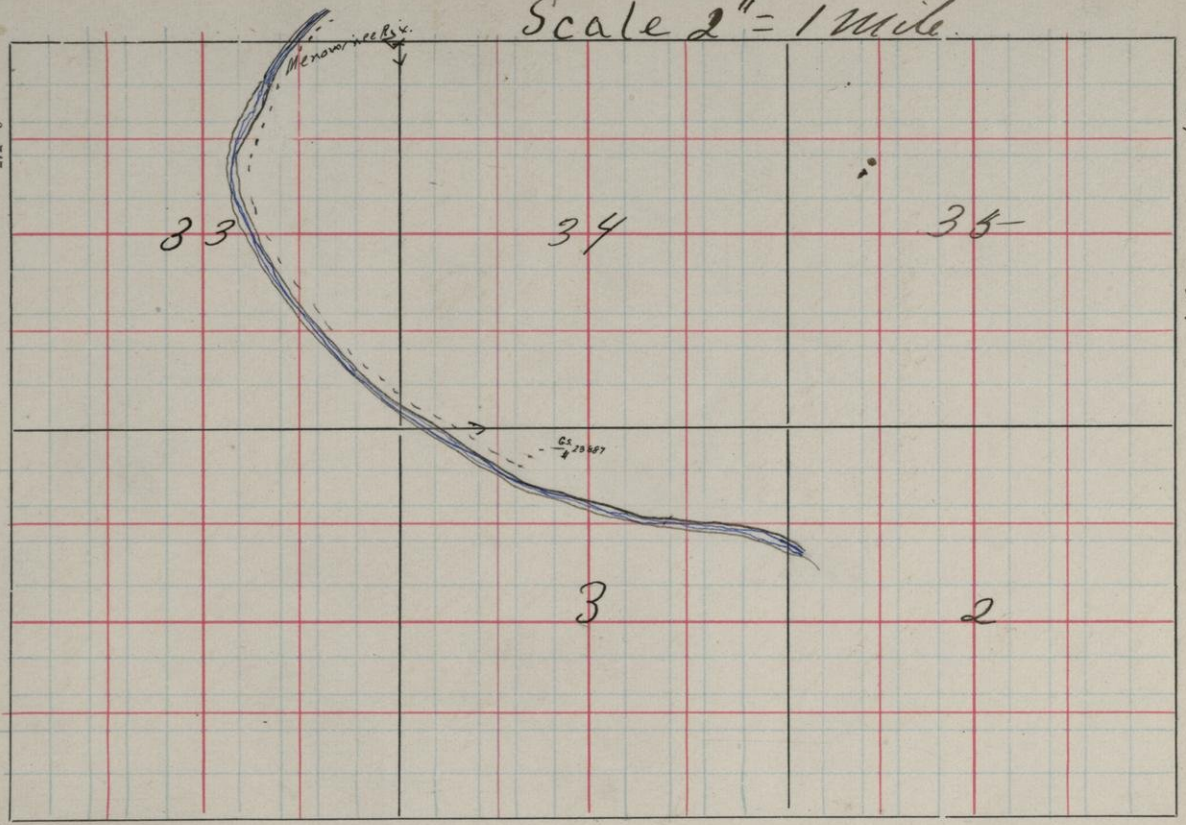


23886 N 1875 W 490 SE Cor. Sec. 35-40-31
Knob of coarse greenstone.

Compassman ran across Sec. 27
from Cor. to Cor. while I
meandered the river. No
outcrops were found.

47

Scale 2" = 1 mile.



S. 33/34/35/31/32 T. 40/39 R. 31

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23887 N875-W1140 SE Cor. Sec. 3-39-31
Knob of schistose greenstone poorly exposed in underbrush.

23888 See BP 2708

23889 N775-W1700 SE Cor Sec. 30-40-30. Mah. P
Ledge in stout of very siliceous grey limestone very much foliated. Could get strike & dip.

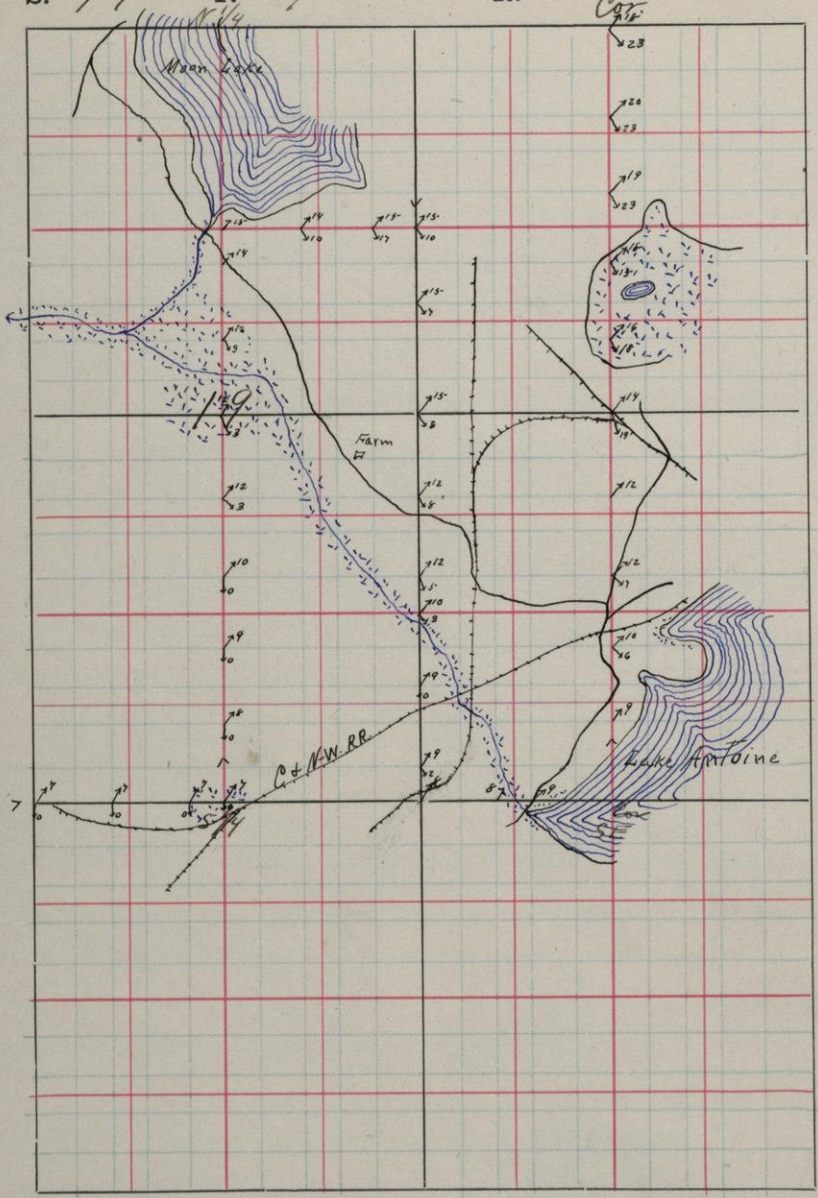
23890 See BP 4304

23891 N200 W1750 SE Cor Sec. 30-40-30 Mah. P.
Banded gossany ore from Chapin stock pile of shaft D. Could find no brecciated pieces on dump. Stock from shafts B & C. just same.

23892 N75-W1300 SE Cor Sec. 30-40-30 Mah. P
Red slate which forms south wall of Chapin pit. Ledges show at various places in pit but for most have evidently been moved by caving. Strike-taken where rock appeared to be solid & in place- is N80°W dip varies from 85°S to vertical and even to N dip.

49

S. 19 T. 40 R. 30 NE



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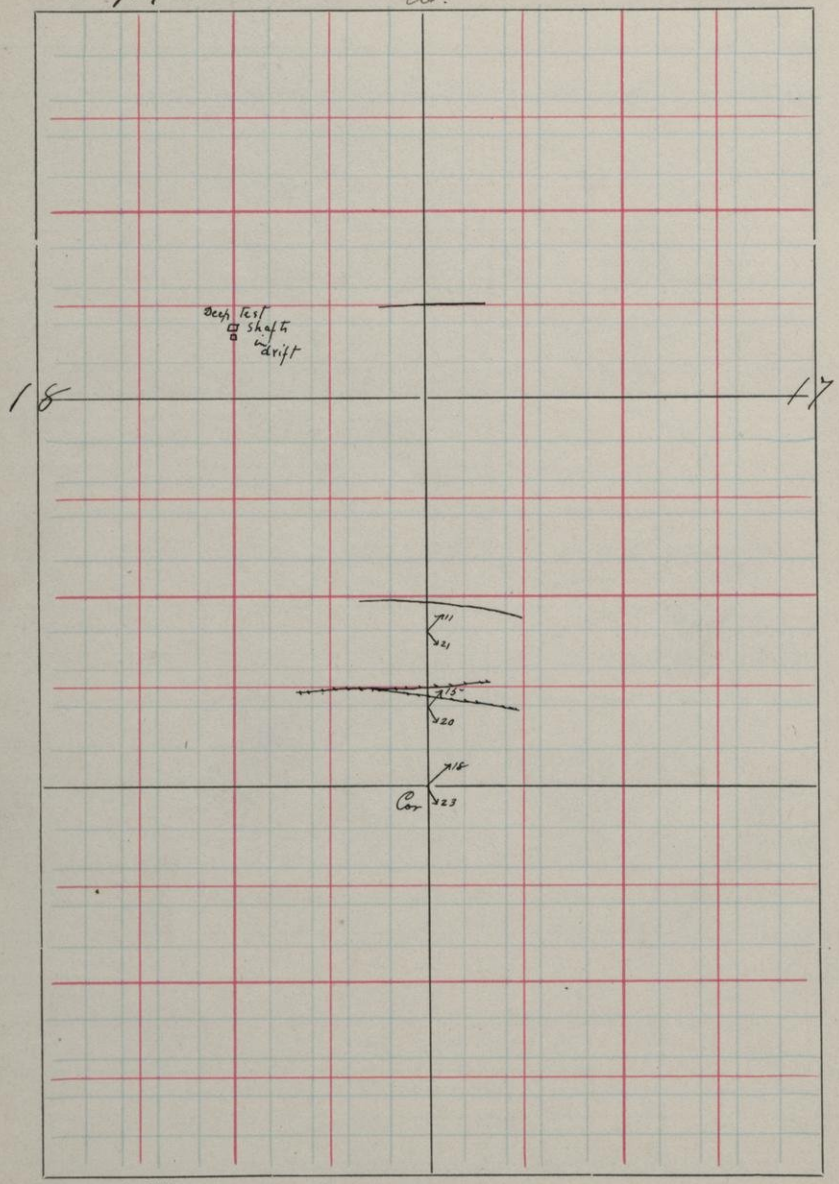
51

S. 18/17 T. 40 Cor. R. 30



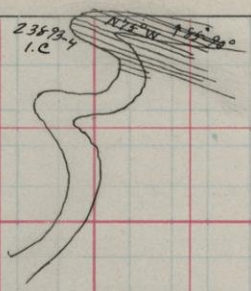
6—747

53

NW Cor.

S. 31 T. 40 R. 30

NE Cor.



SW Cor.

SE Cor.

6—747

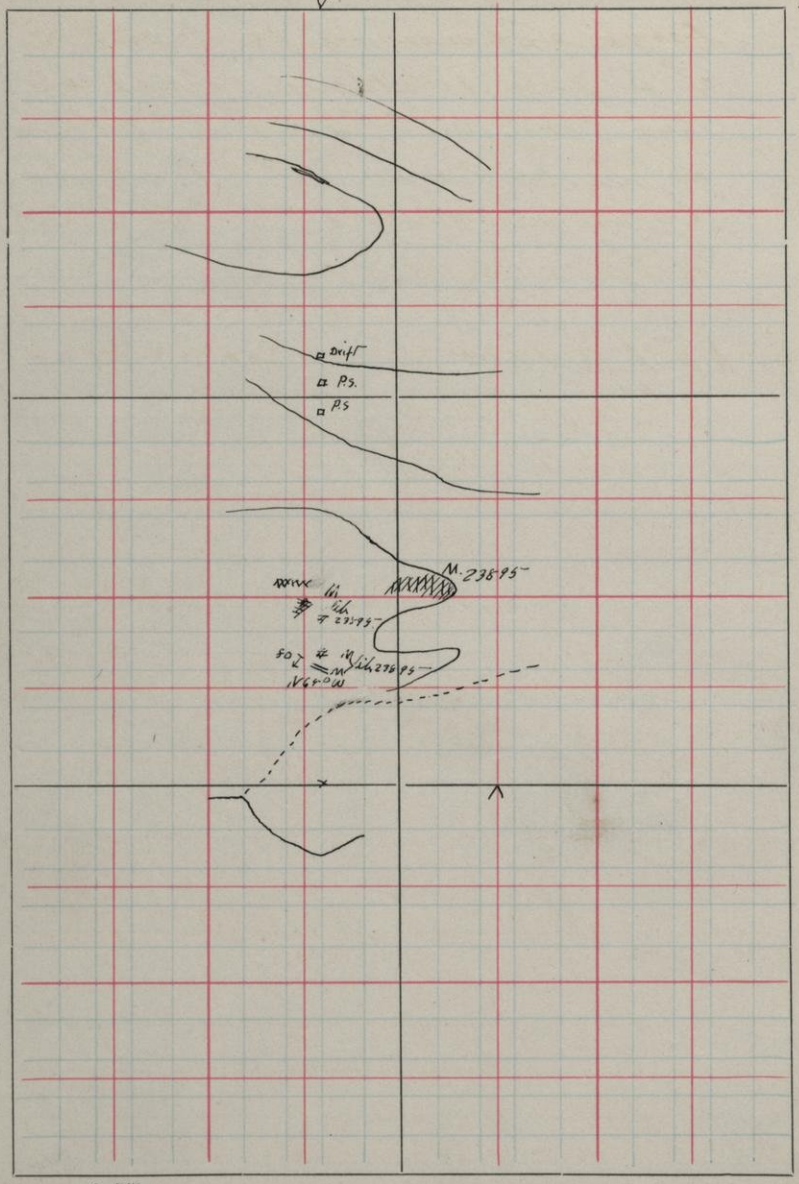
23893-4 N1975-WO SE Cor. Sec. 31-40-30
Ledges of lean gossany ore 23893.
Strike is N 75° W, dip 85° N-20°.
Looks somewhat fragmental in
places & such a spec is shown
by spec. 23894.

55

S. 33 T. 40 R. 30

NW Cor.

NE Cor.



SW Cor.

SE Cor.

6—747

23895 N 580 W 975 SE Cor. Sec. 33-40-30
Large exposure on east end of ridge of a grey siliceous limestone. Can not get the strike accurately on the exposure but it seems to agree in general with trend of ridge & exposure.

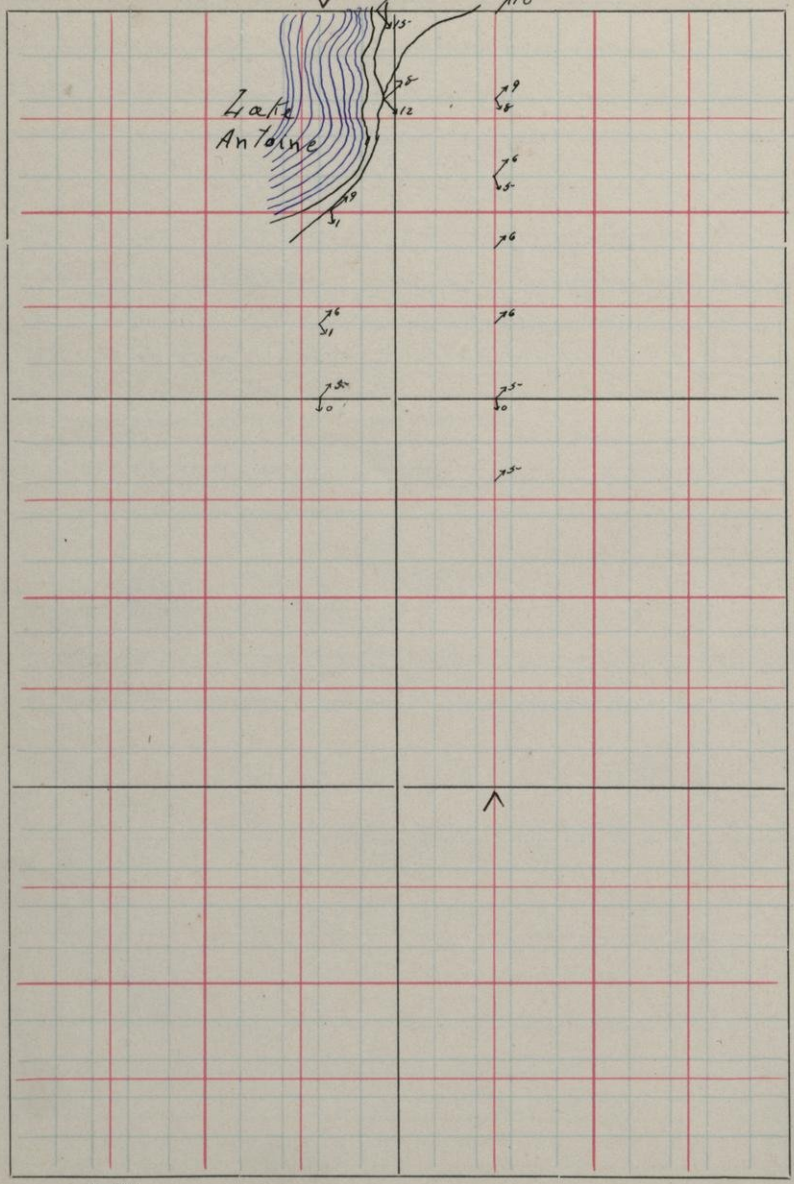
lith 23895 N 330 W 1200 SE Cor. Sec. 33-40-30
Strike N 65° W dip 80° S.

57

S. 28 T. 40 R. 30

NW Cor.

NE Cor.



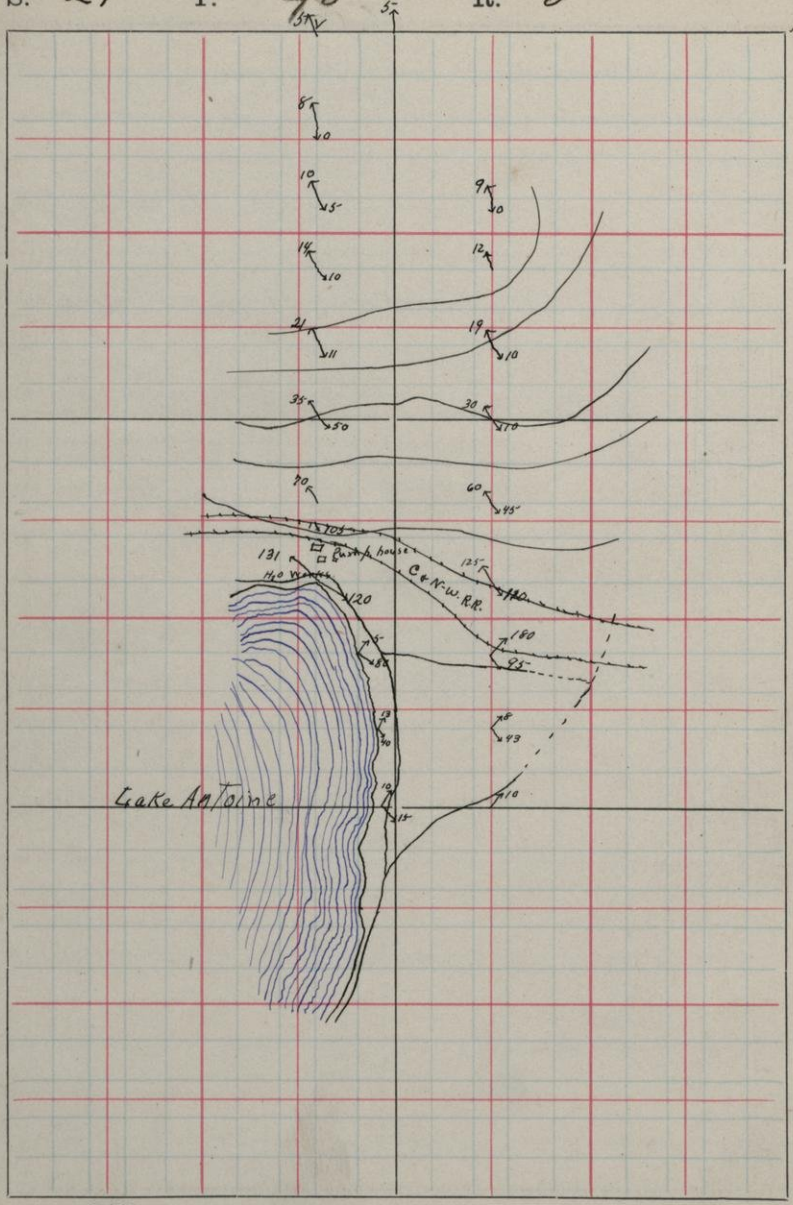
SW Cor.

SE Cor.

6—747

59

S. 21 T. 40 R. 30



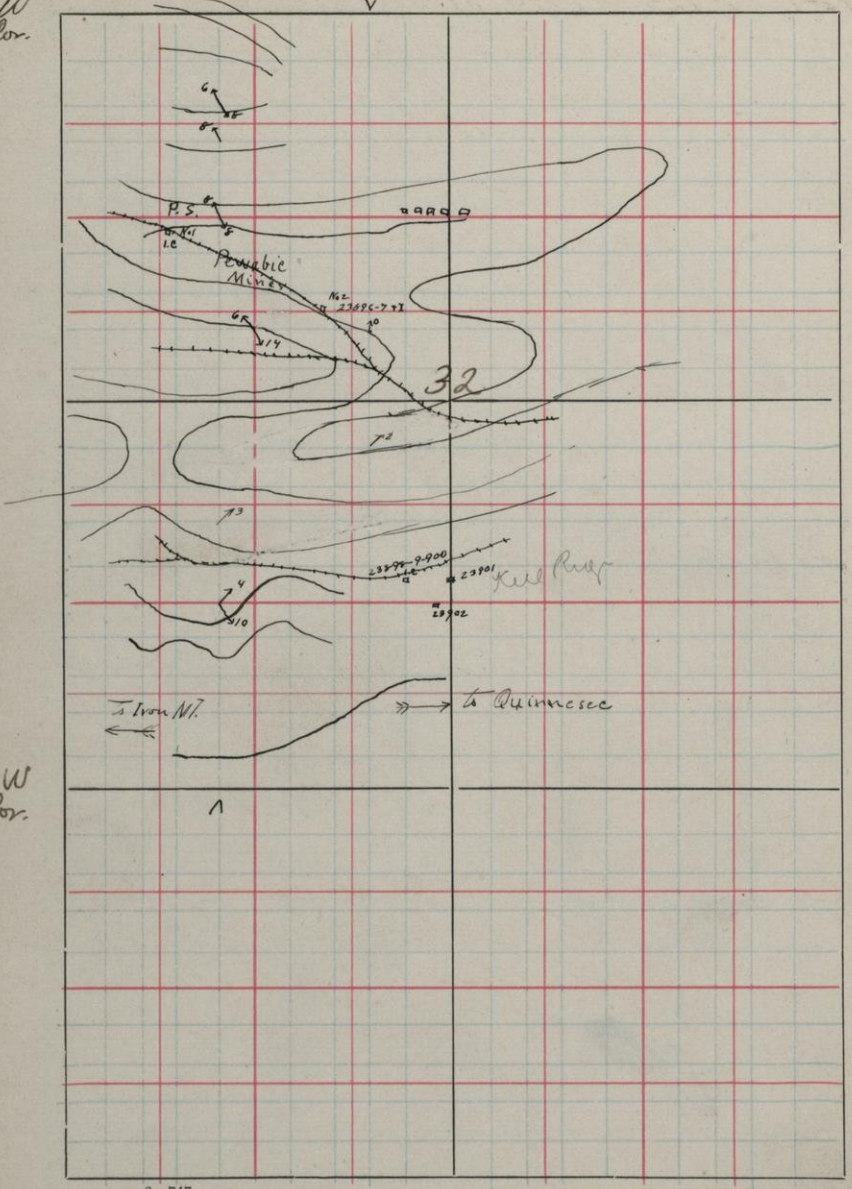
6—747

61

NW Cor.

S. 32 T. 40 R. 30

NE Cor.



SW Cor.

SE Cor.

6—747

23896-7 N125 W1340 SE Cor. Sec. 32-40-30
Red slate from dump of Pewabic shaft No.2.
Shaft must have gone through a very
considerable thickness of Potsdam Sandstone
to judge from dump.
23897 is a specimen of Pewabic 1st grade
ore from No.2. Some of the conglomeratic
ore similar to that seen at Milly,
Walpole & Pewabic No1 was to be found
at No2. although it is said to be
brought up at times.

23898-9-900 N570 W1100 SE Cor. Sec. 32-40-30
Abandoned shaft with dump composed
of shaly lean jasper ore (23898), red
slate (23899) and a ferruginous conglom-
eratic rock 23900 which is probably
from the base of the Potsdam.

23901 N570 W1000 SE Cor. Sec. 32-40-30
Pit with materials, which are on dump
that came from it, like 23898-9-900
and with them a silicated graywacke
23901

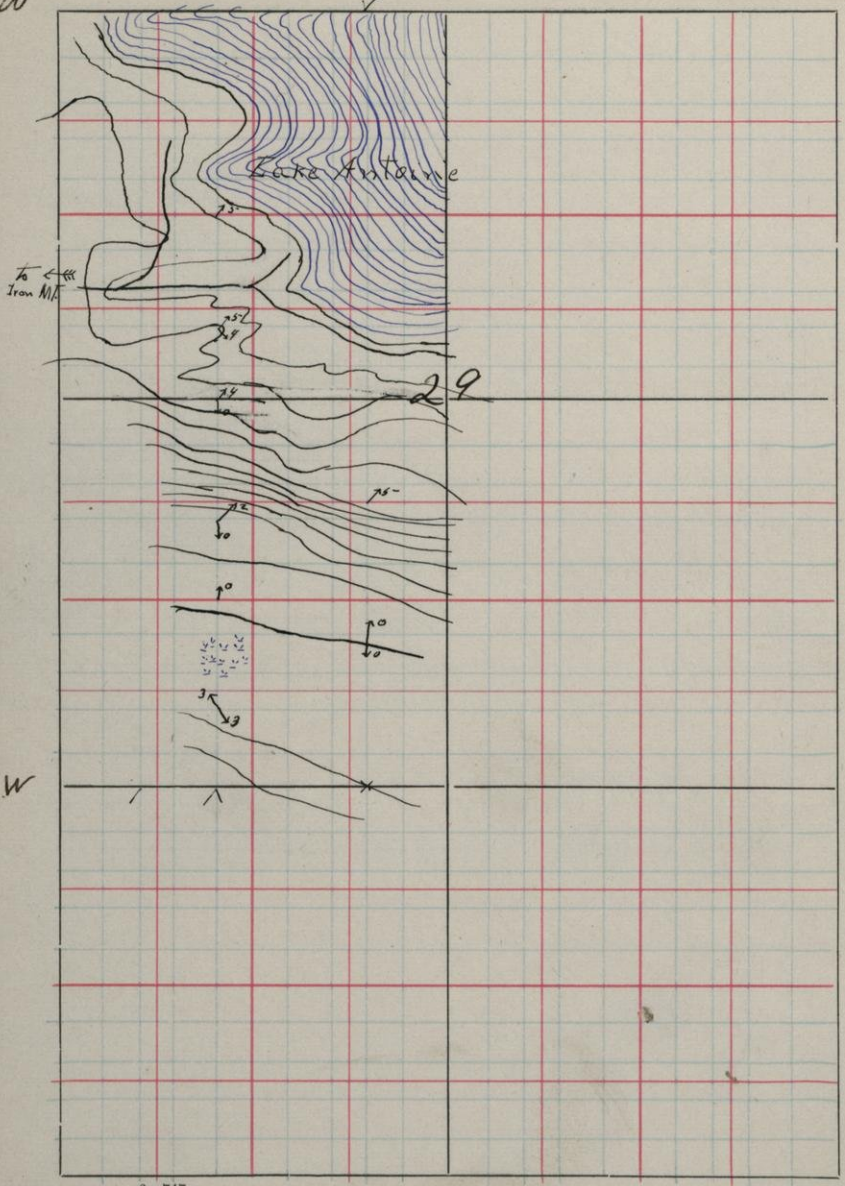
23902 N495 W1045 SE Cor Sec. 32-40-30
Shallow pit with this slate on dump.

63

S. 29 T. 40 R. 30

NW

NE



SW

SE

6—747

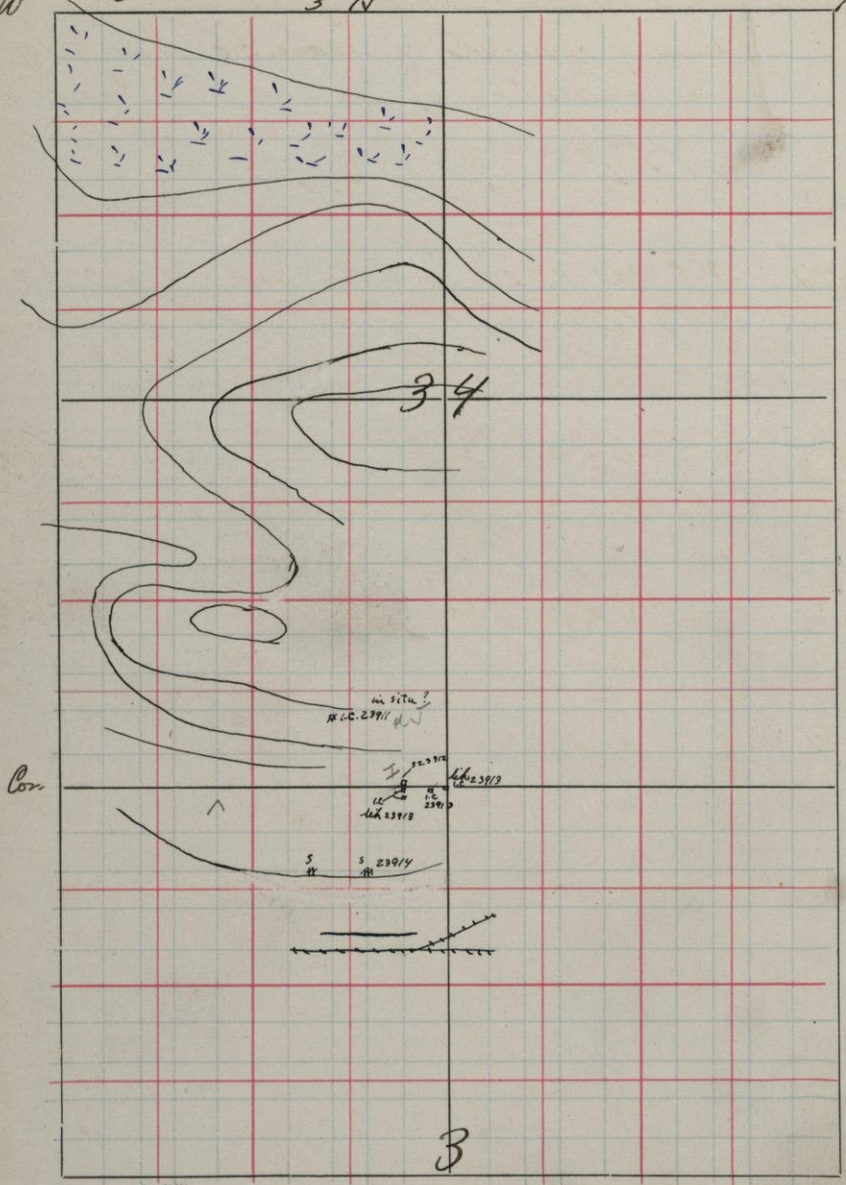
23903-10

cf. pp. 69-70

65

S. 34/3 T. 40/39 R. 30

NW NE



6—747

23911 Banded Jasper
N 175 W 1300 SE Cor. Sec. 34-40-30
Many fragments of lean ore like specimen were found on the side hill. Rock is probably in place just below surface but can not be sure.

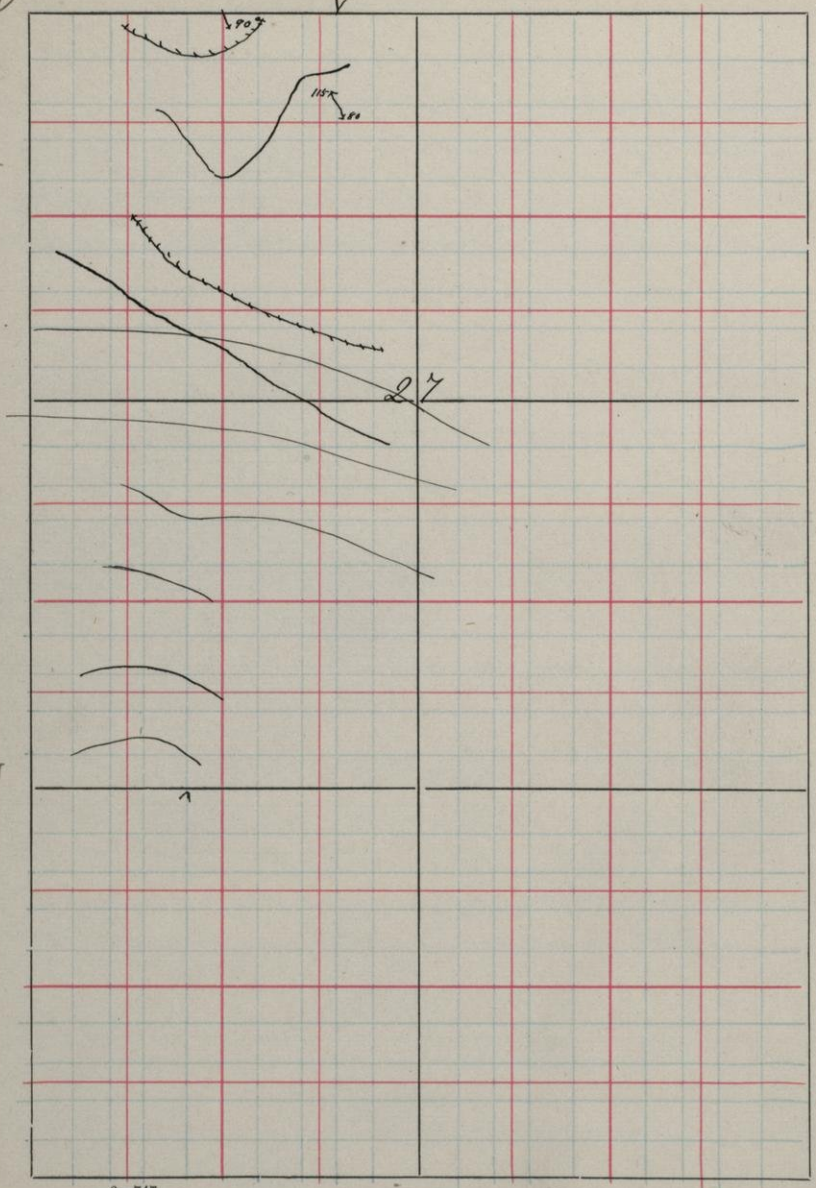
23912
N 0 W 1100 SE Cor. Sec. 34-40-30
Shallow test pit with red & green mottled slate on dump.

23913
N 1990 W 1050 SE Cor. Sec. 3-39-30
Shallow test pit with lean cherty ore on pit dump. Numerous such pits in same material occur here as located on map.

23914
N 1800 W 1200 SE Cor. Sec. 3-39-30
Ledge of grey sericitic schist so plicated that I can't get the strike or dip. Forms the first ridge N of main road between Iron Mt. & Quinnesec.

67

NW S. 27 T. 40 R. 30 NE

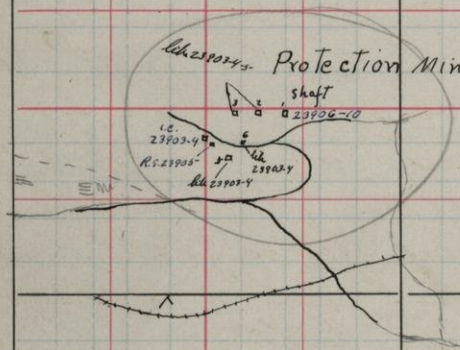


6—747

69

NW S. 22 T. 40 R. 30 NE

100 feet N.



SW SE

6—747

23903-4 N 400 W 1500 SE Cor. Sec. 22-40-30
Pit with banded shaly jasper ore on dump 23903 and mixed with it there is a breccia 23904 probably from base of Potsdam.

23905 N 390 W 1470 SE Cor. Sec. 22-40-30
Pit with red slate on dump.

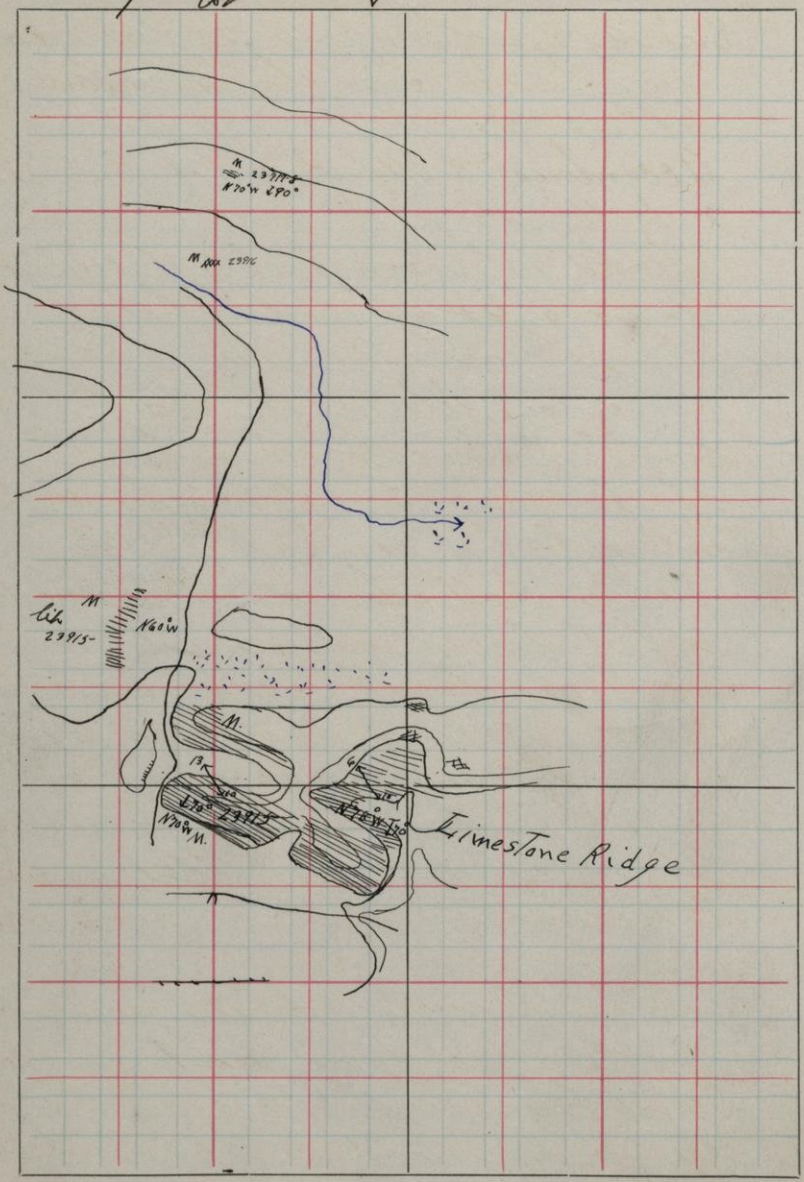
23906,9,10 N 490 W 1300 SE Cor. Sec. 22-40-30
Protection shaft, numbered 1 on plat. Ores from it. 23906 resembles the soft ore of Mills & Newabic
23909 is average ore sample.
23910 is same with jasper band. Very little jasper found with the ore.
23907 is also from shaft and forms the foot wall of ore according to J. W. Thickens, Supt.
23908 Quartzite interbedded with rock 23907

Open pit no 6. shows brecciated rock like 23904 lying on top of 23903 Can not get thickness of 23903 but it furnishes fragments in Conglomerate which is I think at base of Potsdam.

23911-14
C. H. K. 65-6

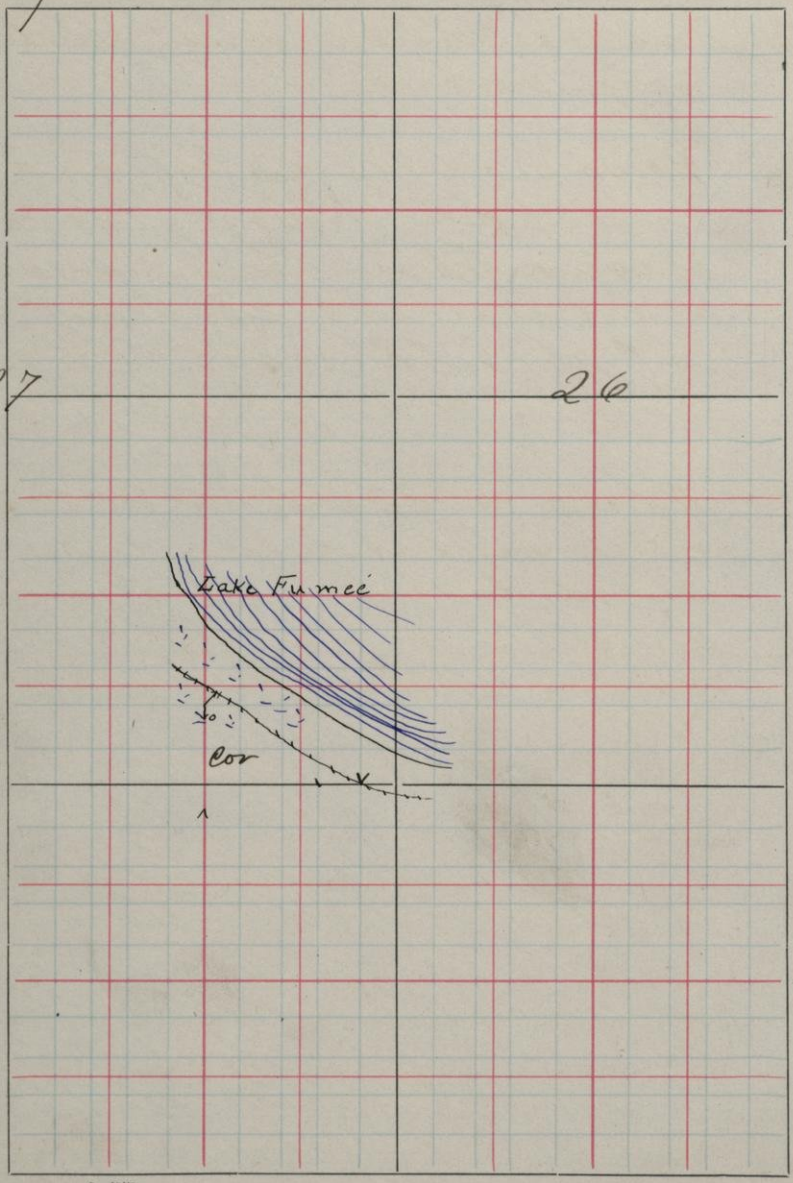
71

S. 34 T. 40 R. 30



23915 N 1900 W 0 SE Cor. Sec. 2-40-30
South edge of exposure of silicious grey limestone striking N 80° W and dipping 70° S.
According to Mr. Buell of Quinnesec a drill hole put down by him started at barn just S of engine house & going north passed through ore and then struck limestone like 23915 about 100' south of above location for it. Appears thus to dip to S for certain & to be foot of ore.
Another drill hole was put in one block west of this and running in to north also passed through ore & bottomed in limestone. About ¼ mile to W of & in continuation of limestone according to its strike I can see the iron formation. It would seem that there must be either a fault to throw the iron formation off to the limestone or else - and the probable explanation - there is a trough or bend in the limestone with place with the iron lying in it. According to Buell one of old Quinnesec mine laid to

73. S. 27/26 T. cor. 40 R. 30



6—747

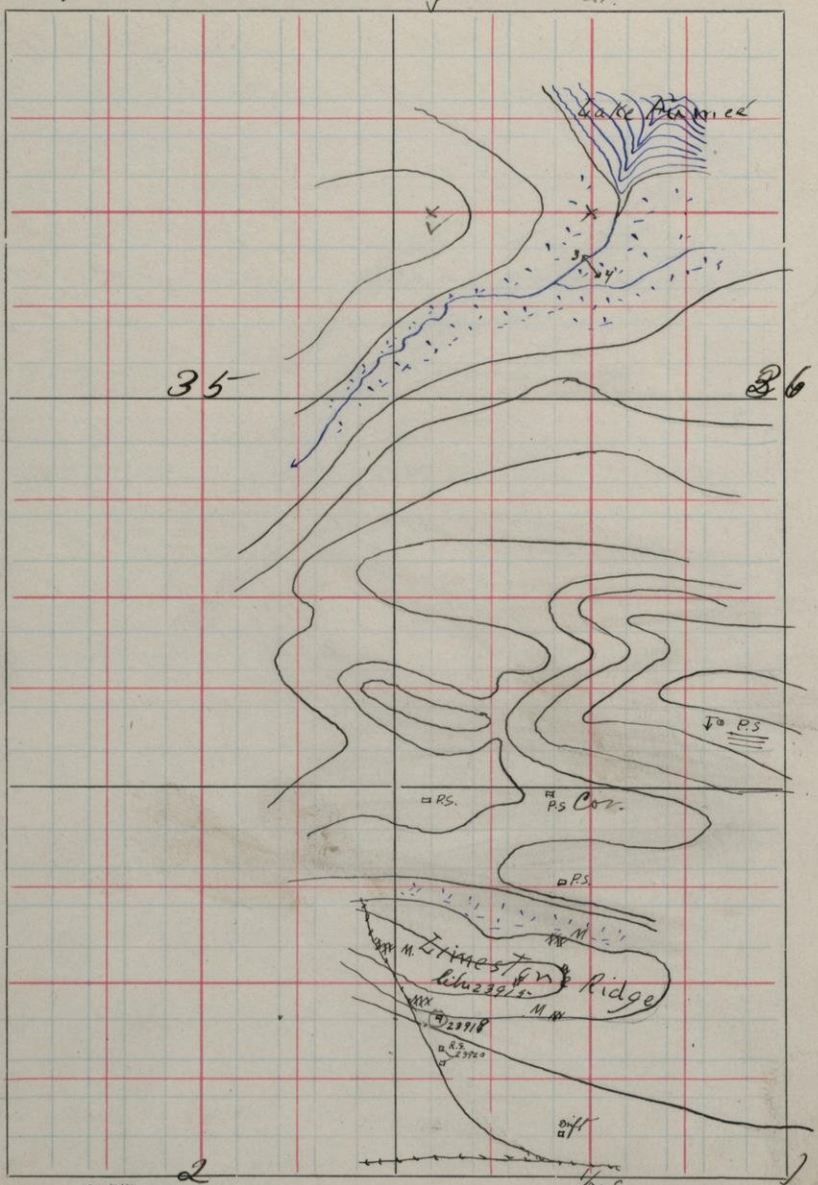
south of a south dipping limestone and was cut out by a bed of soap rock dipping to north.'

23916 N1340 W 0 SE Cor. Sec. 34-40-30
Ledge of grey silicious limestone. So concealed in thick hardwood and covered with moss that am not absolutely sure it is in situ though I believe it is.

23917-8 N1625 W 1975 SE Cor. Sec. 35-40-30
Poorly exposed ledge of calcareous sandstone 23917 and a silicious limestone 23918.
Strike N 70° W, dip 20°.

75

S. 35/36 / 2/1 T. 40/39 R. 30 Cor.

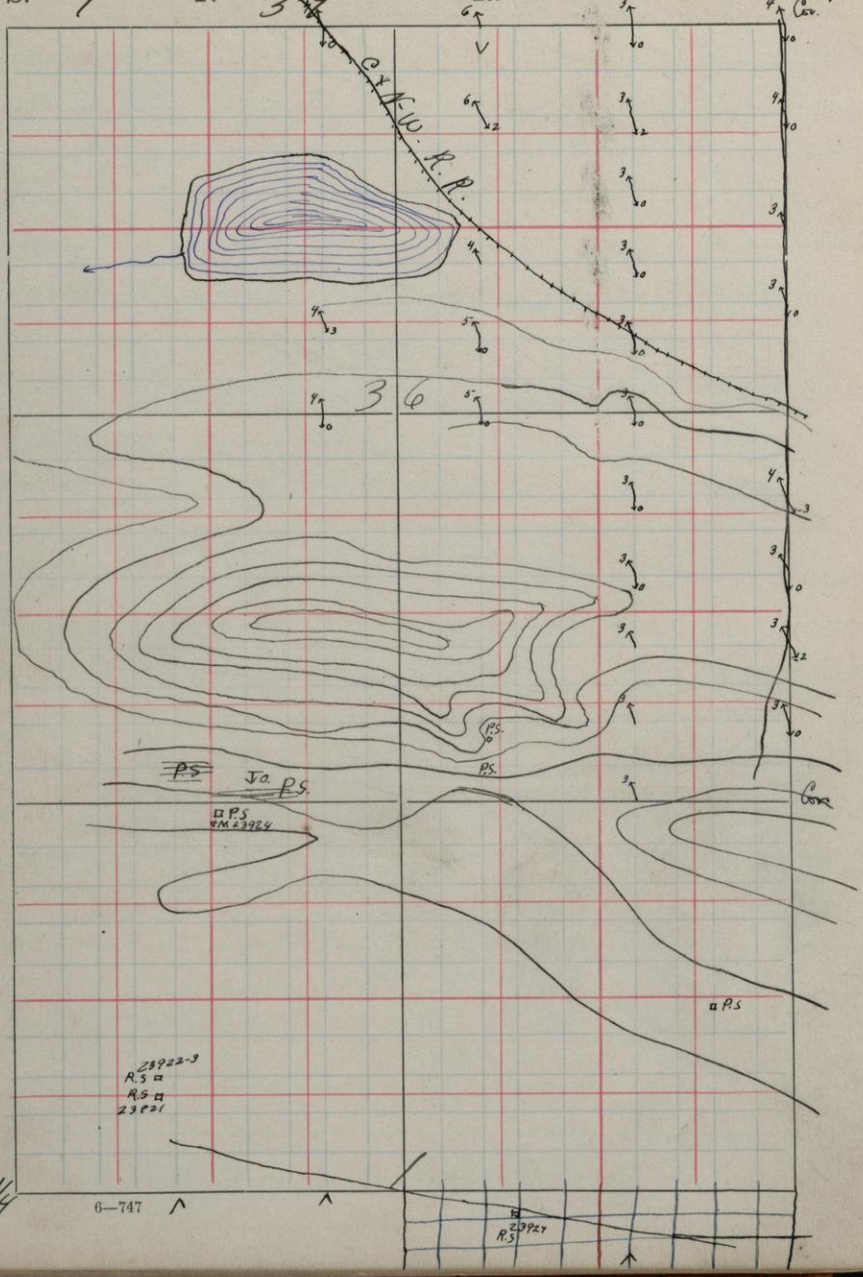


6—747

23919 N1400 W370 SE Cor. Sec. 2-39-30
Pit with greyish black graphitic rock on dump.

23920 N1325 W370 SE Cor. Sec. 2-39-30
Pit with red slate on dump.

77 36 40
NW Cor. S. 1 T. 39 R. 30 NE



1/4

6—747

23921 N 1250 W 1650 SE Cor. Sec. 1-39-30
Test pit with grey talcose slate on dump.

23922-3 N 1300 W 1650 SE Cor. Sec. 1-39-30
Pit with grey slate like 23921 on dump and also with some red slate like drill core 23922. Picked up a number of drill core pieces 23923 which must have come out of this pit. Drill, if it followed shaft opening, went in N at about 60°.

23924 N 1980 W 1475 SE Cor. Sec. 1-39-30
Here a pit has been sunk through Potsdam sandstone and conglomerate and has evidently bottomed in grey silicious limestone 23924

23927 N 925 W 725 SE Cor. Sec. 1-39-30
Pit with red slate on dump.

79

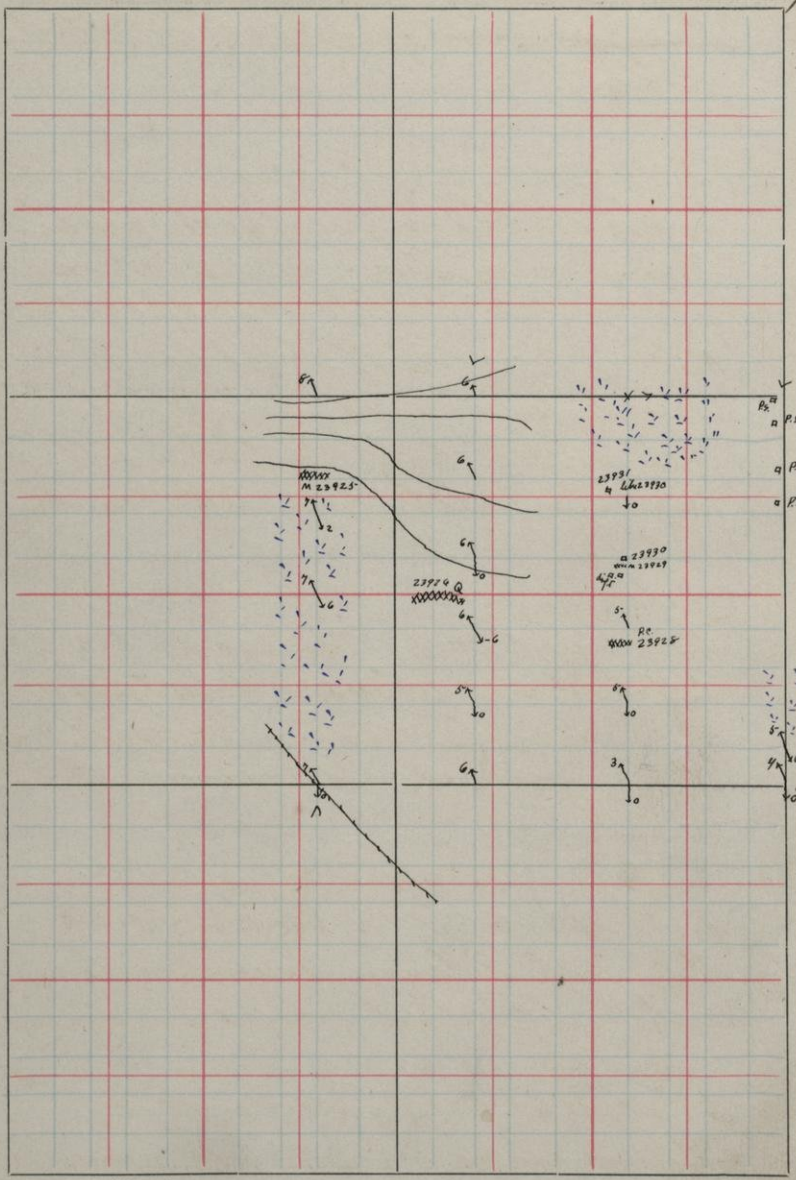
S. 25 T. 40 R. 30

NW Cor.

NE

SW

SE



6—747

23925 N800 W1200 SE Cor. Sec. 25-40-30
Poorly exposed ledge of limestone near edge of swamp.

23926 N500 W900 SE Cor. Sec. 25-40-30
Ledge of coarse quartzite, much like vein quartz in general appearance.

23927 cf. 1177-8

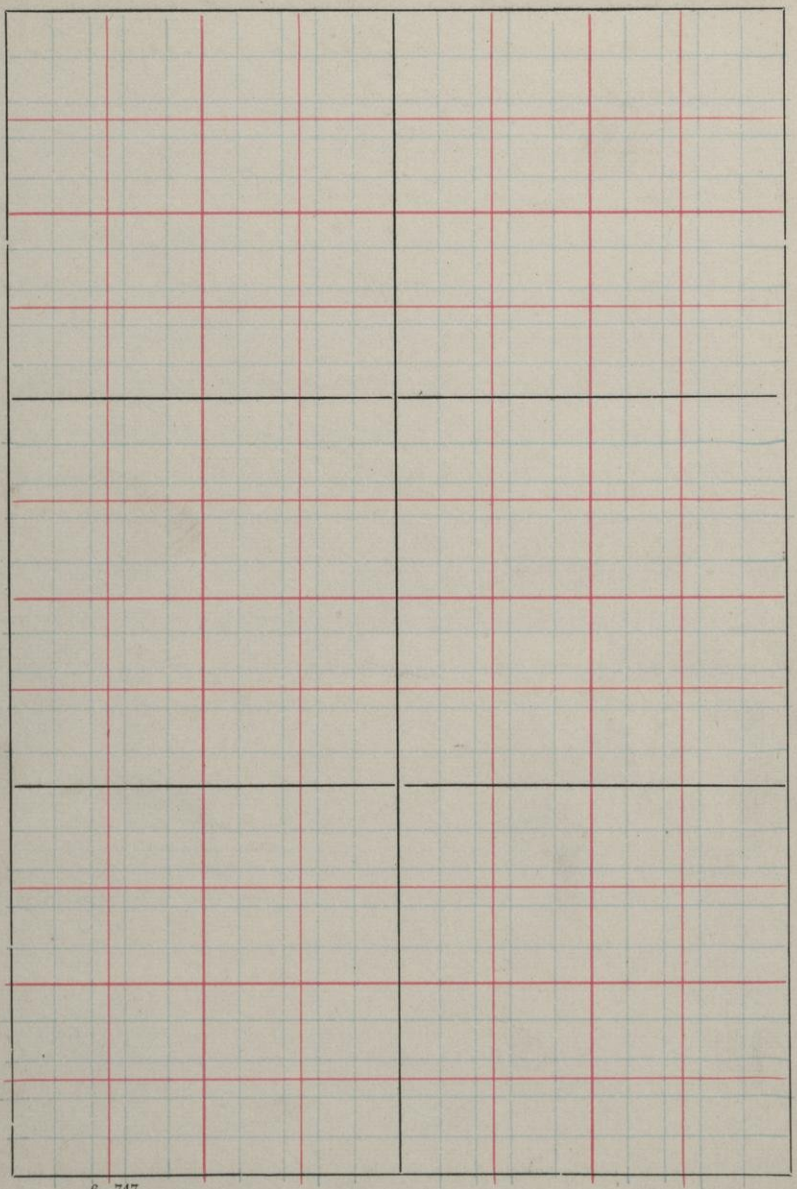
23928 N380 W400 SE Cor. Sec. 25-40-30
Rough knob 20 ft. high of cherty breccia or congl. Pebbles of chert & stone of iron formation also found. Apparently a Potsdam basal congl.

23929 N540 W400 SE Cor. Sec. 25-40-30
Ledge of grey siliceous limestone.
Pit near this shows some on their dump. Others never passed drift judging from dump.

23930 N570 W400 SE Cor. Sec 25-40-30
Pit with Potsdam conglomerate, containing pebbles of excellent iron, ore on dump.

23931 N760 W450 SE Cor Sec. 25-40-30
Lit 23930 Lot of work done here. Deep shaft on which passed through Potsdam sandstone & conglom like 23930

S. T. R.

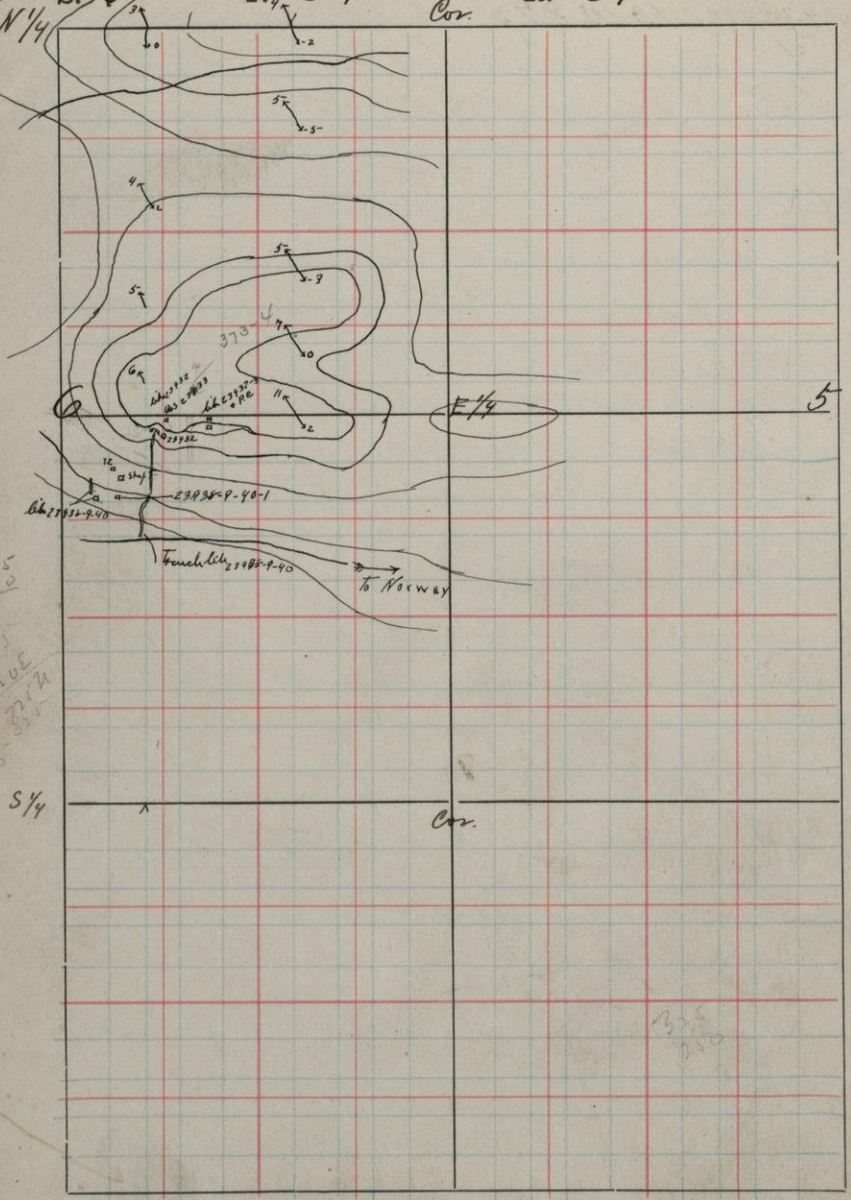


and must have reached a
quartzite (siliceous limestone) 23931
as I find fines on dump.

23932-T 9/11/85-6

83

S. 6 T. 39 R. 29



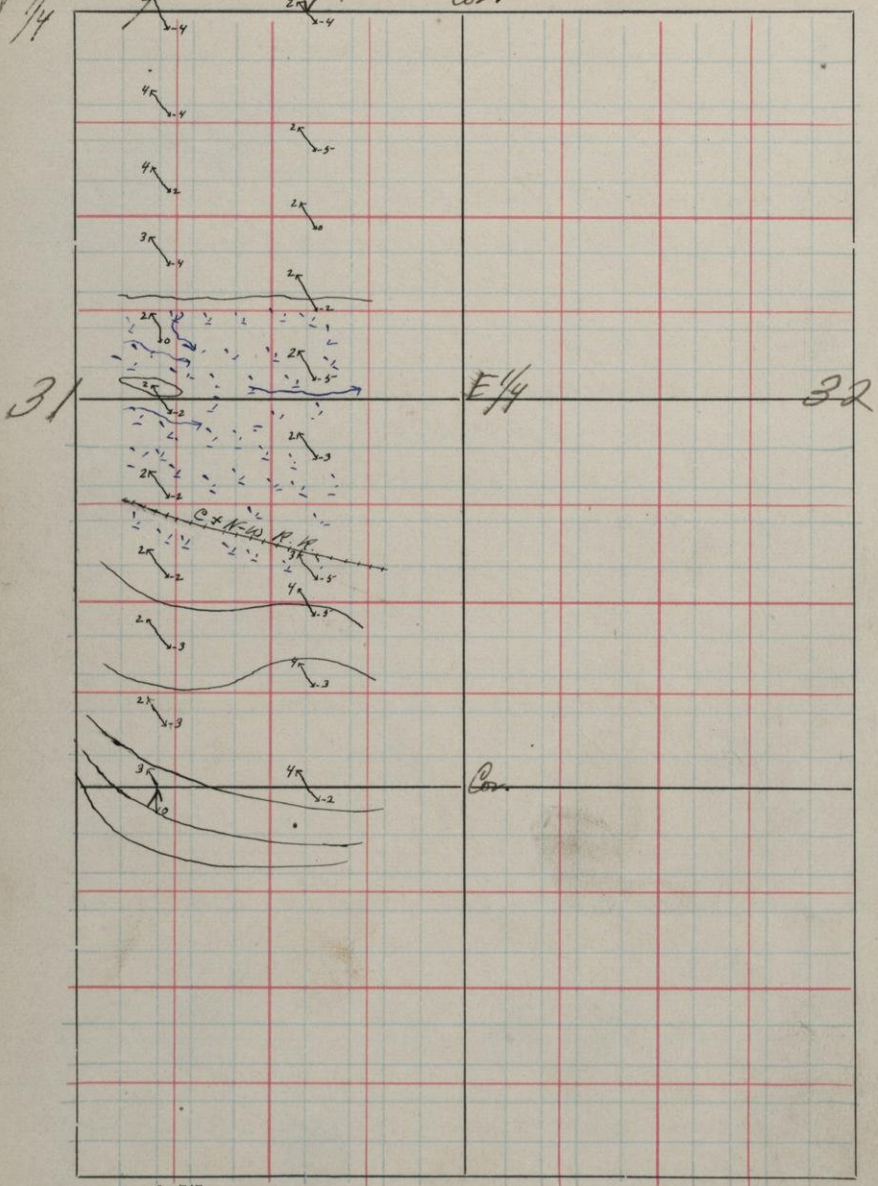
6—747

23938-9-40-41 N 810 W 875 SE Cor. Sec. 6-39-29
Entrance to drift in S. side of hill.
On dump I find red ferruginous
Int. slate 23938 and mixed with it
a more quartzose kind 23939 and
also a banded jaspery slate 23940.
This last specimen shows the
nodular character of the jasper.
Obtained the following information
concerning the rocks from the two
men who have driven the drift. slightly E of N
Drift gone in almost due N 170'.
Passed through 78' of slates 23938+9 then
12' of rock like 23941 and last 47' of lean
ore 23940. Dip is about 60° slightly
78 W of S making soap rock 23941
12 the hanging wall, strike about E-W
47 as well as can be told in drift.
137 Drift has not gone through the
lean ore so don't know what foot
is but presume it will be 23938 or
that followed by 23932. See sketch p.
like 23938-9+40 N 700 W 800 SE Cor. Sec. 6-39-29
There begins here at road side a
shallow trench which has followed
up a gully in hill side and in
which is exposed red slates (23938) &

85

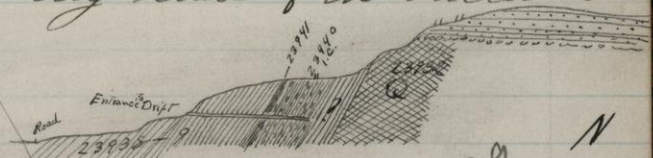
S. 31/32 T. 40 Cor. R. 29

N 1/4



jaspery ore 23940. The surface of the slates is so broken that one can't get strike or dip. The trench ends on top of hill at

23932 N 960 W 750 SE Cor. Sec. 6-39-29 at a ledge of quartzite. This apparently forms foot wall of slates & iron formation. Following profile – not drawn to scale – shows my idea of the succession.



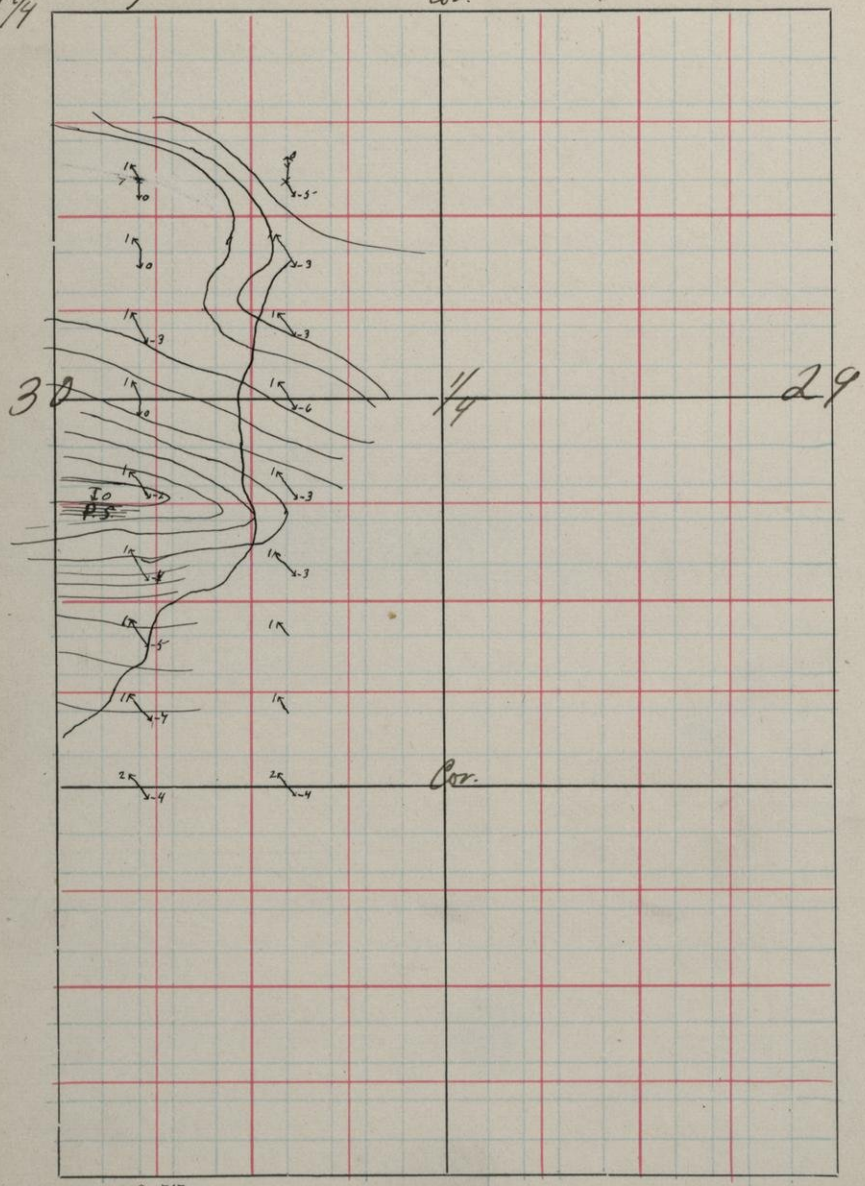
23933 N 980 W 940 SE Cor. Sec. 6-39-29
Pit with quartzite like 23932 and slate 23933 on dumps. Near this SE there are two shafts which have passed through Potsdam sandstone & conglomerate into S + Q like 23933 #2.

23934 N 930 W 420 SE Cor. Sec. 6-39-29
Pit with ferruginous grey slates on dumps.

23935-6-7 N 900 W 420 SE Cor Sec. 6-39-29
Shaft upon whose dumps I find ferruginous slate like 23934 and also a yellowish grey slate 23935.

87
N/4

S. 30/29 T. 40 Cor. R. 29

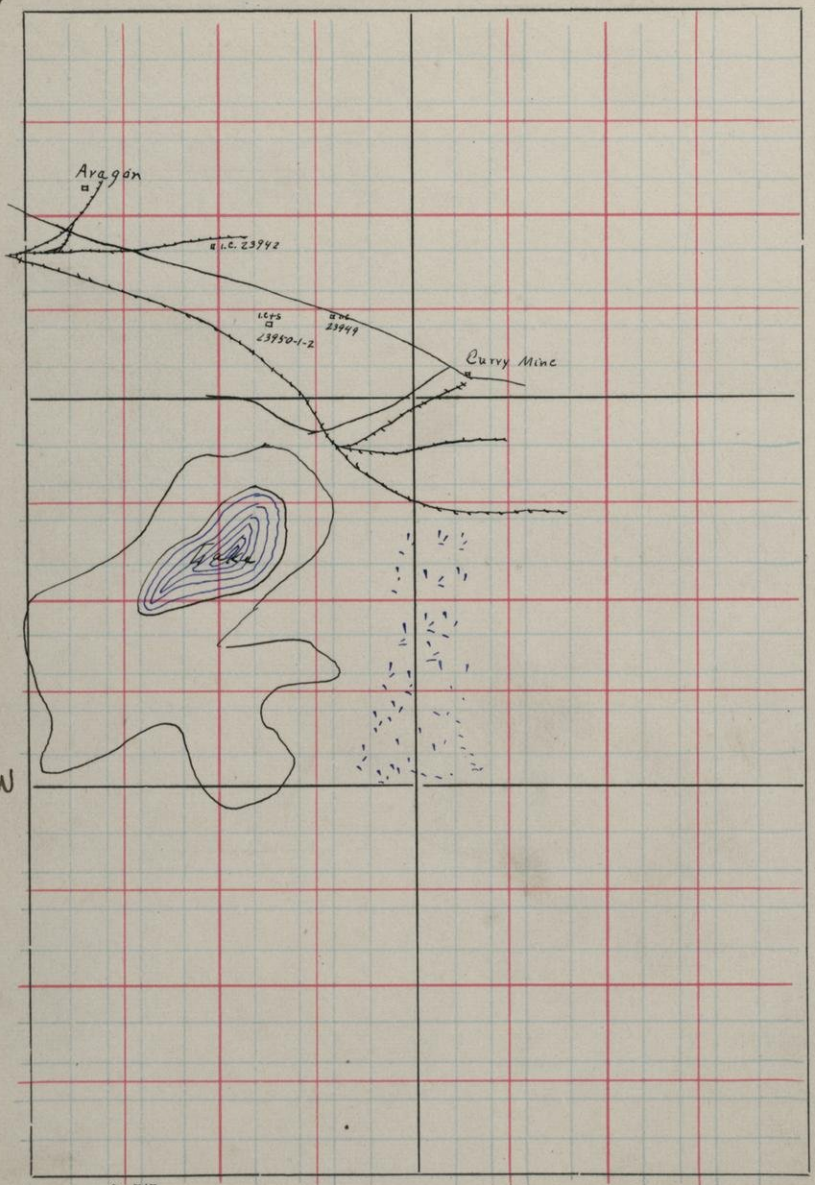


6—747

A slaty iron ore 23936 forms a great part of the dump. It is banded with jasper in places, the jasper frequently has a nodular character. See specimen 23936.
An ore breccia 23937 is mixed with the other rocks in small quantity.

89

NW S. 9 T. 39 R. 29 NE



6—747

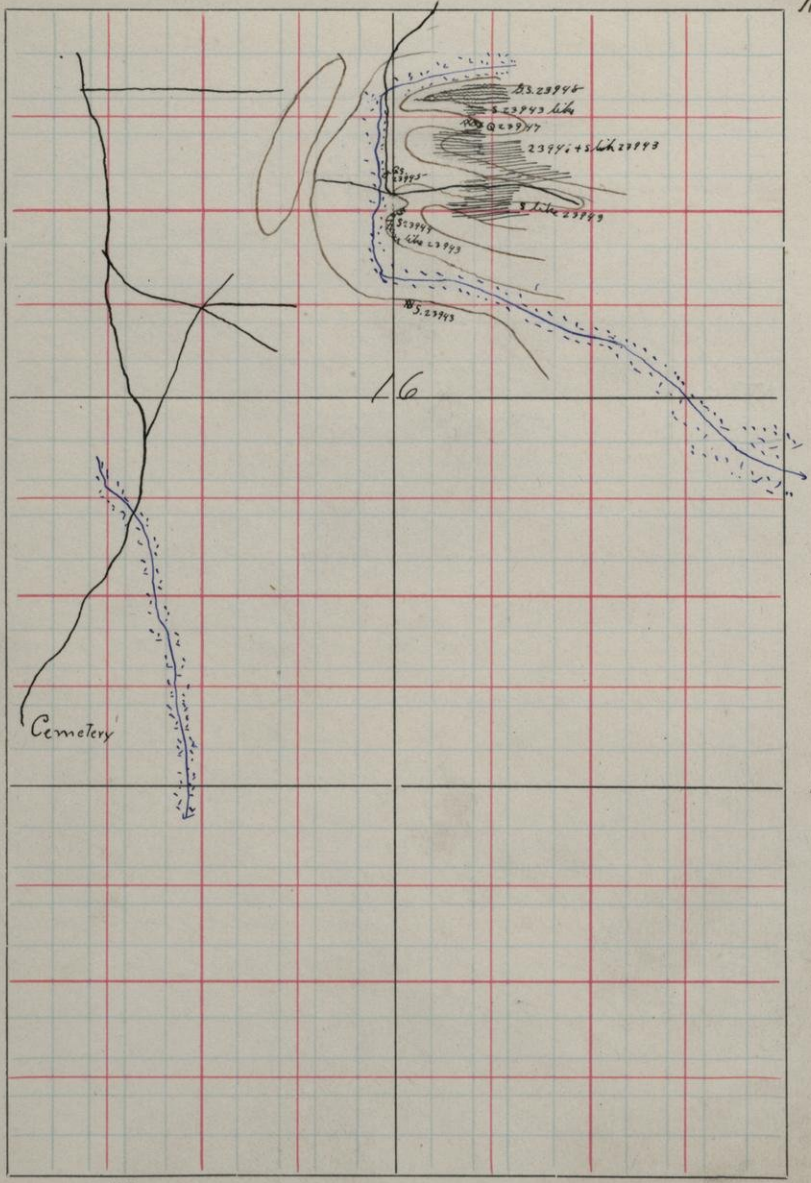
23942 N 1410 W 1500 SE Cor. Sec. 9-39-29
Test pit with jasperoy iron slates on dump.

23949 N 1210 W 1200 SE Cor. Sec. 9-39-29
Pit with lean jasperoy ore on dump.

like 23949 N 1200 W 1360 SE Cor. Sec. 9-39-29
23950-1-2 Shaft with lean jasperoy ore like 23949 on dump. I find with this a ferruginous slate 23950, a green soapy rock 23951 which at times contains a great deal of iron and becomes quite red and a black shiny graphitic slate 23952. Shaft is now abandoned so that I can't learn anything about relations of the rocks to each other. Understand that this property is leased by the Penn Co. so may be able to get some information from Kelly of Vulcan.

91

NW S. 16 T. 39 R. 29 NE



SW SE

6—747

23943 N1250 W950 SE Cor. Sec. 16-39-29
Grey sericitic slates outcrop along side of hill immediately south of stream flowing from S. Hanbury.

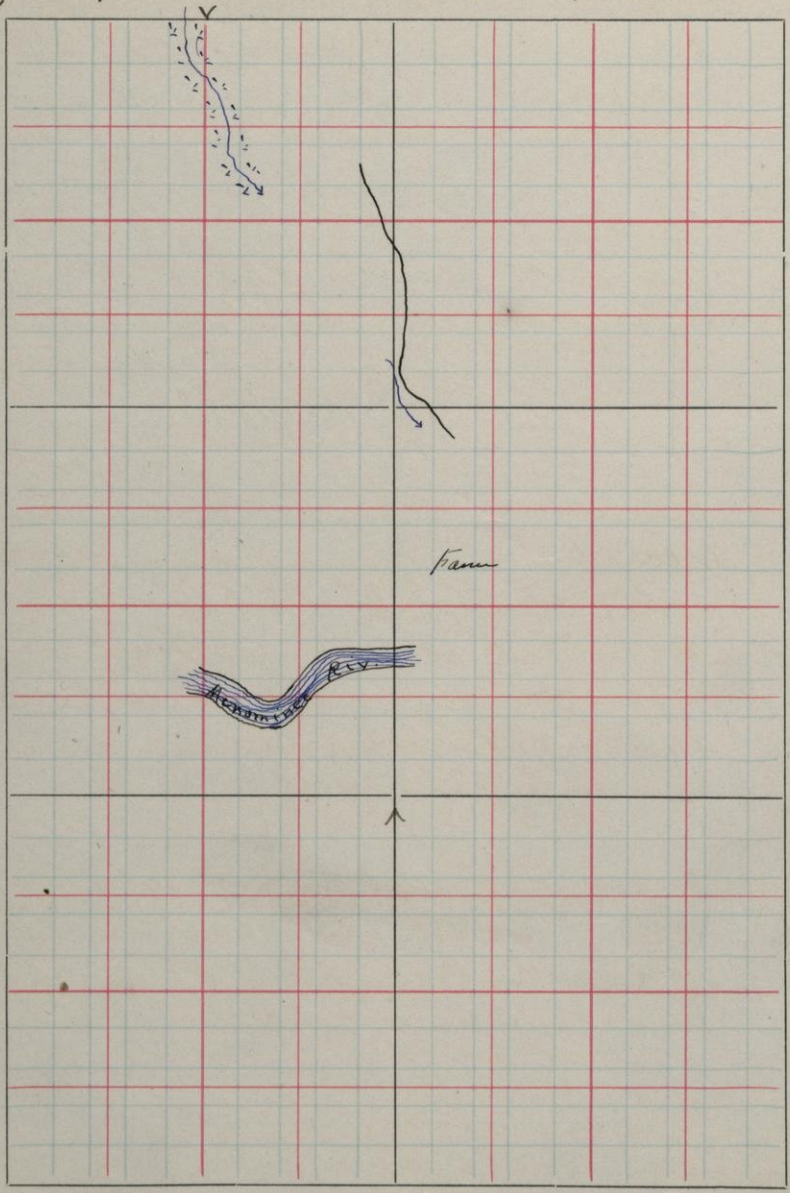
like 23943
23944 N1410 & 1520 W1500 SE Cor. Sec. 16-39-29.
Between above points there are numerous ledges practically continuous – of slates like 23943. At times they become red & grey mottled as in 23944. Badly plicated so that can't get strike or dip. Schistosity, possibly = bedding, strikes N 75° W & dips 70° S.

23945 N1600 W1025 SE Cor. Sec. 16-39-29
Here near edge of stream are found large angular pieces of schistose greenstone probably in place just below surface.

23946 N1575 W850 SE Cor. Sec. 16-39-29
Exposure in road of grey slates like 23943. Strike of schistosity – is it here not ∥ with bedding? – N 85° W, dip 80° S. In a few places where cross sections of slates could be seen they were marked by bands of material of varying resistance to weathering. Probably bedding if they were they showed a folding in

93

NW S. 21 T. 39 R. 29 NE



SW SE

6—747

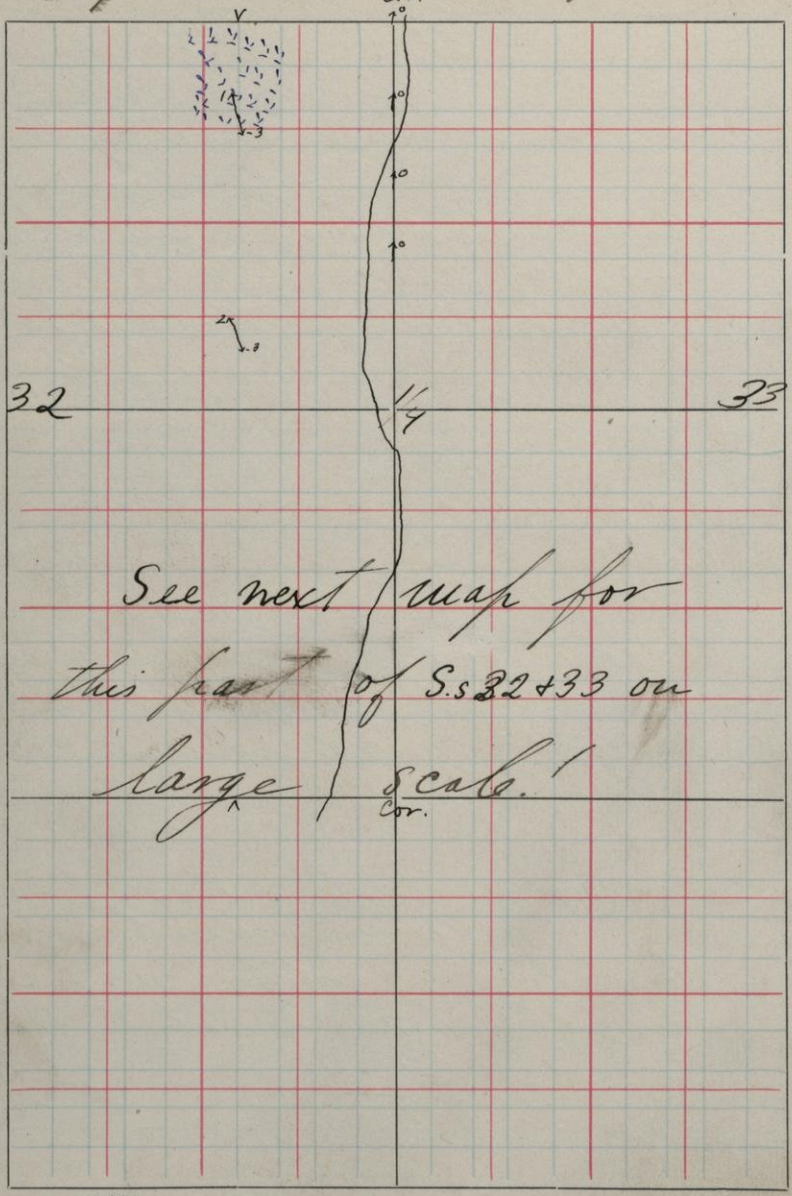
E-W folds with pitch of axis about 45° to E. If closely folded as they appear to be the strike and relative unity might well agree on the limbs of the folds. Leaving the slates in the valley we ascend ridge formed of slates like 23943 and a calcareous slate or slaty limestone 23946. Here the strike was about E-W, dip 85-20° S.

23947 N 1740 W 800 SE Cor. Sec. 16-39-29
Occupying the E end of a small valley with slate ridge 23946 to S. + greenstone 23948 ridge to N & also slate between it and greenstone I find a badly fractured exposure of calcareous quartzite 23947.

23948 N 1800 W 850 SE Cor. Sec. 16-39-29.
Top of ridge of greenstone whose descending which to N we reach swamp which extends to L. Hanbury.

95

S. 32/33 T. 40 R. 29



6—747

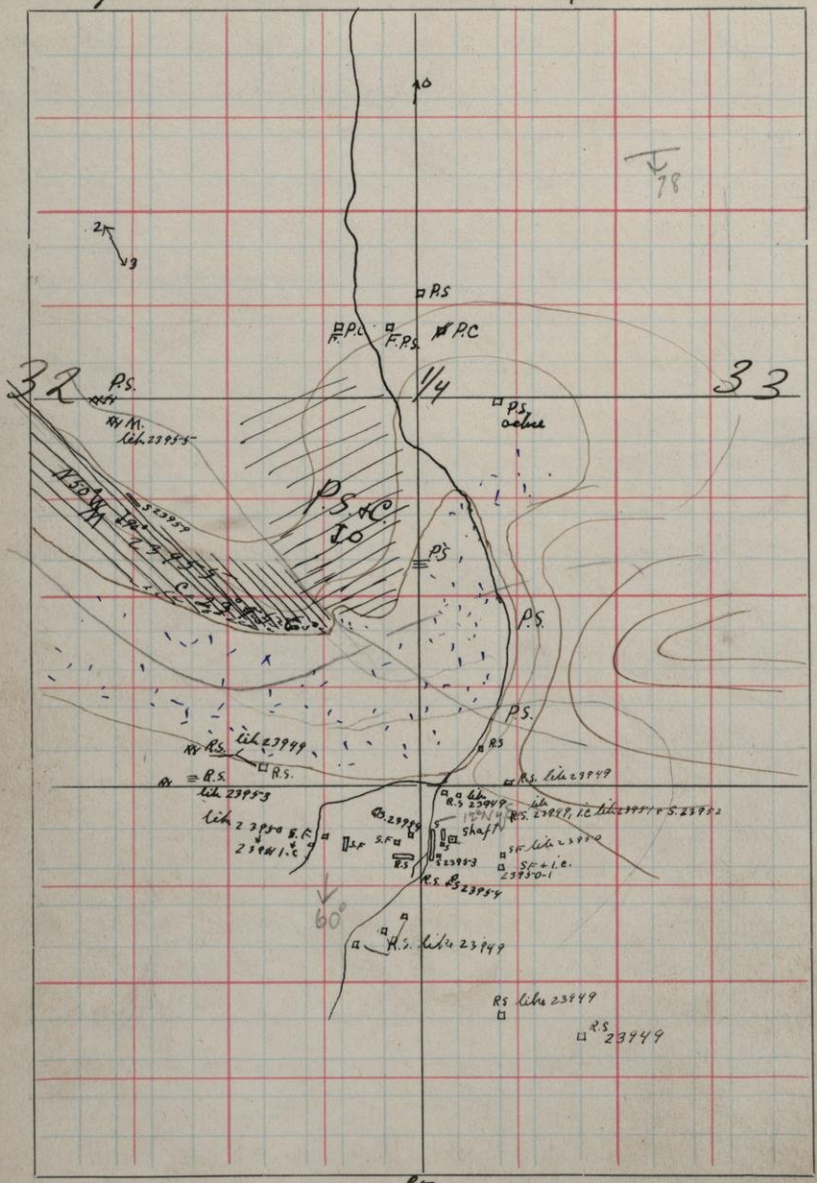
23949A N 150 W 1800 SE Cor. Sec. 33-40-29
Test pit with red slate on dump.

23950-1A N 400 W 1900 SE Cor. Sec. 33-40-29.
Shaft with ferruginous slate 23950A on dump and also a quartzitic ore 23951A

23952A N 440 W 1960 SE Cor. Sec. 33-40-29.
Near here there is a nest of test pits, trenches & shafts in which various slates have been struck right at surface. Pits are located on plat & specimen number attached to each. This location is of a shaft with a large dump upon which there is red slate like 23949A slate like 23950A & ore like 23951A and a grey slate like 23952A to the west of shaft occur most of the pits showing usually red slates on 23953-4 dump. Associated with these red slates there is a black graphitic slate 23953. Another pits shows quartzite 23954 bedded with red slates. Owing to broken character of surface strike & dip can not be determined accurately. In general strike is E-W.
Continuing north we cross wagon road shortly after leaving pits and then

97

S. 32/33 T. 40 R. 29



6—747

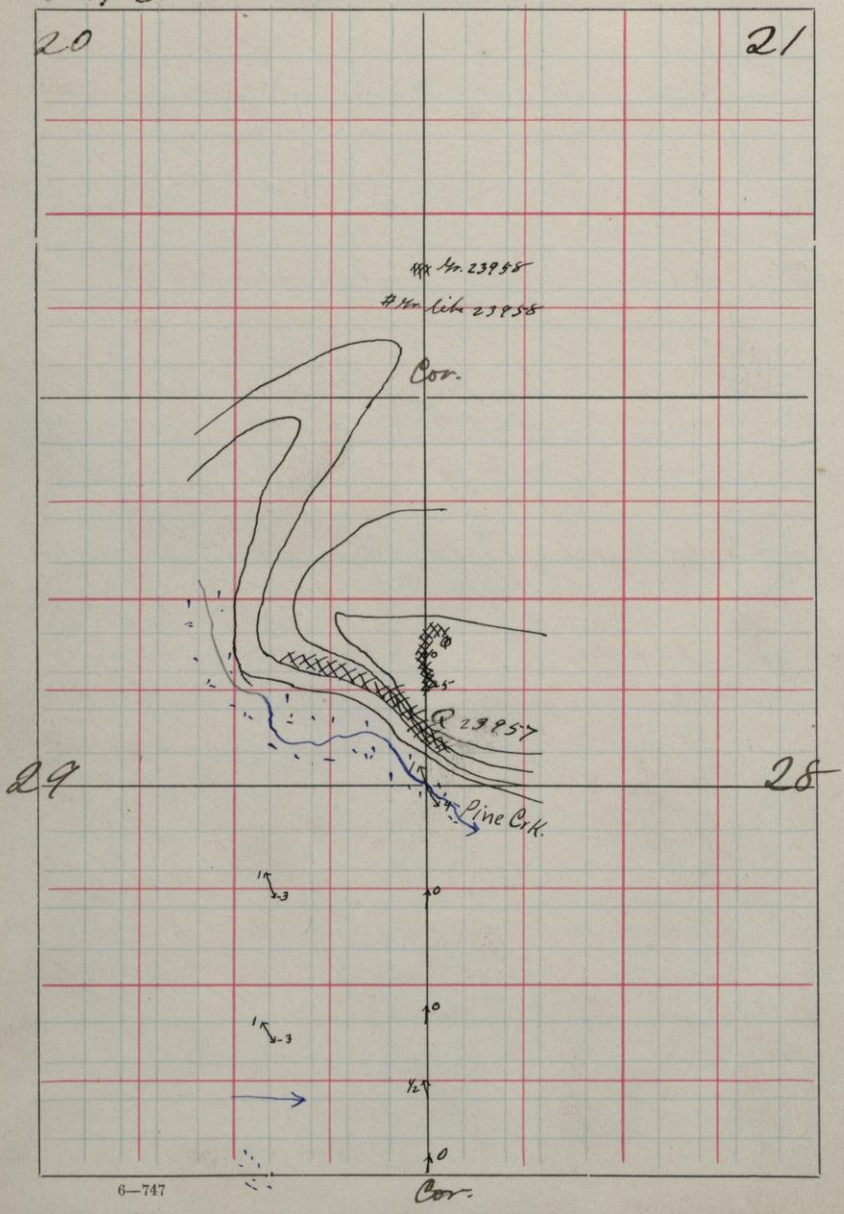
Scale 8" = 1 Mile

Cor.

outer valley which is closed on the E by a high abrupt hill capped with Potsdam overlying the Huronian. Several pits have been sunk in this sandstone and a good deal of ochre brought up.

23955-6 N700 W200 SE cor. Sec. 32-40-29. Crossing the valley we find along the section line on the N side the Potsdam represented by beds of cherty conglomerate overlaid by sandstone. Going west along face of hill the capping of Potsdam gets thinner and here and there ledges of a siliceous grey limestone 23957 stand up above it. Limestone increases in quantity as we continue westward. The inequalities of the pre-Potsdam land surface are well shown in places where one sees small valley in the marble filled with Potsdam and the Potsdam lying against the face of limestone cliffs. This limestone along its southern edge is bordered by a fine

99 20/21
S. 29/28 T. 40 R. 29



6—747

23956.
Conglomerate of limestone fragments. After careful study it seems to me to represent an intra-formational conglomerate rather than a long time interval. Strike N 50° W, dip 90°

23959 N 775 W 375 S E Cor. Sec. 32-40-29
Quartz schist interbedded with the limestone and showing same strike N 50° W, dip 90°

23960 N 950 W 150 S E Cor. Sec. 32-40-29
Specimen of the cherty Potsdam conglomerate which covers the above limestone.

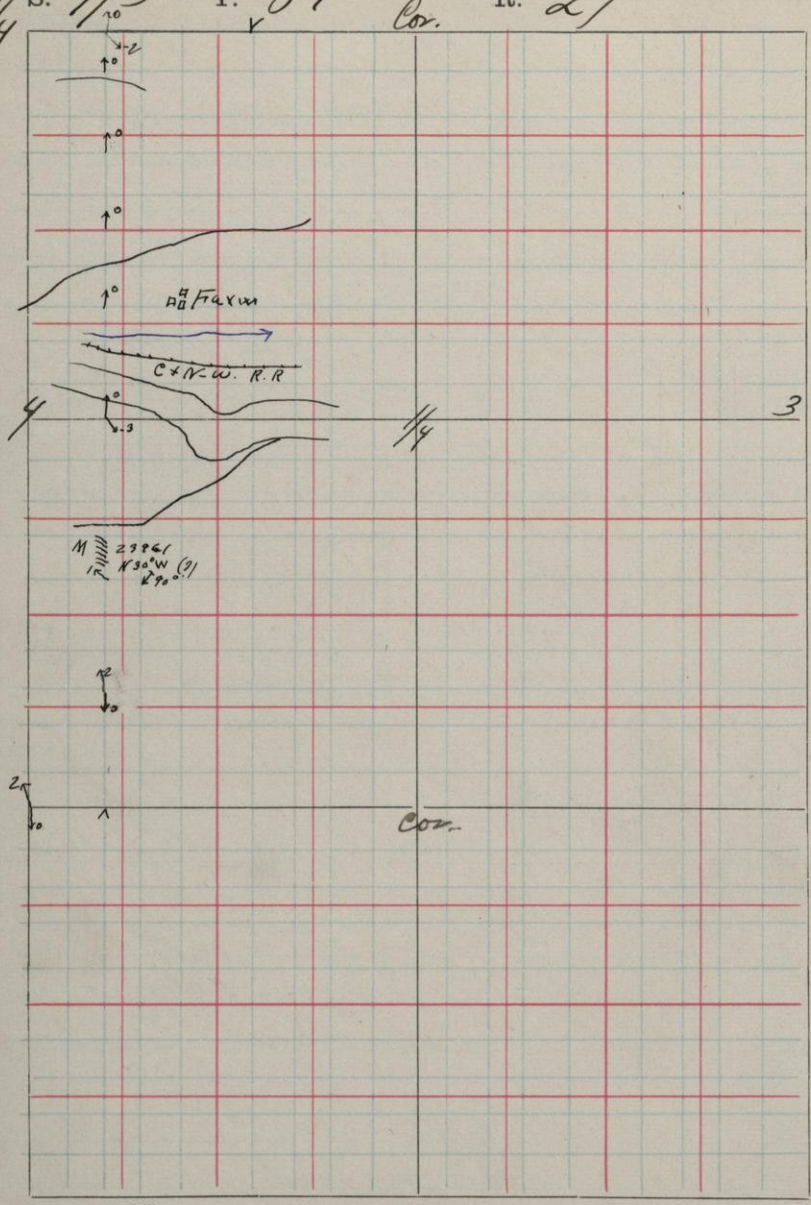
23957 N 1075 W 0 S E Cor. Sec. 29-40-29
White & purplish quartzite forming high cliffs on S side of hill just across i.e. on N side of Pine Creek. Can't get strike or dip. Same quartzite that has formed cliffs on north & E. bank of Pine Creek almost from its source.

23958 N 350 W 0 S E Cor. Sec. 20-40-29
Ledge of fine grained grey granite.

9 101

S. 4/3 T. 39 Cor. R. 29

1/4

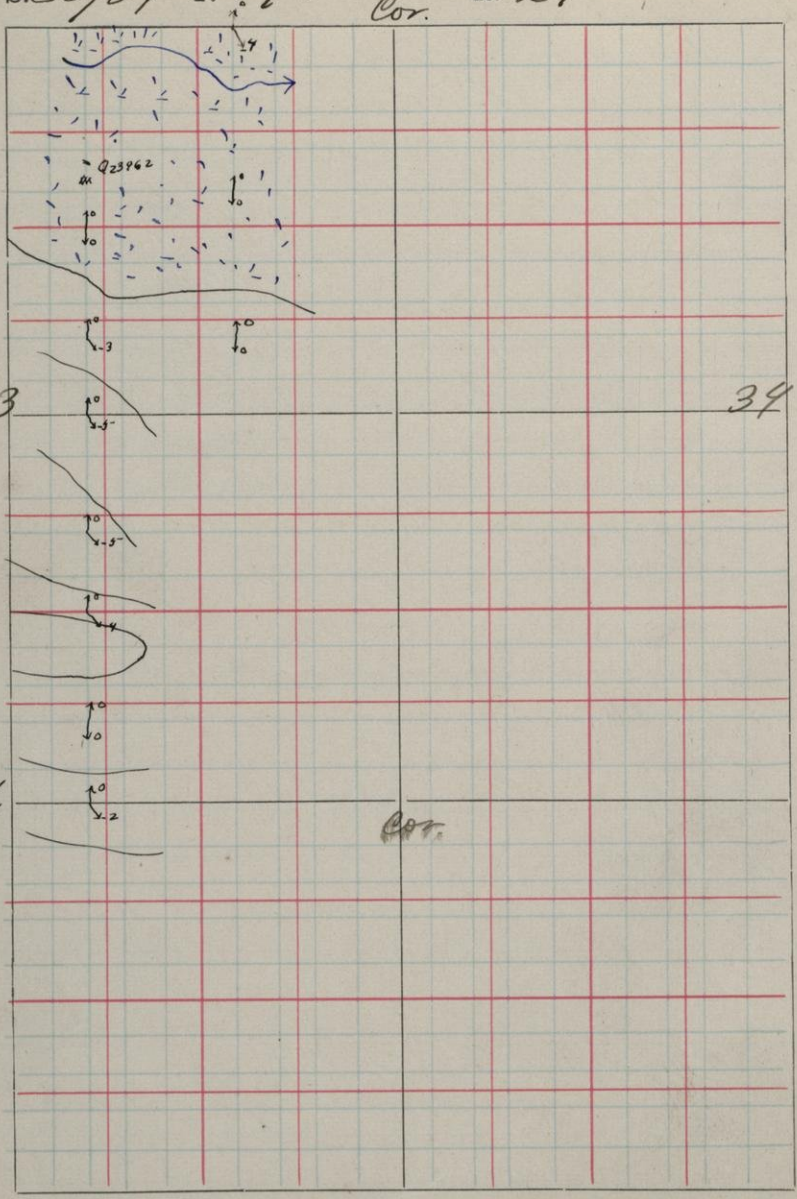


6—747

23961 N 660 W 800 SE Cor. Sec. 4-38-28
Ledge of white silicious lime-
stone. If cherty bands indicate
bedding their strike is N30°W, dip 20°

103

S. 33/34 T. N. 40 Cor. R. 29

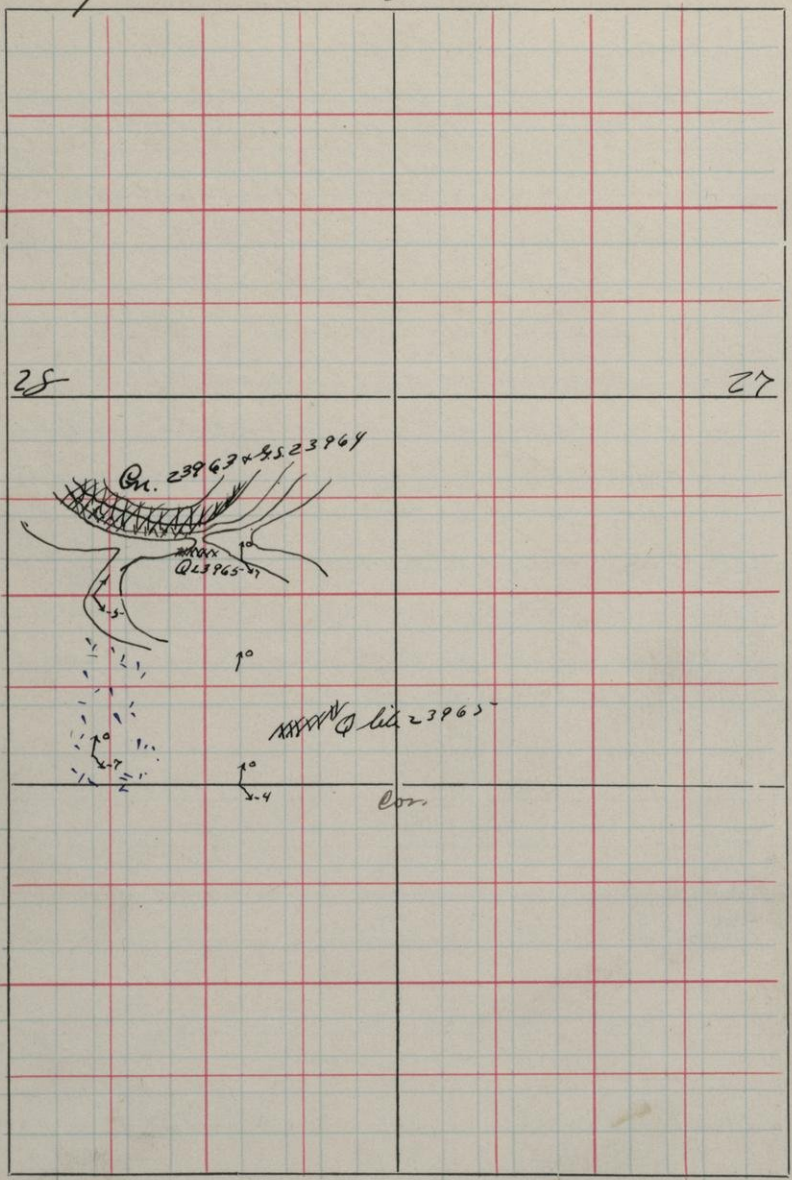


6—747

23962 N1620 + 80 W800 SE Cor. Sec. 33-40-29
Two ledges of very friable quartzite, apparently cement rather calcareous, with some more shaly layers. Can not be sure of strike and dip but it seems to be about E-W with vertical 80° dip. This may represent the quartzose limestone found near Hamilton & Merryman Camp 6. near head of Pine Creek. If that is so then Pine creek has naturally eroded its channel in it leaving the quartzite bluffs to N & E and has retained its uniform proximity to the quartzite ridge.

105

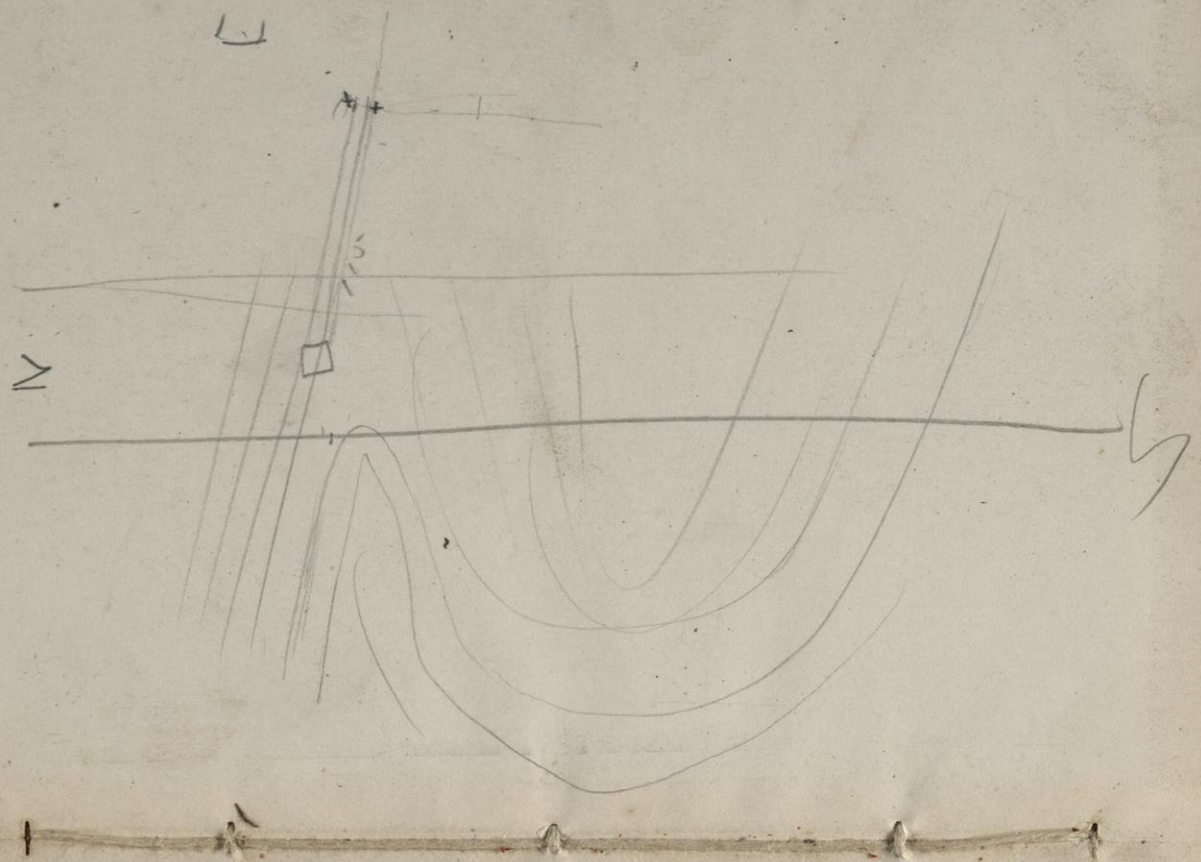
S. 28/27 T. 40 Cor. R. 29



6—747

23963-4 N 700 W 800 SE Cor. Sec. 28-40-29
Foot of perpendicular cliff 75' high of gneiss 23963 cut by dykes of a micaceous rock 23964, squeezed diabase or diorite perhaps. The dykes vary from 3' to 4" in width, and dwindle down at ends until they disappear.

23965 N 625 W 560 SE Cor. Sec. 28-40-29
N side of hill with quartz showing. Granite is just to north across narrow valley. Valley must follow line of contact.



W of graphite slate is quartzite and slate and there [illegible] at Shaft marked by Clements a slate like Hanbury

The cut is 30 S. and 63 W of the graph[ite]

The [illegible] [illegible] 5 of [illegible] looks like Hanbury Sl.

Kearns is pretty [illegible] west of the graphite hole and [illegible] has Hanbury slate

Strike of [illegible] [illegible] N 5 of E. Dip S. 80°.