# Crystal Falls region, Michigan: [specimens] 32606-32689. No. 293 [1892]

Merriam, W. N.
[s.l.]: [s.n.], [1892]

# U. S. GEOLOGICAL SURVEY

## FIELD SECTION BOOK

293

Crystal Falls Region
Michigan.
H. N. Merriam

32606-32689

# 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.

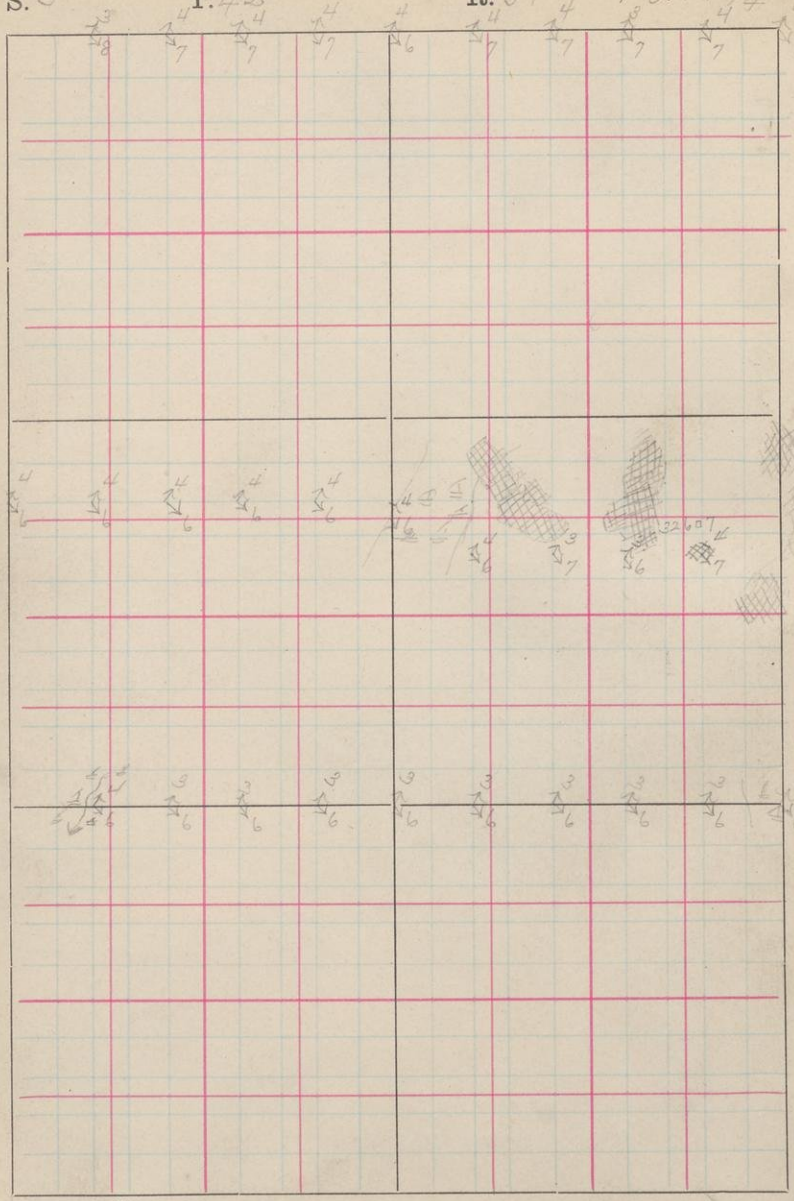
2. On the right-hand page place the notes descriptive of the exposures. Begin in each case with the number of the specimen, placing the number on the left-hand side of the red line, after which give in order on the right of the same red line the position of the ledges as reckoned in paces from the southeast 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.

S. 3 T. 42 R. 31 N. M. 4



6—747

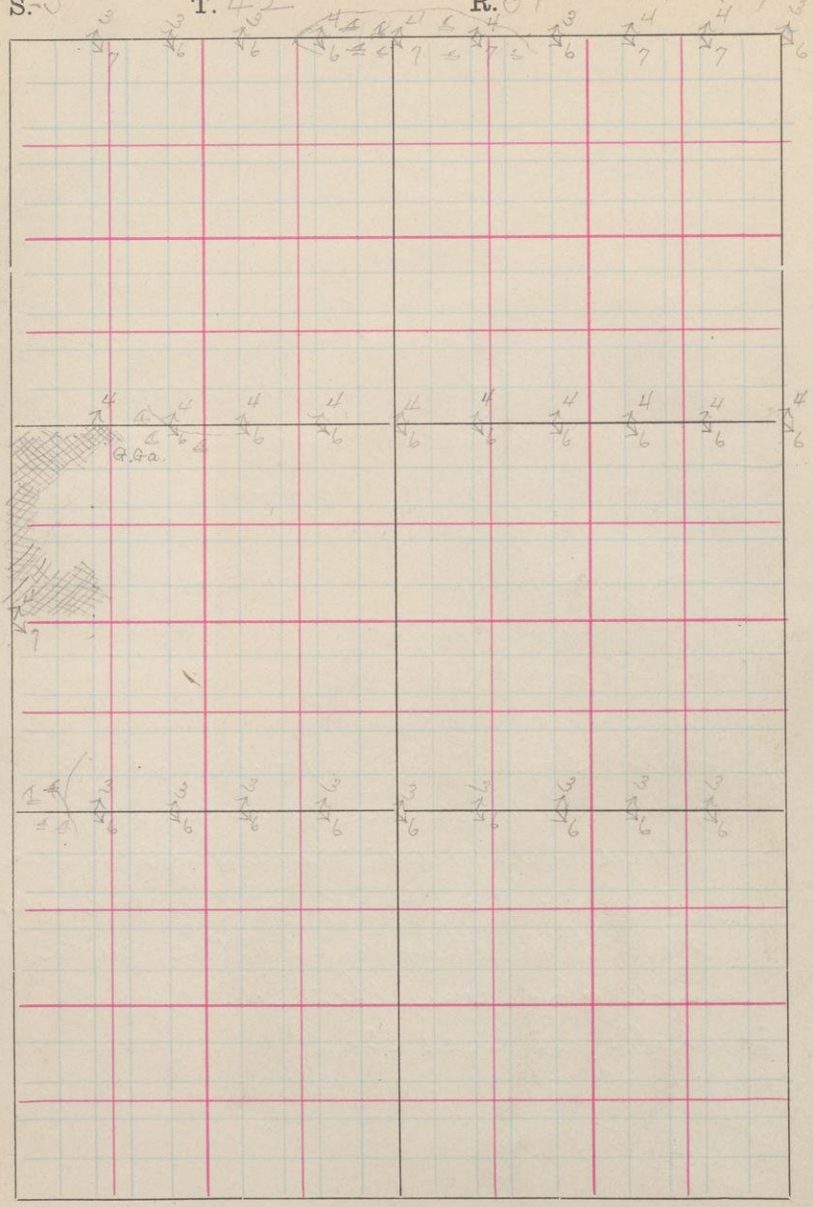
32606 900 N. 1470 W. S.E. 3-42-31
G.D. Large ledges of a coarse greenstone gabbro. It is like the gabbros to the west and north and I think is of the same age

32607 1070 W. 1375 N. S.E. 3-42-31
G.D. From the south side of the same series of ridges. The rock is finer grained and darker looking more like a diabase

32608 400 N. 890 W. S.E. 31-43-31
G.D. A large ledge of greenstone similar to those east of the river

32609 800 N. 300 W. S.E. 31-43-31
G.D. Coarse greenstone diabase
There are quite prominent exposures of this coarse rock in the vicinity It is like that east of the river and also near the Gladden shafts in Sec. 32

S. 3 T. 43 R. 31 N. E. 1/4




6—747

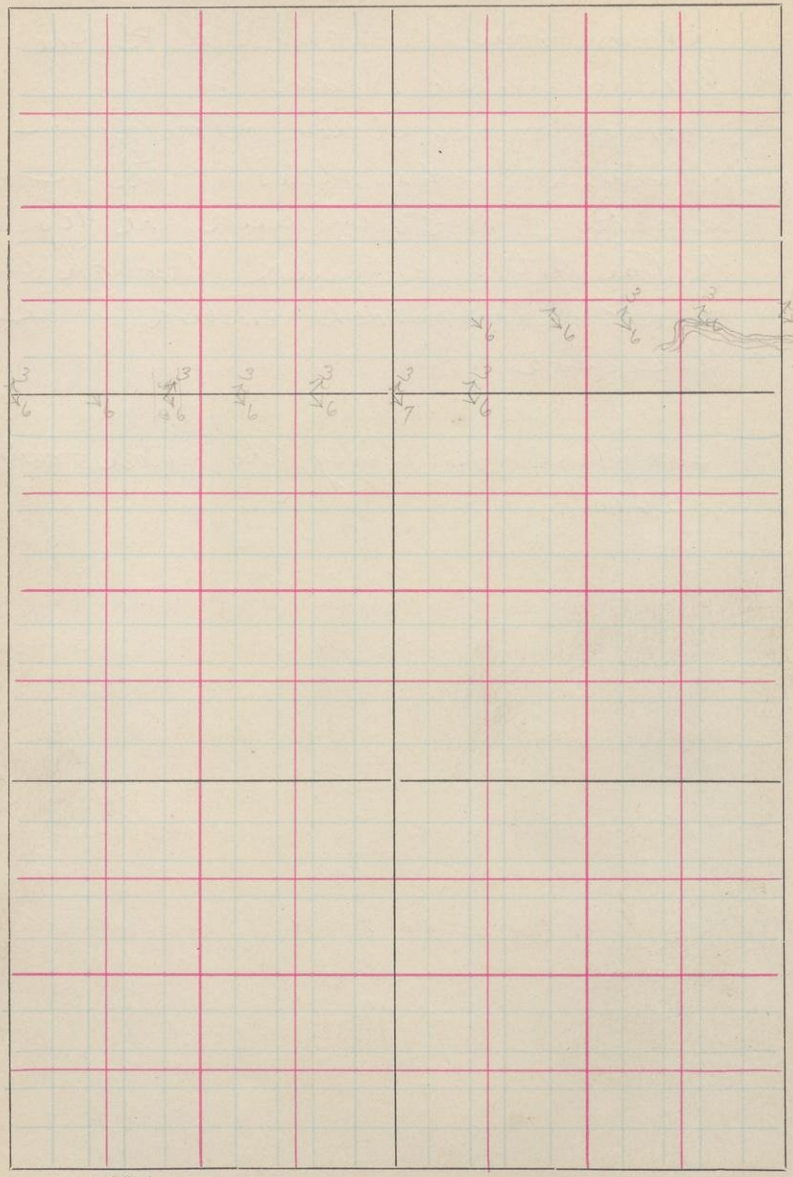
32610 R. S2. 1920 N, 1080 W P.E. 5-42-31

Slates from the west side of the Michigamme River.

These same slates follow down stream for 600 steps with a strike of N. 55 W. and the dip to the S.W. I think though the rock is too much tumbled to be positive.

32611 R. S2 300 steps S.E along the river from 32610

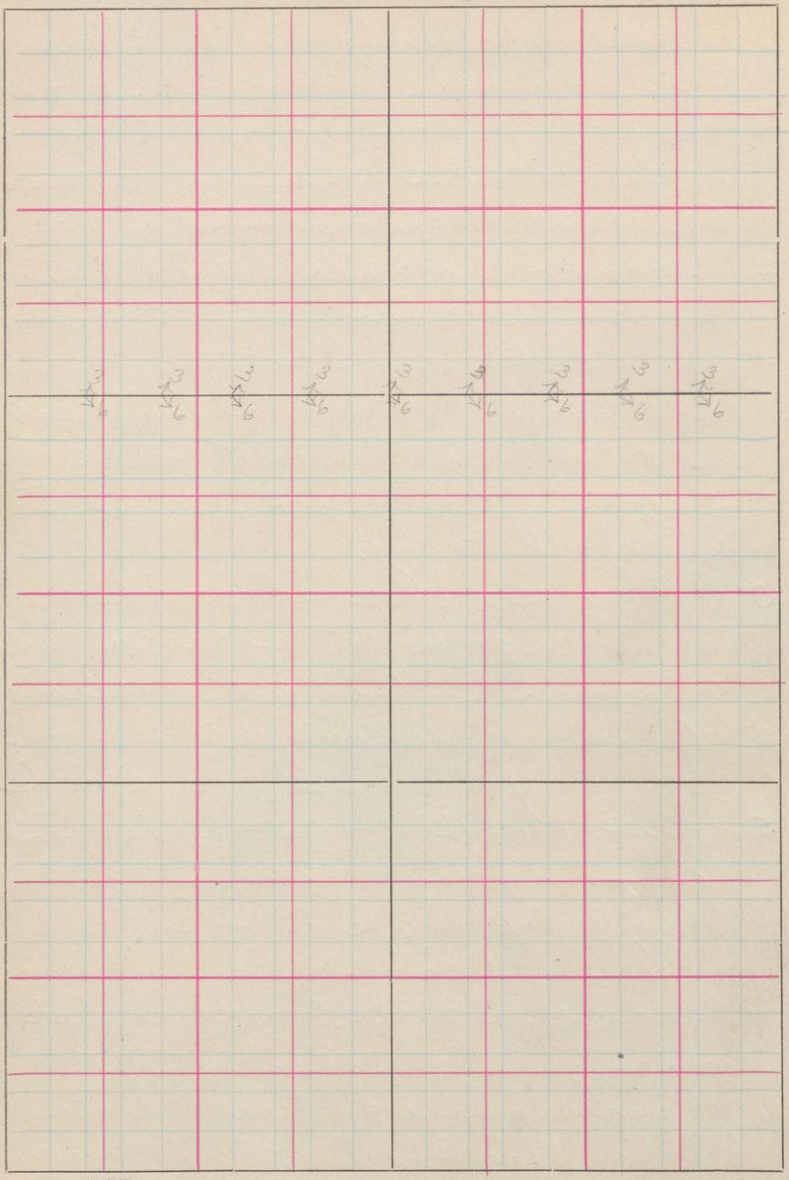
S. 3 T. 42 R. 31 N. E 1/4



6—747

32612 The slate similar to the specimen
taken by Bayley on the shore in
Sec. 9 42-3E show continuously
down the river for about ½ a
mile or near where it crosses
the east section line of 16
32612 a short distance below this
point the green schist shown
in 32613 is exposed for a
number of slips on the east
side and has the bed of the
stream The strike seems to
be E & W. (Mag.).
32613 About 200 slips above the bend
to the east in 15 a mica schist
is exposed This rock varies into
32614 almost a pure quartzite in some
of the layers and to a black
32615 fine black mica slate in
others The strike is 18° N. of W.
(Mag.) dip high to N.E.
The schist contains numerous
lenses of a fine grained lucent
quartz
32616 A coal seam of these schistose
rocks This seam occurs quite
frequently in narrow bands

S. 3 T. 42 R. 31 N. M. 14



6—747

32619 A few feet south of 32616. a more compact quartzose band only a few feet in width. In contact with this on the south occurs the very schistose contorted
32688 phase shown in 32618

32619 Another spec. of the coarse phase from the southwest side of the river at the bend

32620 from the south side of the river in the east and west length in Sec. 15

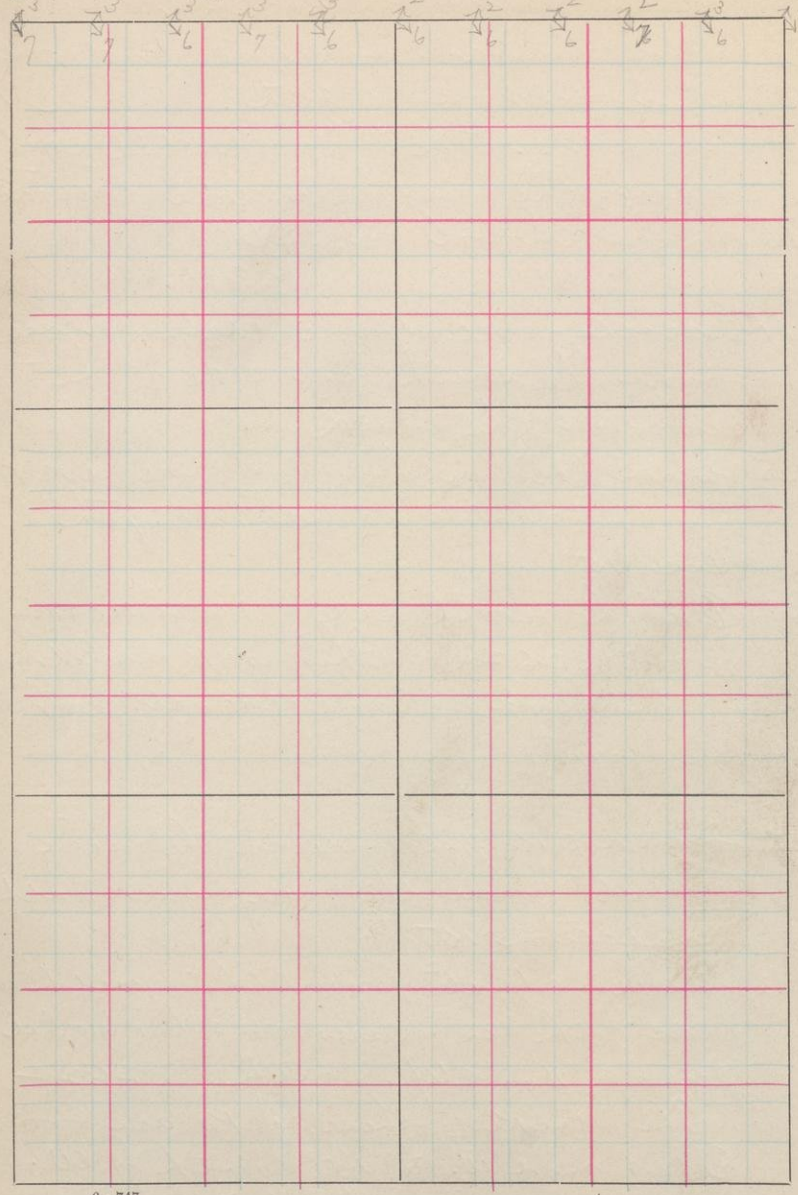
32621 On the north side of river across from 32620 This rock splits in large slabs several feet in length

32622 From a dike 4 ft wide in the mica schists where the river turns south in section 15

32623 Mica schist from the south side of the exposure at this point, perhaps 40 or 50 ft. south of 32622

The strike of these rocks are from East and W. to 15° south of W. and the dip is high to the S.

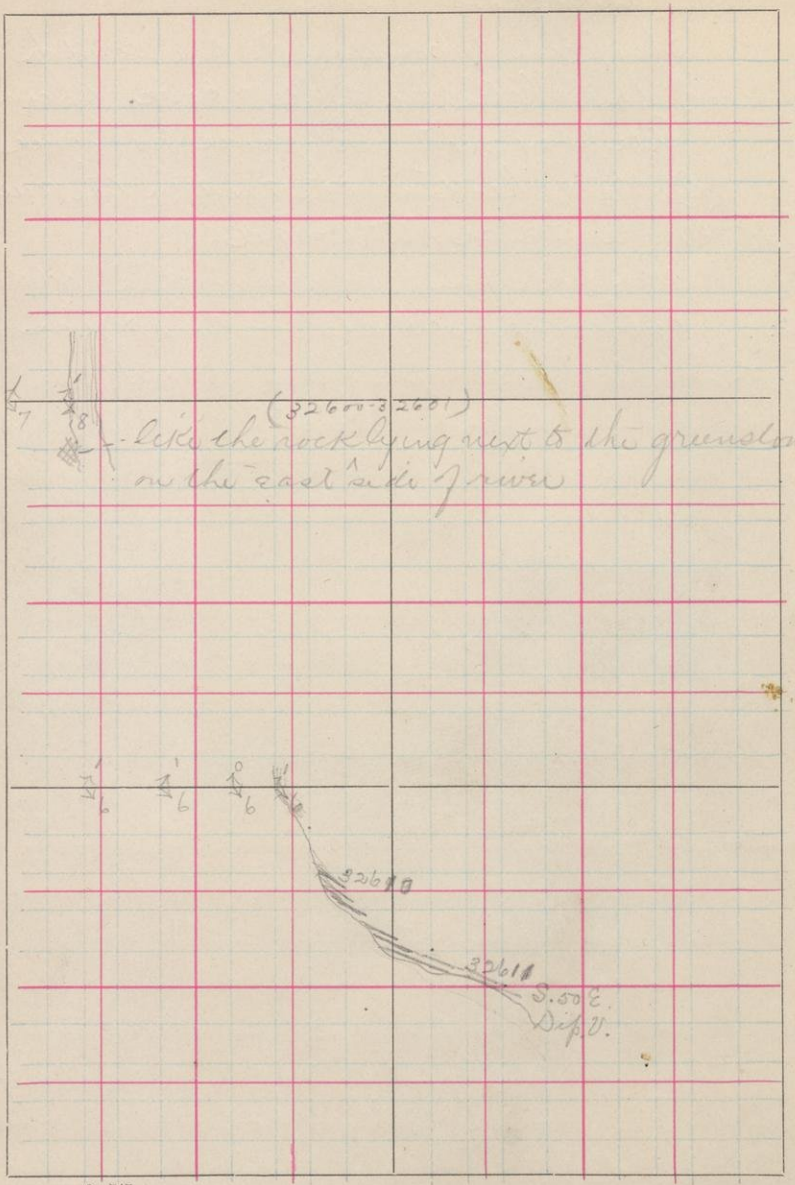
S. 9 T. 42 R. 31 N. E 44



6—747

clear across them
They seem to come in to the south
of the slates and lie above them
Are they not the same as some
of the schists to the east in the center
of the Field Mt. range
They are the youngest of the bedded
slates and schists in this region

S. 32 T. 48 R. 31 A. H. 1/21



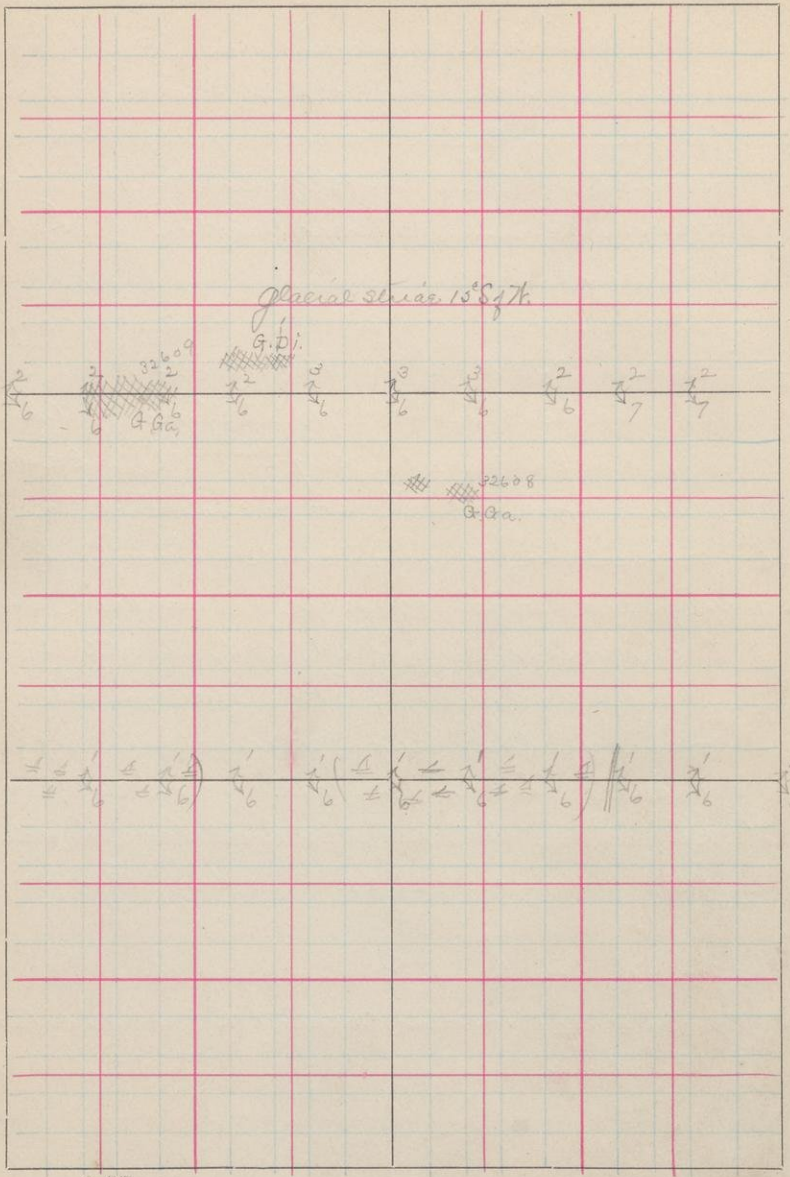

6—747

32624 1100 W. 870 N. S.E. 5-42-31
Q. A schistose greenstone, that looks much like the older flows. It is an isolated knob lying just south of the road that runs to the Michigamme river north of Lake Maly

32625 1400 W. 950 N. S.E. 1-42-32
Q.C., Sp A large knob of greenstone with spheroidal weathering on the east ends from which it passes into a
32626 greenstone conglomerate which is
32627 exposed for a number of hundred steps
Q.C. to the west This rock in all its phases is exactly like some which occur in the large greenstone cong'l. area to the north east. It contains
32628 numerous pebbles of amygdaloid like
Q.C. that shown in 32628. (See also Bayley)

32629 860 W. 640 N. S.E. 6-42-31
Q.P. A very coarse grained greenstone (diabase)

S. 31 T. 43 R. 31 N.E. 1/4



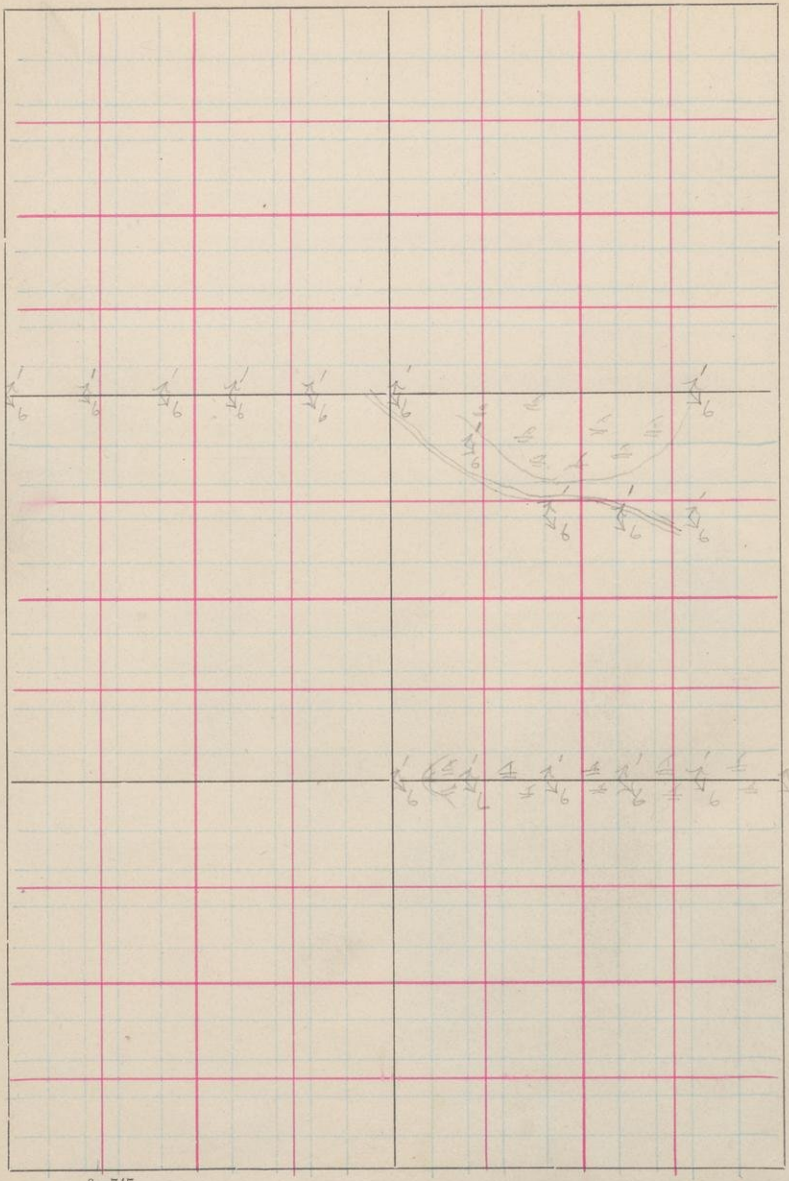

6—747

Blank Odd Pages

15-49

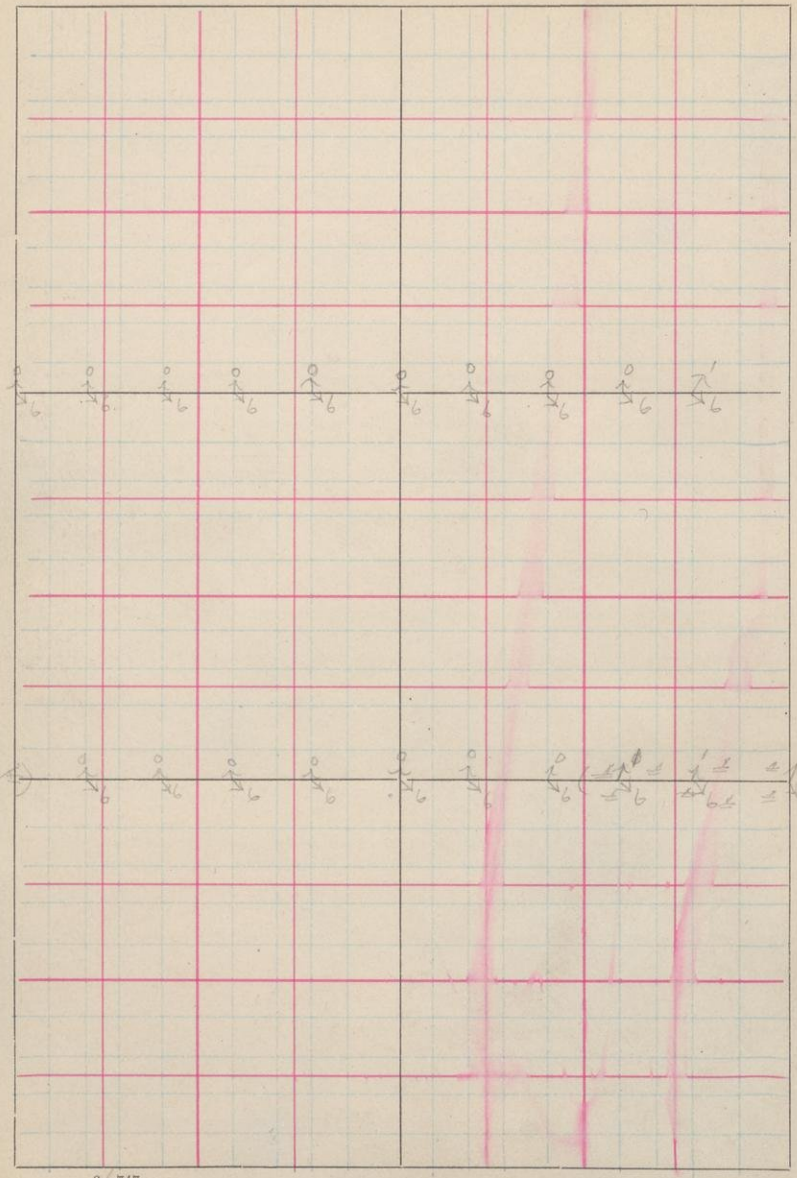
Skipped

S. 31 T. 43 R. 31 D.H 1/4



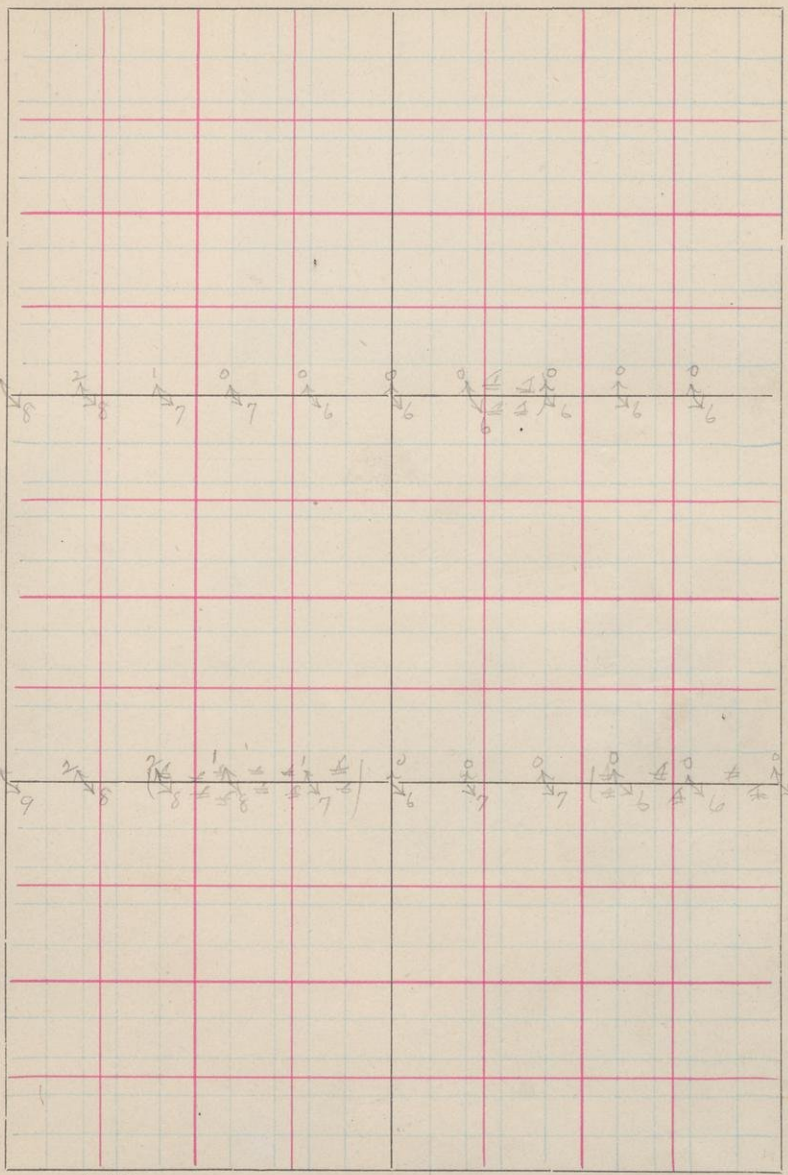
6—747

S. 36 T. 43 R. 32 S.E. 1/4



6—747

S. 36 T. 43 R. 32 S.W.1/4



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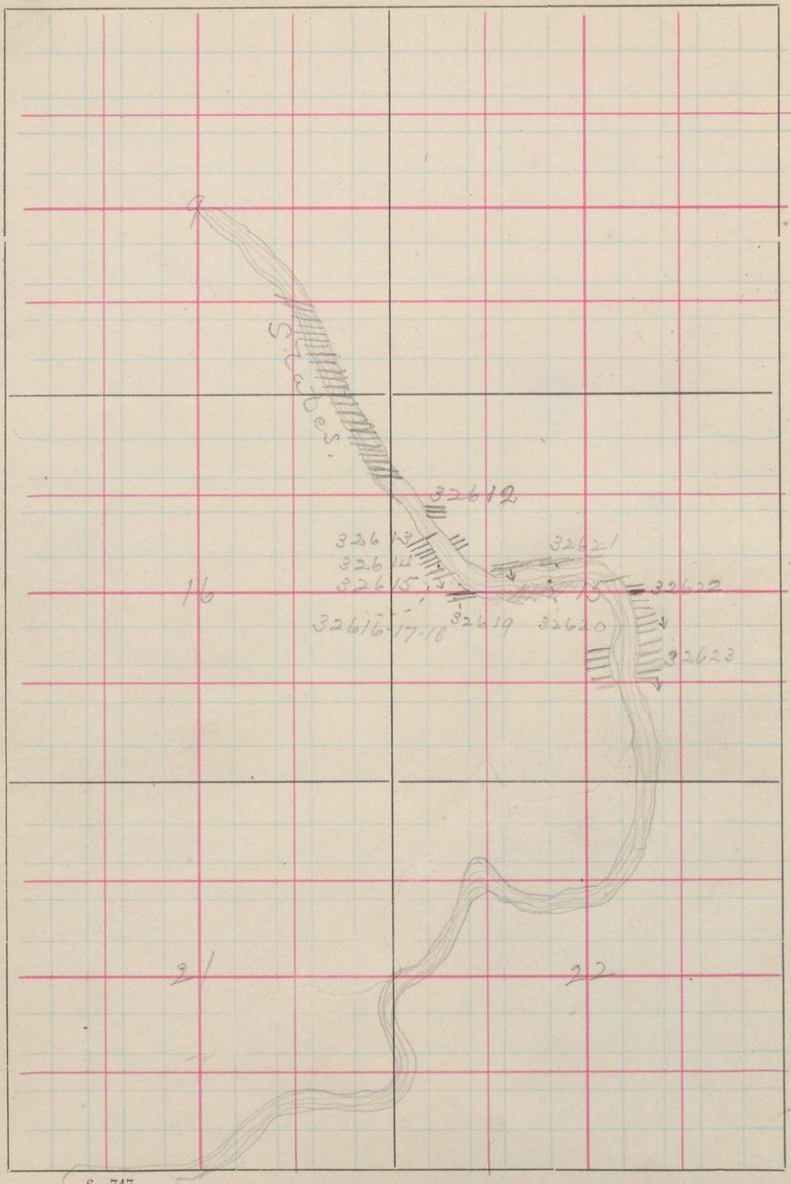
S. T. 42 R. 31

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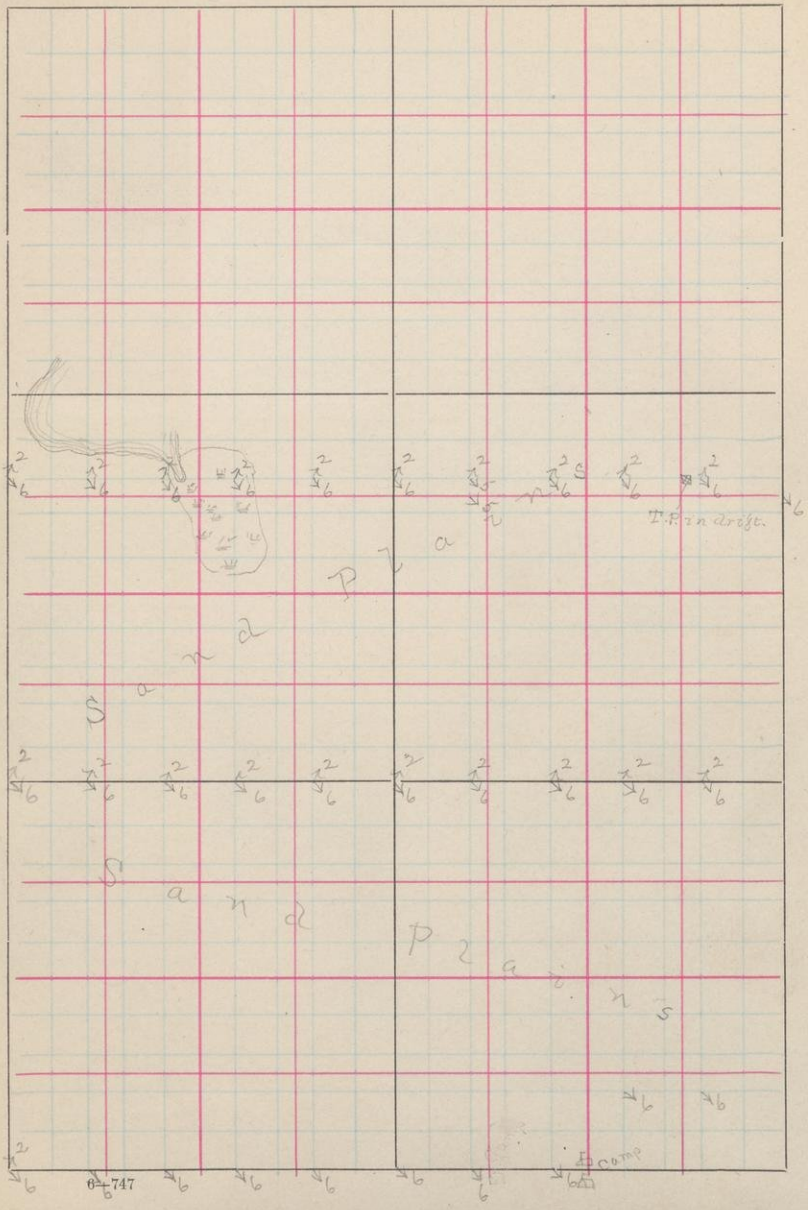
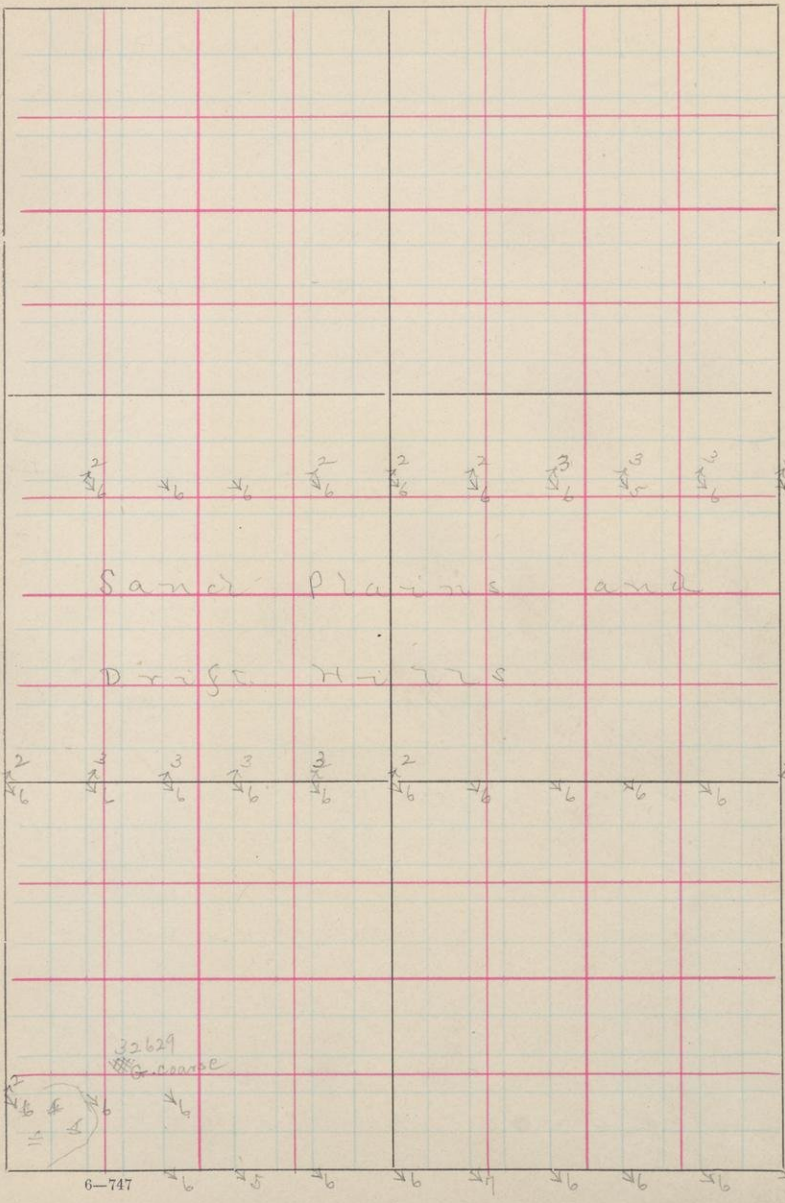
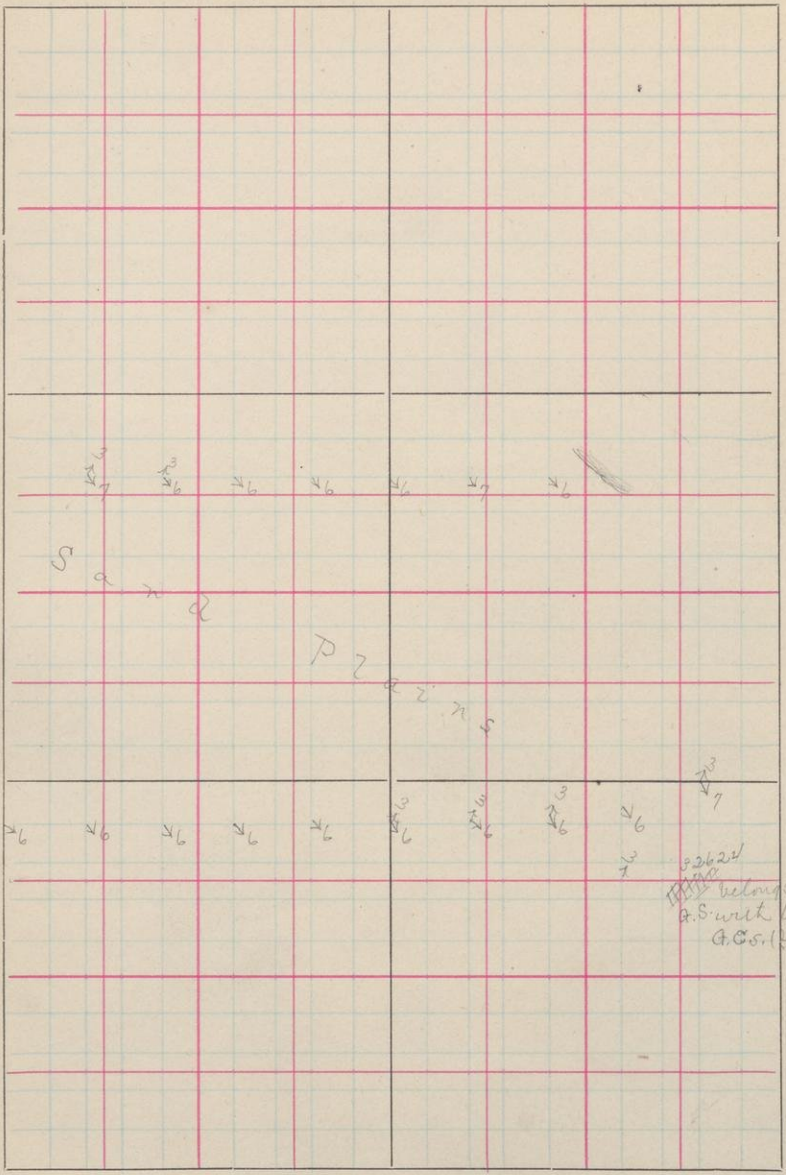
S. 6 T. 42 R. 31 N. W. 1/4



S. 6 T. 42 R. 31 N. E 1/4

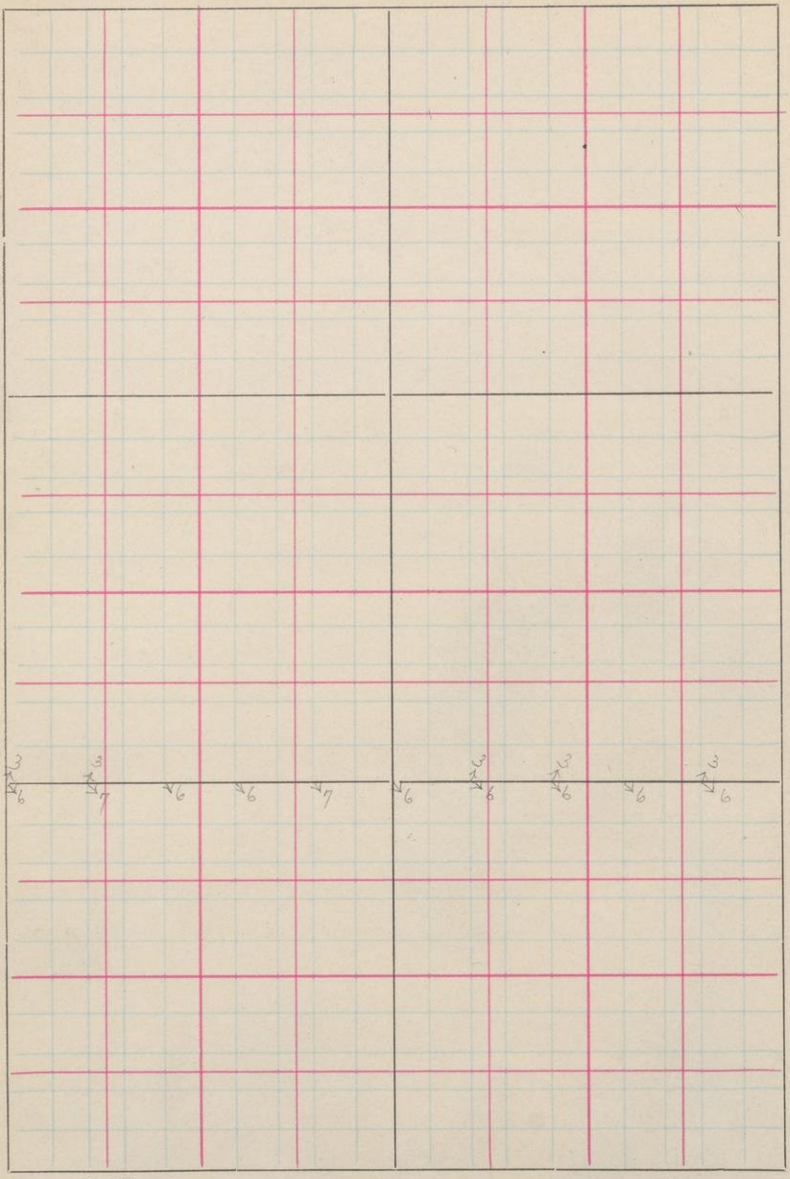


S. 5 T. 42 R. 31 N.W. 1/4



6—747

S. 5 T. 42 R. 81 N.E.¼



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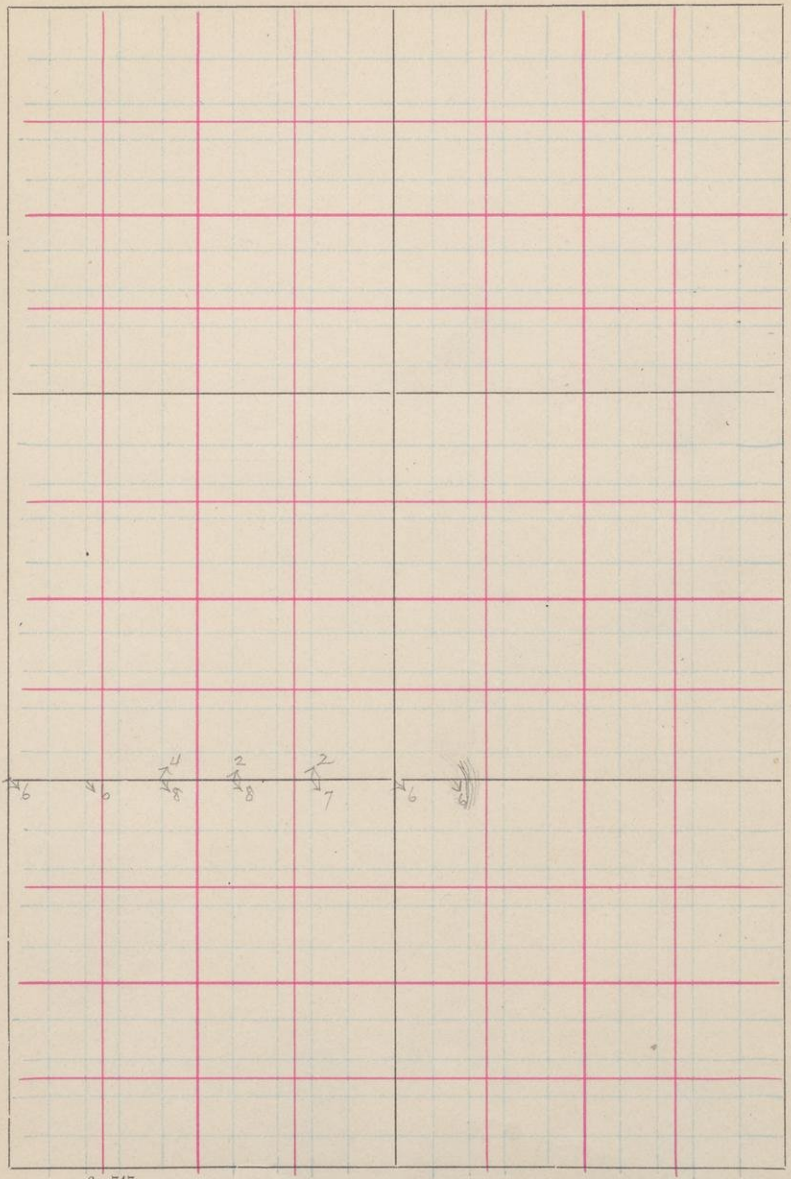
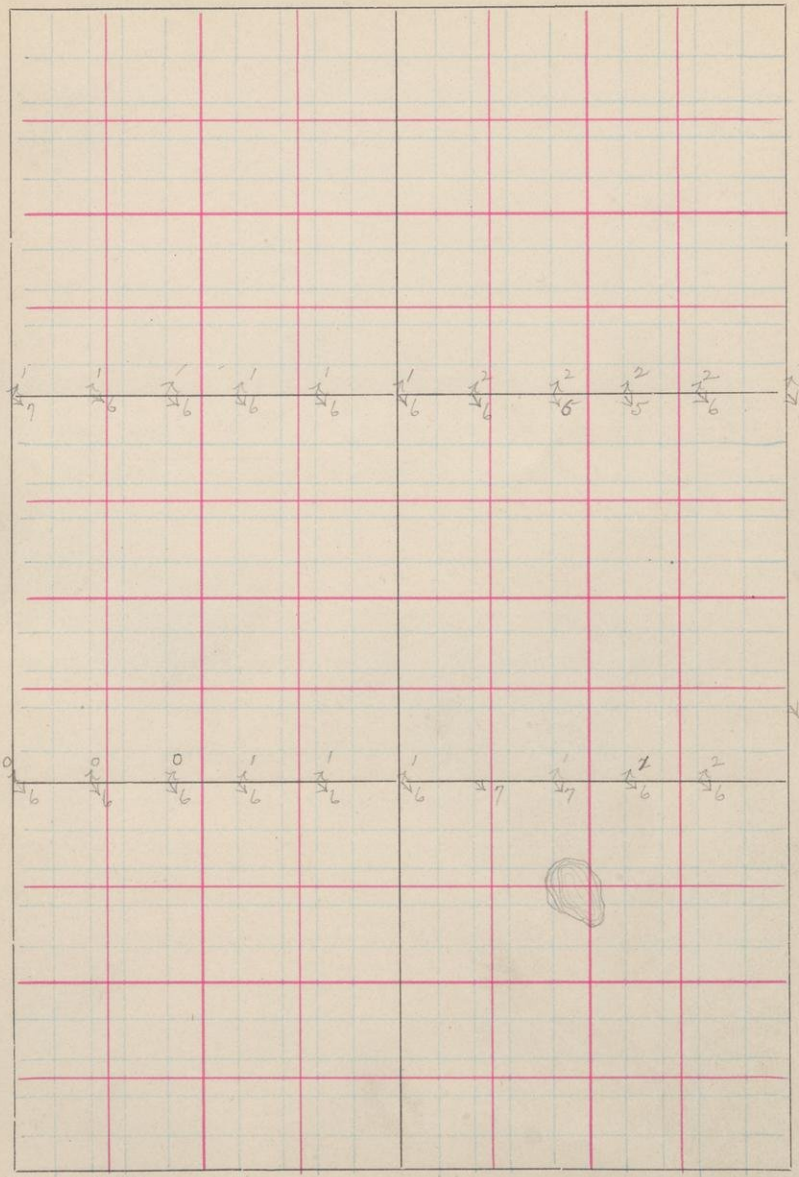
S. 4 T. 42 R. 31 N. W. 4



6—747

S. 1 T. 42 R. 32 N. E 1/4



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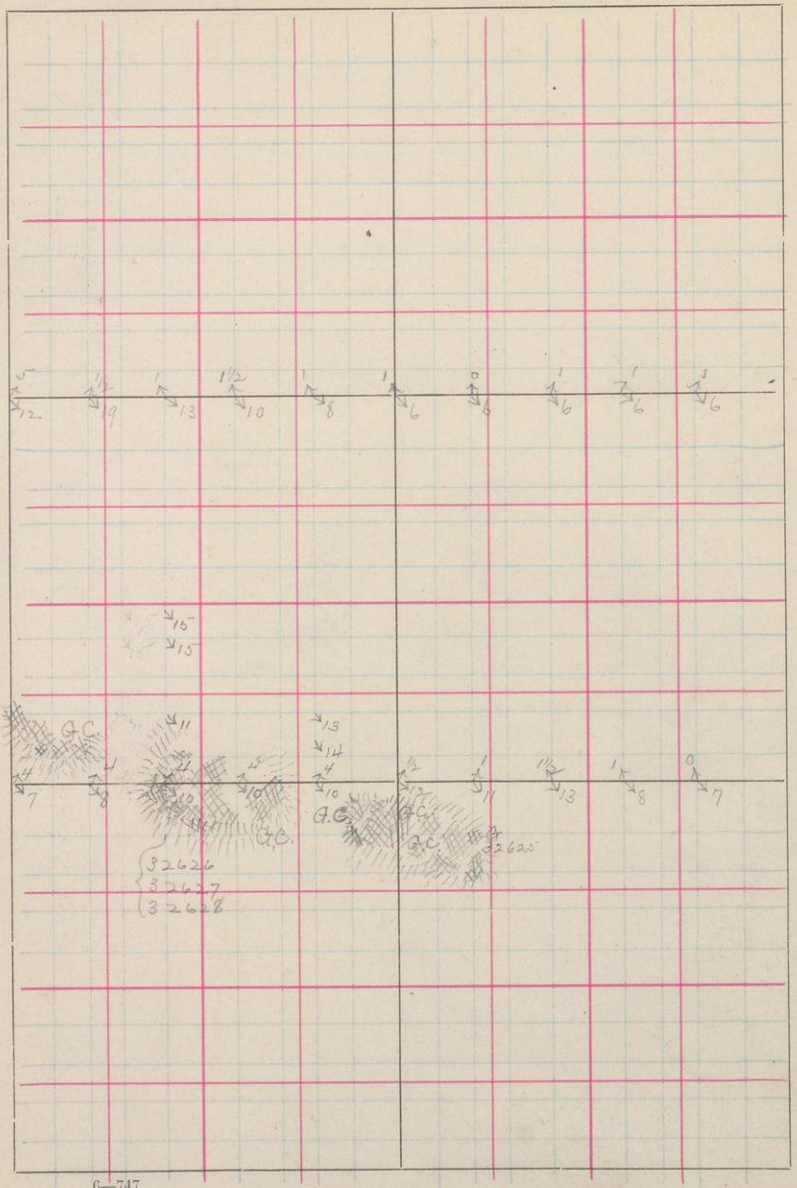
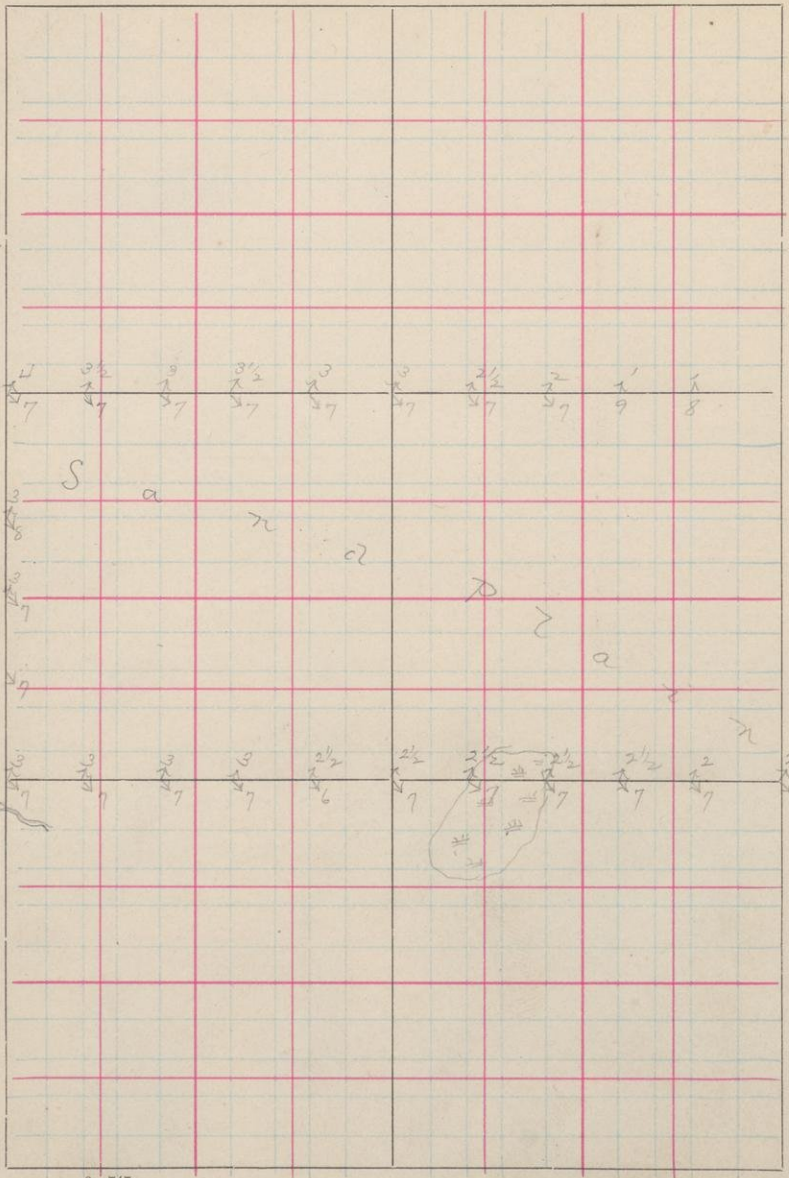
S. 4 T. 42 R. 32 N.W. 1/4



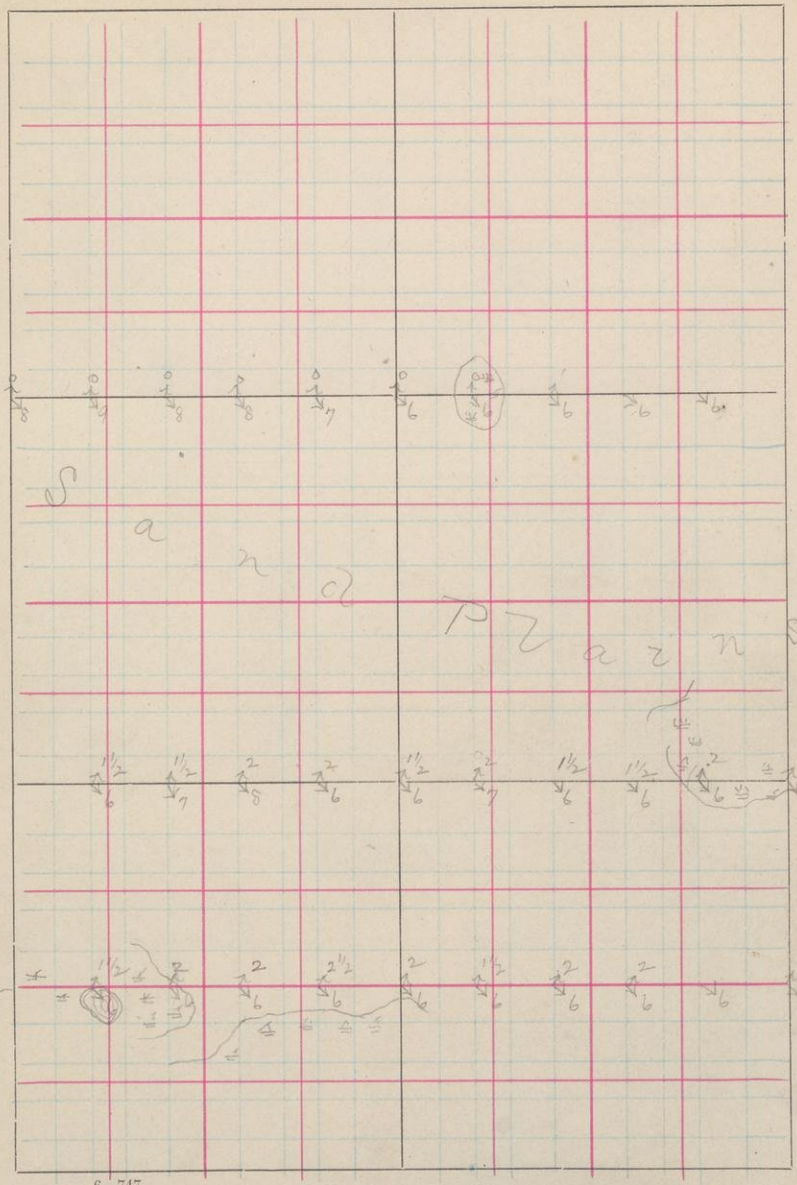

6—747

S. 1 T. 42 R. 32 N. M. P. M.



6—747

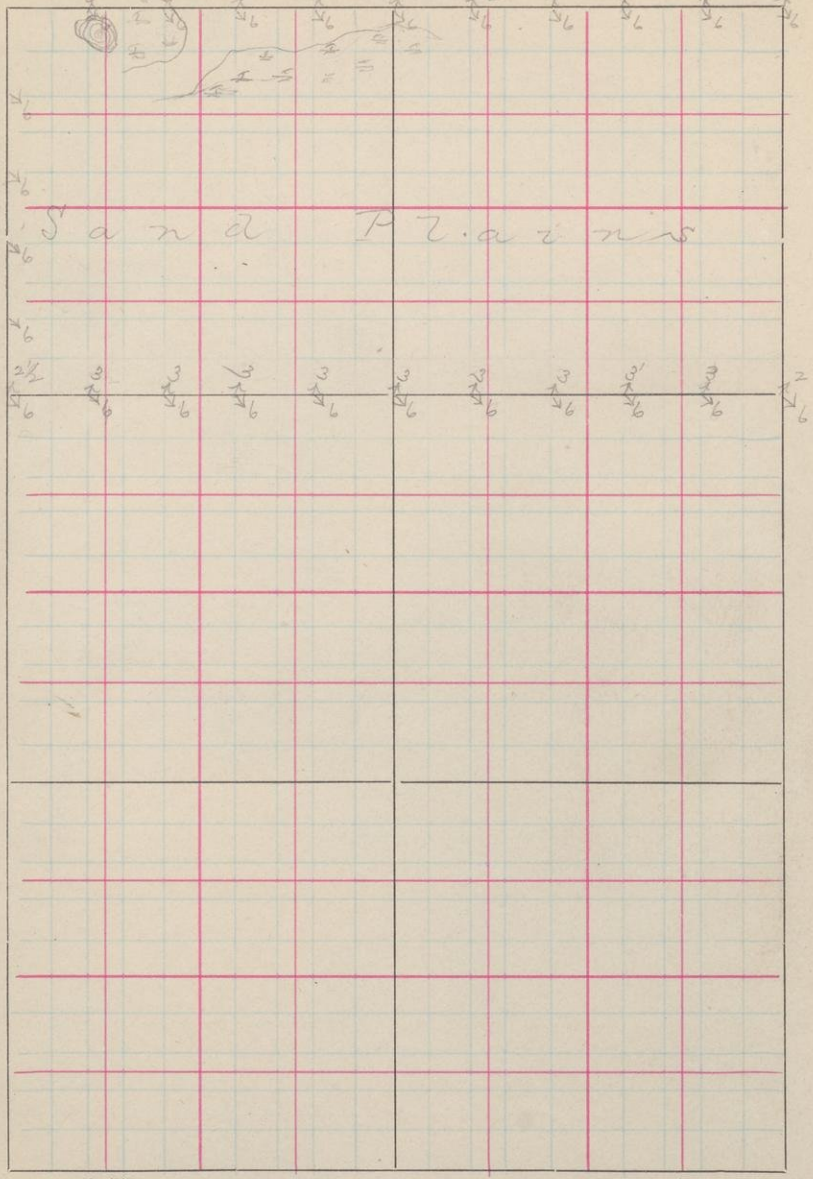
S. 1 T. 42 R. 32 . A. E. 4



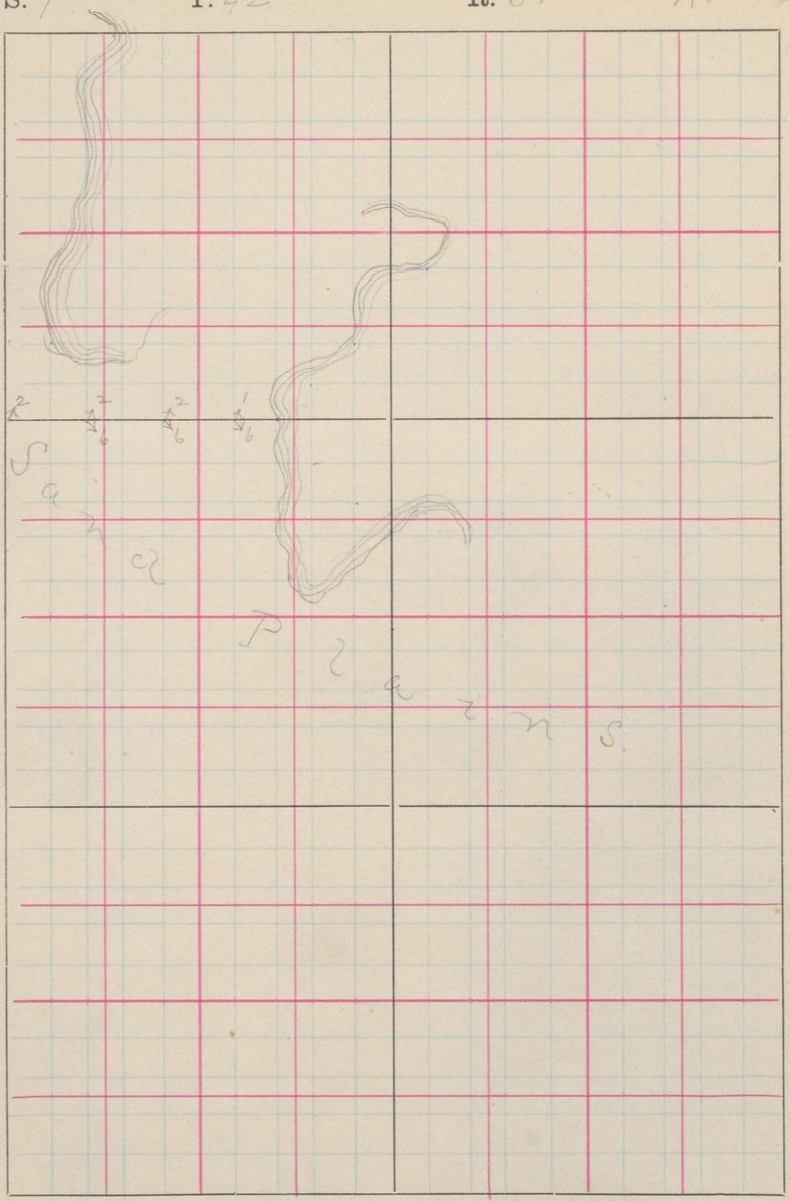

S. Cor. Sec. 6-42-31

6—747

S. 7 T. 42 R. 37 - N. W. 1/4

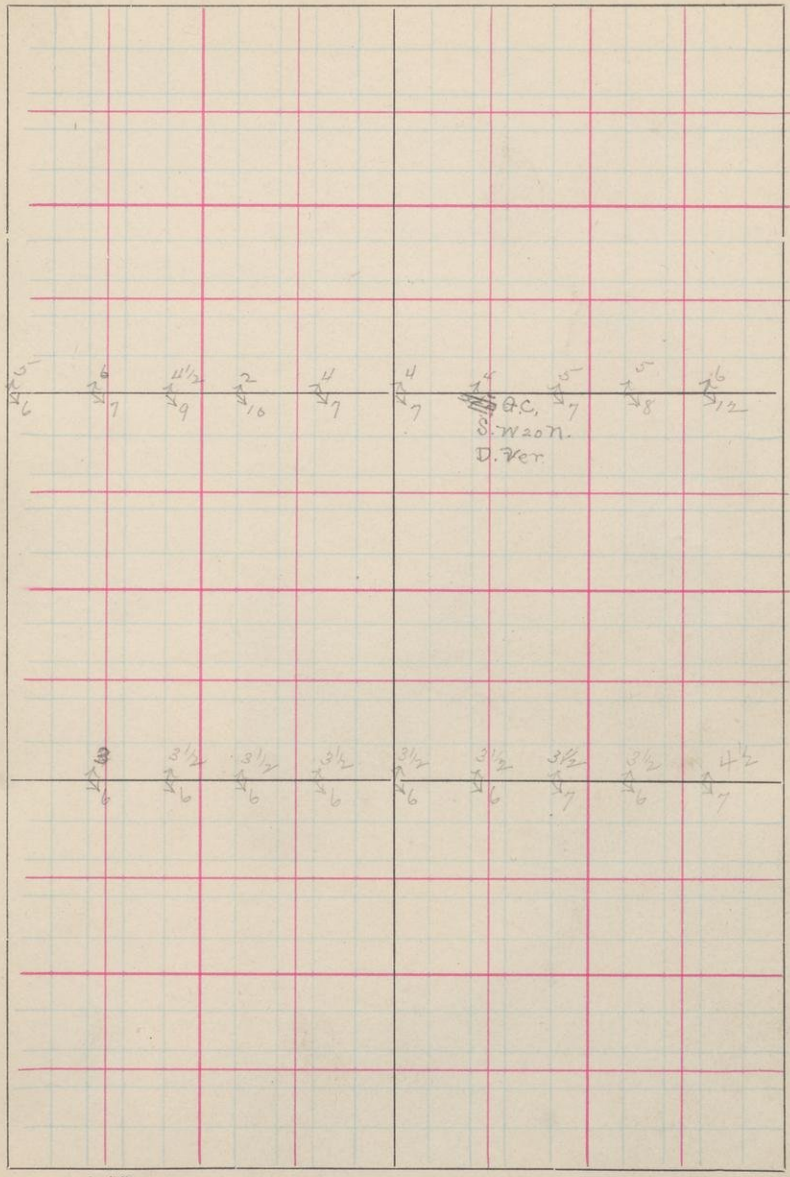


S. 7 T. 42 R. 31 N.E¼



6—747

S. 2 T. 42 R. 32 N. E

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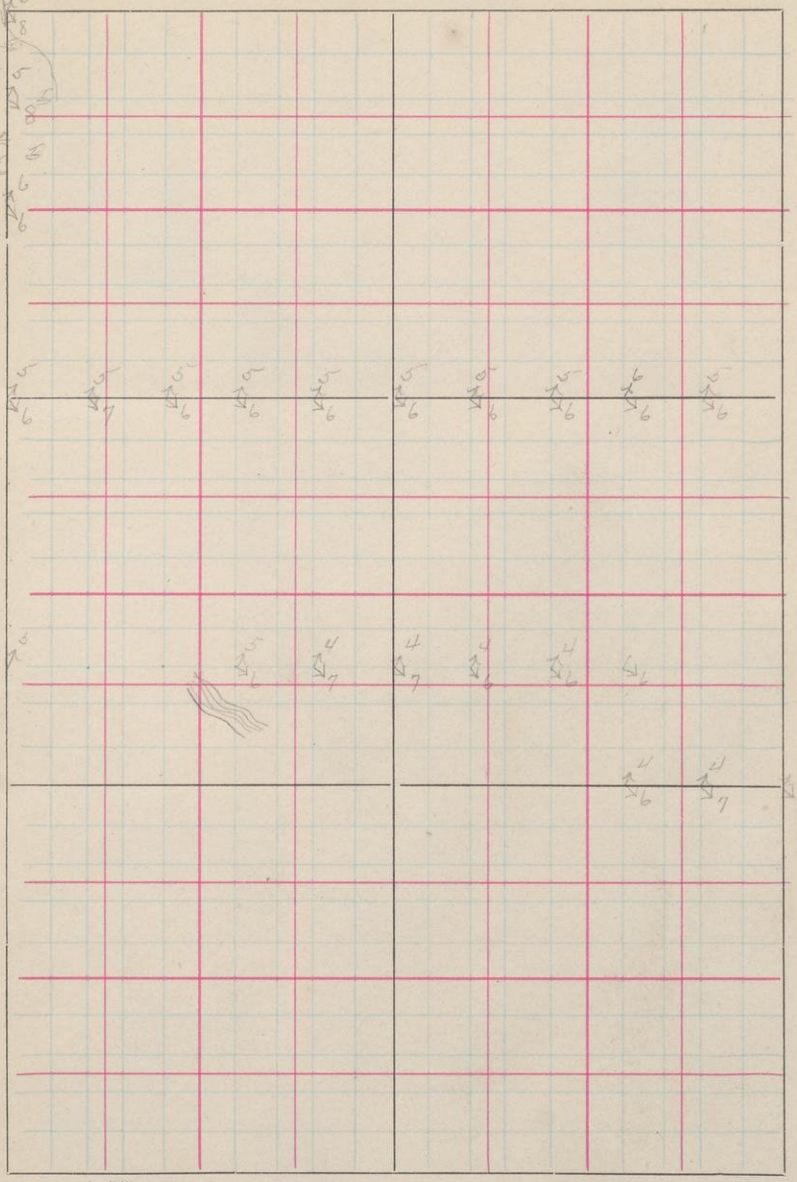
S. 2 T. 42 R. 32 N.M.P.M.



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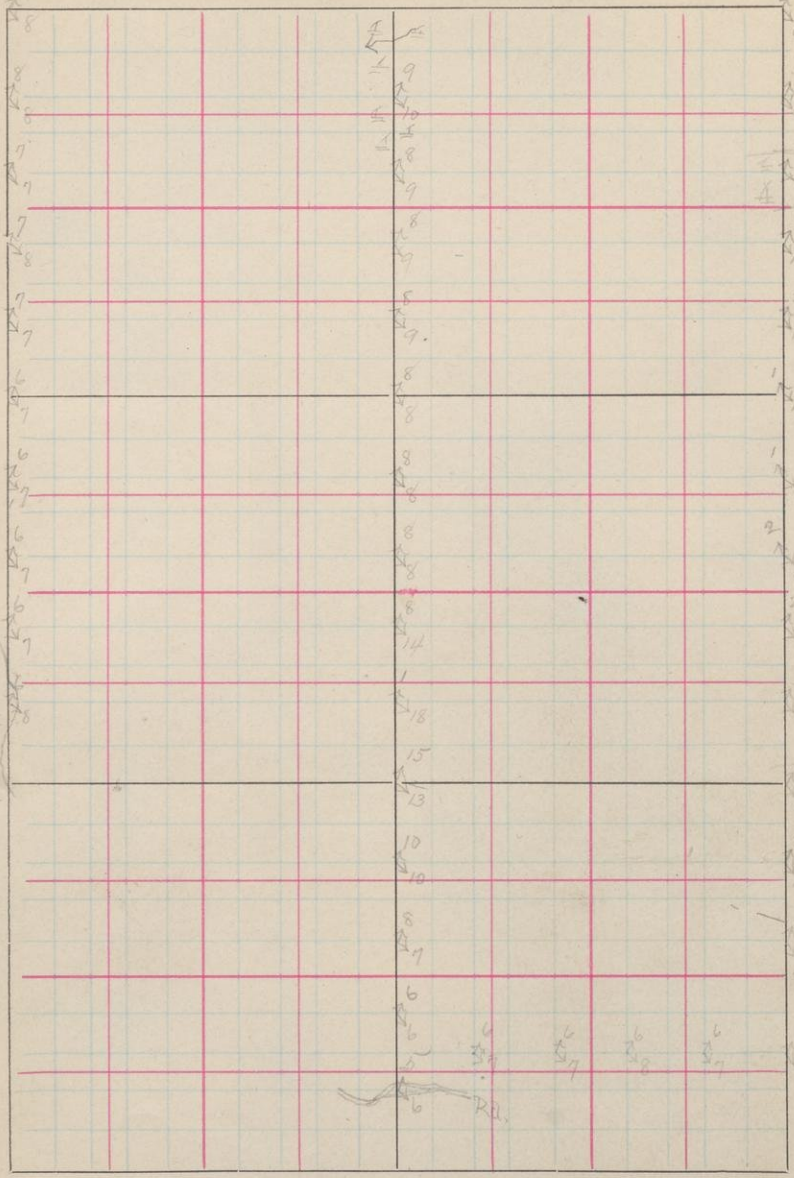
S. 35 T. 43 R. 82 S.W. 1/4



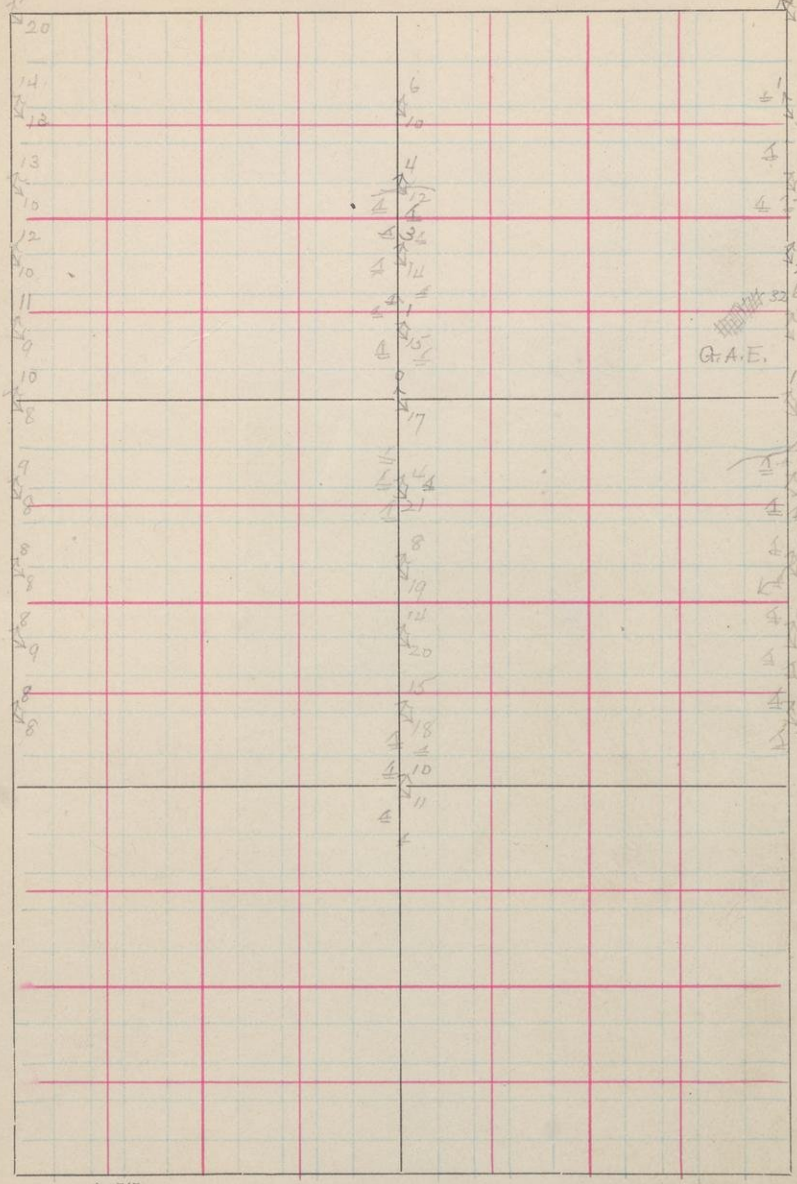
6—747

32630 400 N. 950 W. S. E. 35-43-32
G.A.E. A greenstone that belongs with the Epidotic amygdaloids; it shows every characteristic of those rocks.

32631 1500 N. 970 W. S. E. 35-43-32
G.A.E. A greenstone conglomerate. This rock on the surface seems to be more like the conglomerates that lie below the "epidotic amygdaloids", but the fracture and appearance of the fresh surfaces the rock like the other rock and I think belong with them. The conglomeratic structure may be due to a crushing

32632 1650 N. 1030 W. S. E. 35-43-32
G.A.E. An "Epidotic amygdaloid" in large exposure

S. 35 T. 43 R. 32 N.W. 1/4




6—747

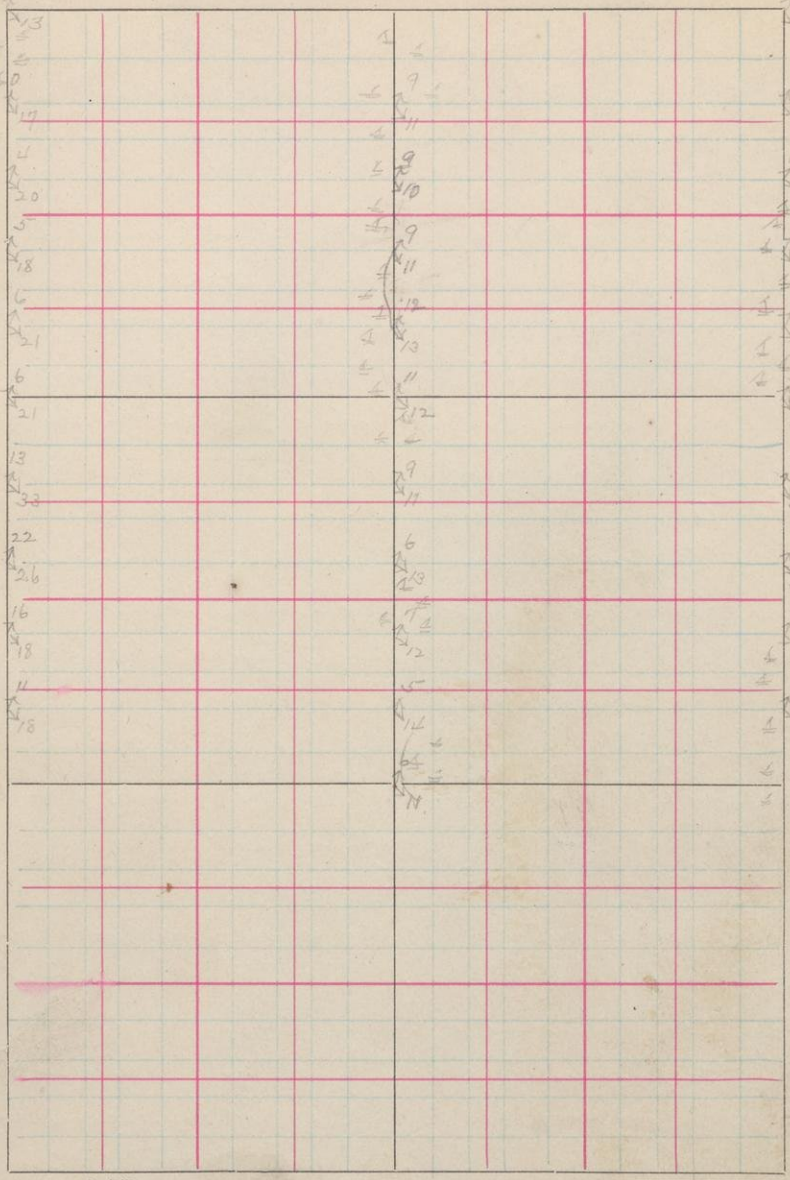
32633 I — 1248 N. 525 W. S.E. 26-43-32
Lean ore from an old shaft.
Pieces of banded ore and jaspe are also shown on the dump.

32634 I — 1100 N. 470 W. S.E. 26-43-32
A more slaty lean ore than shown from the shaft above.
The rock is highly banded and filled with crystals of iron oxide.

32635 I — About 50 steps west of 32634
The rock from this pit is much less ferruginous than the last two.
It breaks in long narrow slabs as shown in the spec.
The strike is about N. & S. dip high to the W.(?)

32636 — 1340 N. 470 W. S.E. 35-43-32
An exposure of schistose greenstone that I am disposed to place with the greenstone conglomerate. The exposure is covered so not much more than is to be seen by the hand specimen which seems to be a schistose amygdaloid.

S. 26 T. 43 R. 32 S. W. 1/4



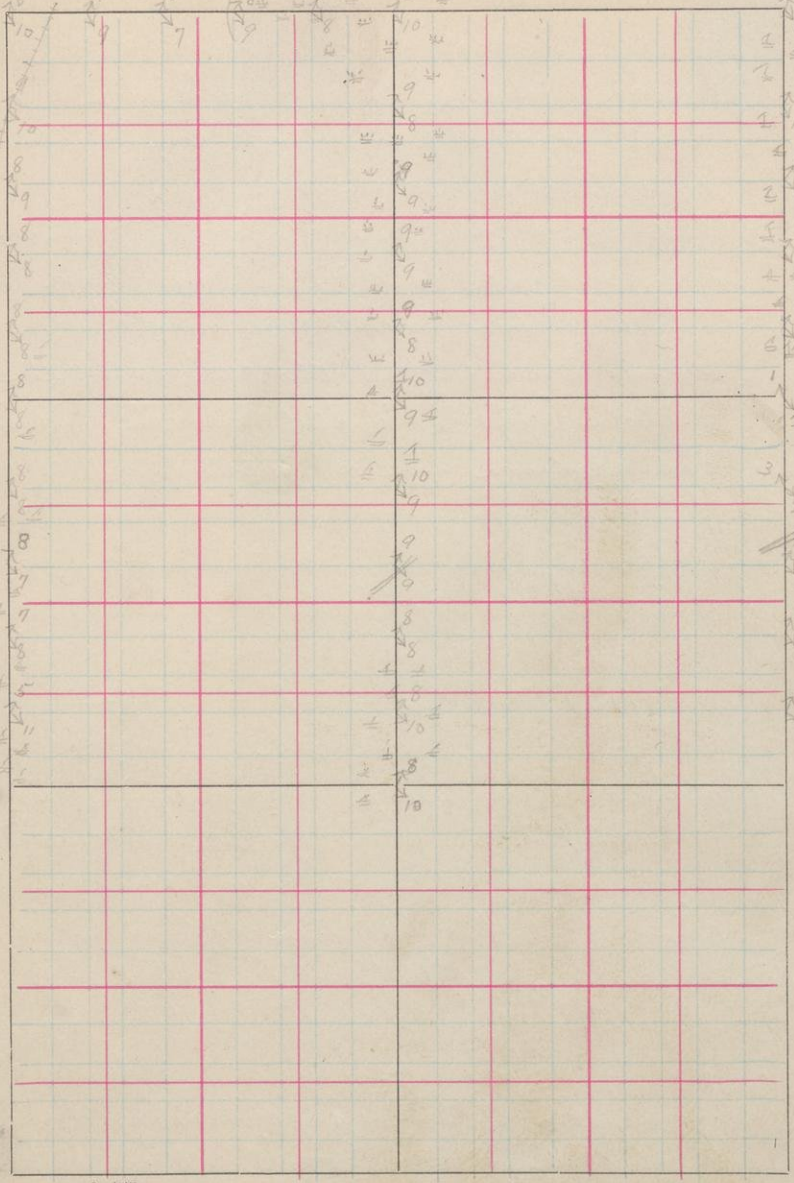
6—747

32637 1575 N. 600 W. S. E. 2 - N 2 - 32
G. A. E Large Exposures of an amygdaloid which looks in every particular like the rocks that have been called "epidotic amygdaloids"
Its position in regard to the greenstone conglomerates just to the east and the line of attraction to the north which seems to cut directly across these "epidotic" rocks would seem to indicate an overturn and a fault.

32638 825 N. 550 W. S. E. 35 - N 3 - 32
Greenstone congl' (2)

32639 1360 N. 700 W. S. E. 28 - N 3 - 32
32640 A large ledge of granite. This rock from its structure and similarity to the granites to the east that are known to be younger eruptives seems to be younger also. The structure is thoroughly crystalline and shows no greenish character The ledges themselves are cut by several systems of joint cracks and the rock is like that east of the Michigamme river (which is known to be eruptive through the younger greenstones)

S. 26 T. 43 R. 32 N.M.




6—747

even to carrying carbonate of iron in considerable quantity
On the whole this granite does not have the least resemblance to the older gneissoid granites
Glacial striae 35° S. of W.

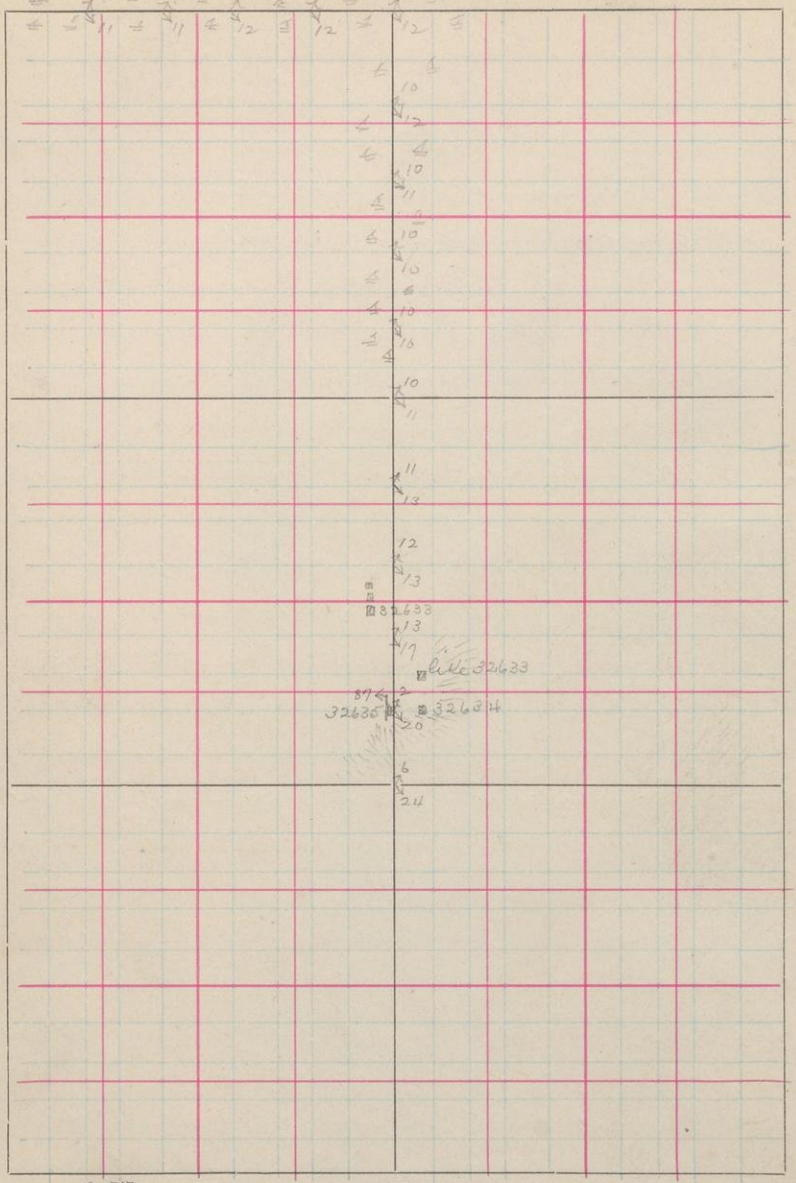
32641 850 N. 715 W. N. E. 28-43-32
32642 32641 is from a lense shaped mass in
32642 These lenses run north and south as shown in the sketch the largest one being about 12 inches in diameter

32643 A few paces west of 32641-42 from a "vein" about 3 inches wide in the "granite", not sure but think it is only a more quartzose phase instead of a fragment could not see all of the ~~fine~~ fine grained portion

32644 750 W. 700 N. N. E. 28-43-32
Granite

32645 1000 W. 900 N. N. E. 28-43-32
This looks like most like a true granite or gniss than any of the rocks yet seen

S. 26 T. 43 R. 32 N.E. 1/4




6—747

32646 Rock from Pit A near the N. E. corner of
32647 B.S2. N. W ¼ of 28-43-S2

32648 From pit B 20 slip west of A. This rock is simply a decomposed granite

32649 From pit C. 15 steps West of B.
32650 B.S2. Graphitic slate and a schistose greenstone with some iron ore

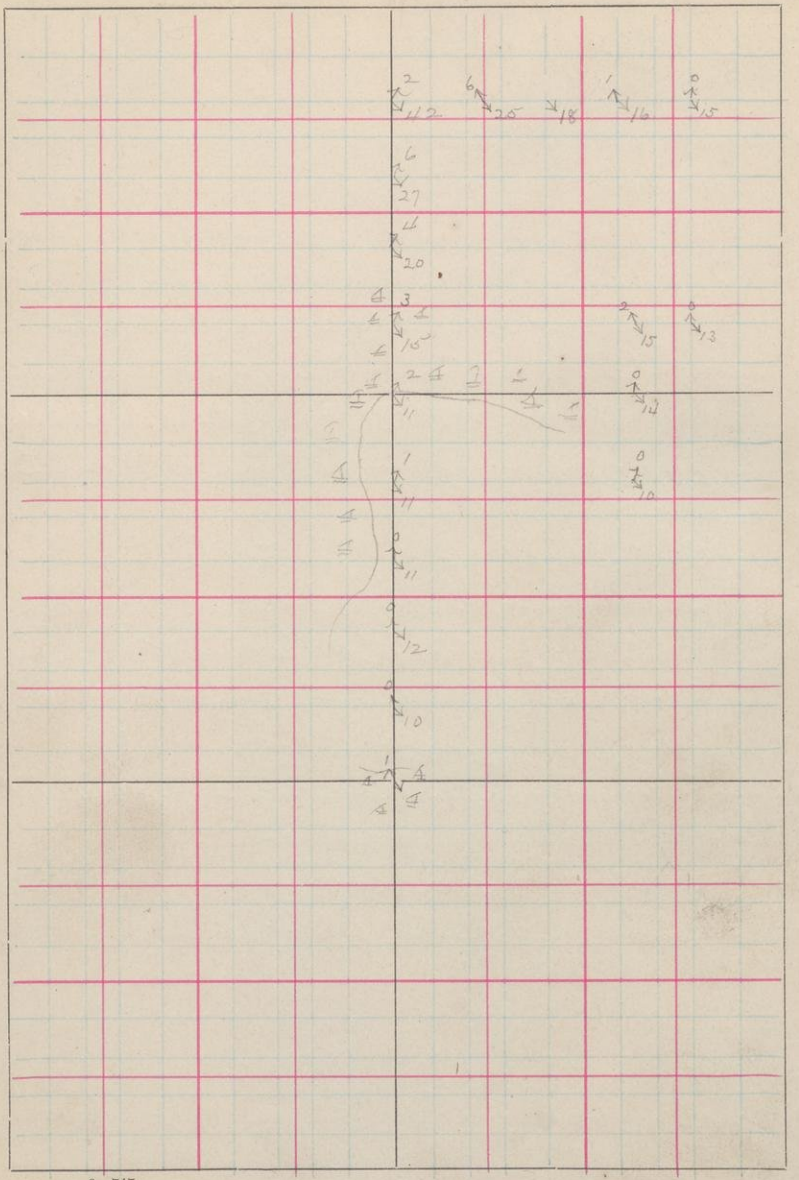
The same rock but mostly the schistose greenstone has been taken from pit D. south of C.

On the east side of pit E. the rock is exposed but much broken so much so that no strike or dip could be seen All these rocks are slickensided showing signs of movement

32651 B.S2. Taken from the wall rock, a squeezed greenstone

32652 Material thrown from the last pit E.

S. 26 T. 43 R. 32 A. E.



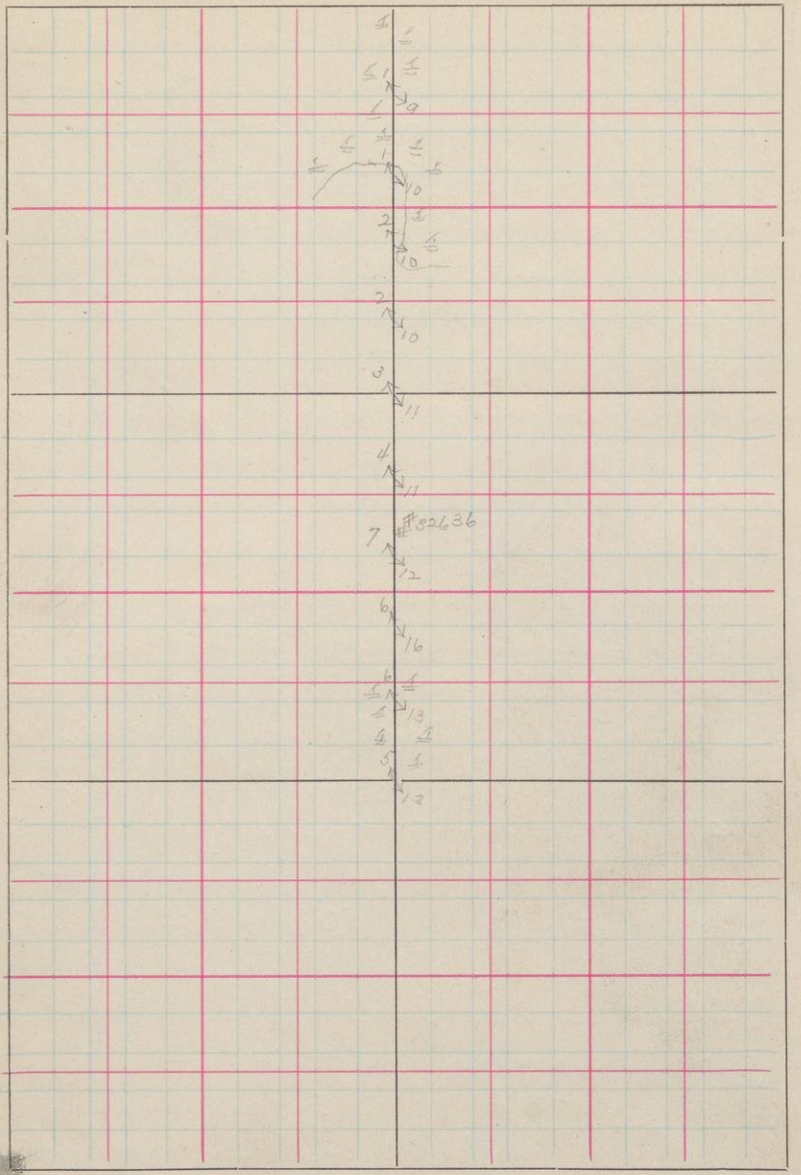
6—747

32653 1420 N. 1300 W. S.E. 28-43-32
32654 Black slate from a pit just west of
B2.52 a "granite" exposure The rock is
quite pyritiferous and somewhat graphitic
The strike of the rock and slaty cleavage
seems to be identical the dip is vertical
Strike about N-S
32654 was taken from the slock pile

32655 Near the north line of Sec 28 on the
B2.52. east side of Paint River
The slates are exposed on the side of
the river for several hundred steps
south of this point Their general
strike is from 40 to 50 North of west
up to the point where they make a
turn to the north. A short distance
up stream however they are striking
27 north of west

32656 150 ft. 120 N. S.E. 20-43-32
32657 The strike of these slates is 27° N of W.
B.S2. They are quite contorted, and banded
with thinner bands that look like a
mica slate The more schistose
portion is greenish in color, very
schistose, and looks more like a

S. 35 T. 48 R. 32 N.E. ¼




6—747

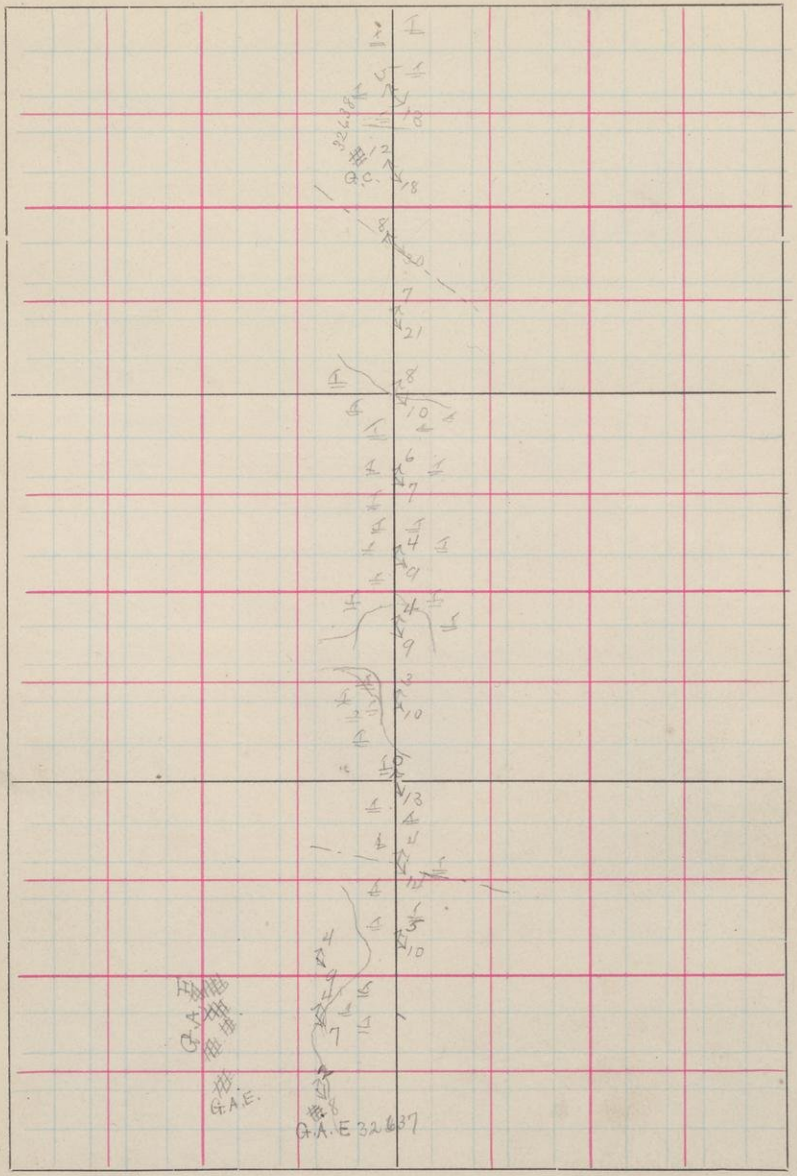
it is a gneiss & green schist than true slate.
The dip of all of these rocks seems to be about vertical. They are too much contorted to be sure of dips.
About 100 slips up stream these rocks show again

32658 200 N. 300 W. S.E. 28-43-32
A conglomerate that seems to be lying between the slates and the schists just mentioned 32657. The congl. is very quartzose, and schistose. The pebbles are mainly banded chert with a few black slates.

32659 Conglomerate from about 30 or 40 pces N of 32658. The exposure shows a band of chert breccia here only about a foot or so wide
These rocks show for several hundred paces up stream
The strike is E. 17 S.

32660 200 N. 450 W. S.E. 28-43-32
A quartzite ledge, a phase of these conglomerates
East and north of this is another conglomerate layer and to the east and north of the slates

S. 35 T. 43 R. 32 S.E¼




6—747

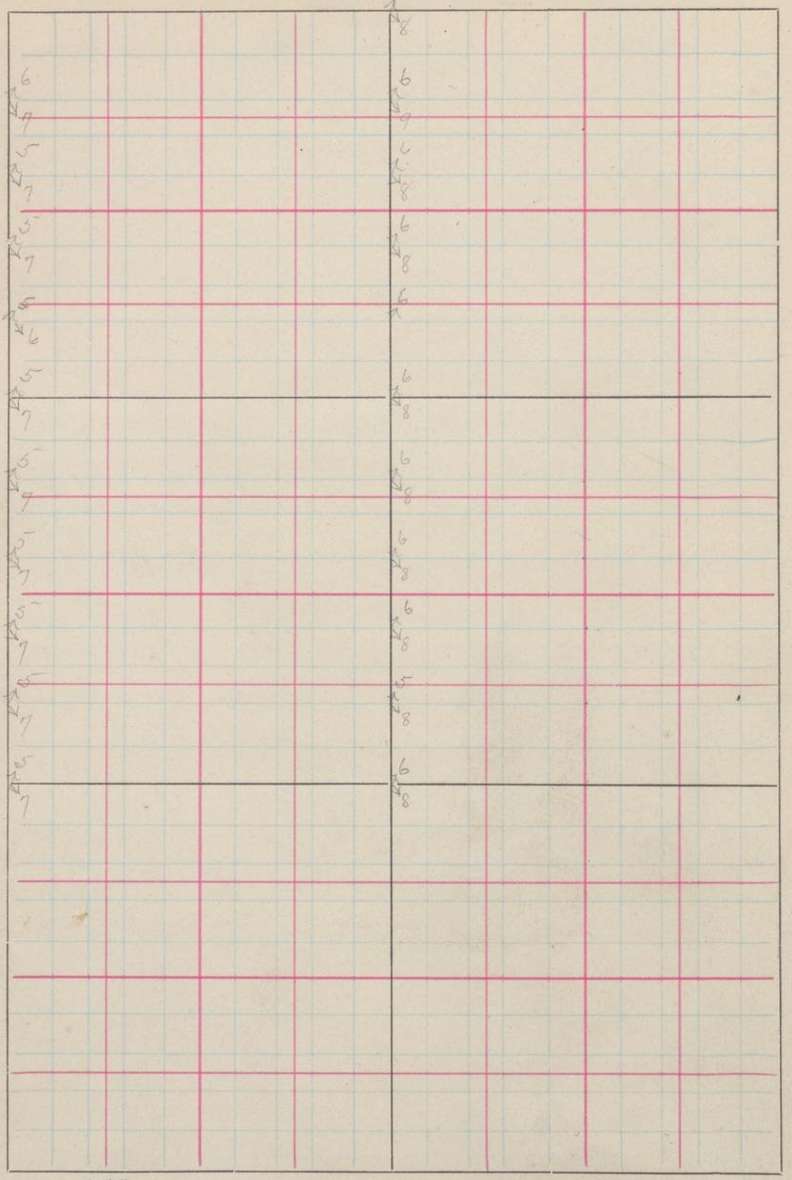
is a large showing of a chert breccia

32661 00 W 625 N. S.E. 20-43-32
I The slates show at intervals ~~across~~ on this line north and are probably a continuous exposure at
(1050 N. 150 W)

32662 At the Ry cut the banded slates and
32663 chert are exposed showing extreme con-
I. 52. tortion (see sketch) At the west end of the exposure where the bowing is the least the strike shows to be about 10 S of W. with a dip to the south - The dip cannot be relied upon however as it changes several times in the length of the cut.

32664 1700 N. 700 W. S.E. 20-43-32
An amygdaloid showing spheroidal parting. Is it like the "Elliptic amygdaloids" farther east? From the south side of large greenstone range

S. 34 T. 43 R. 32 W. E. M.



6—747

32665 1750 N. 950 W. N.E. 20-43-32
Amygdaloid, like 32664

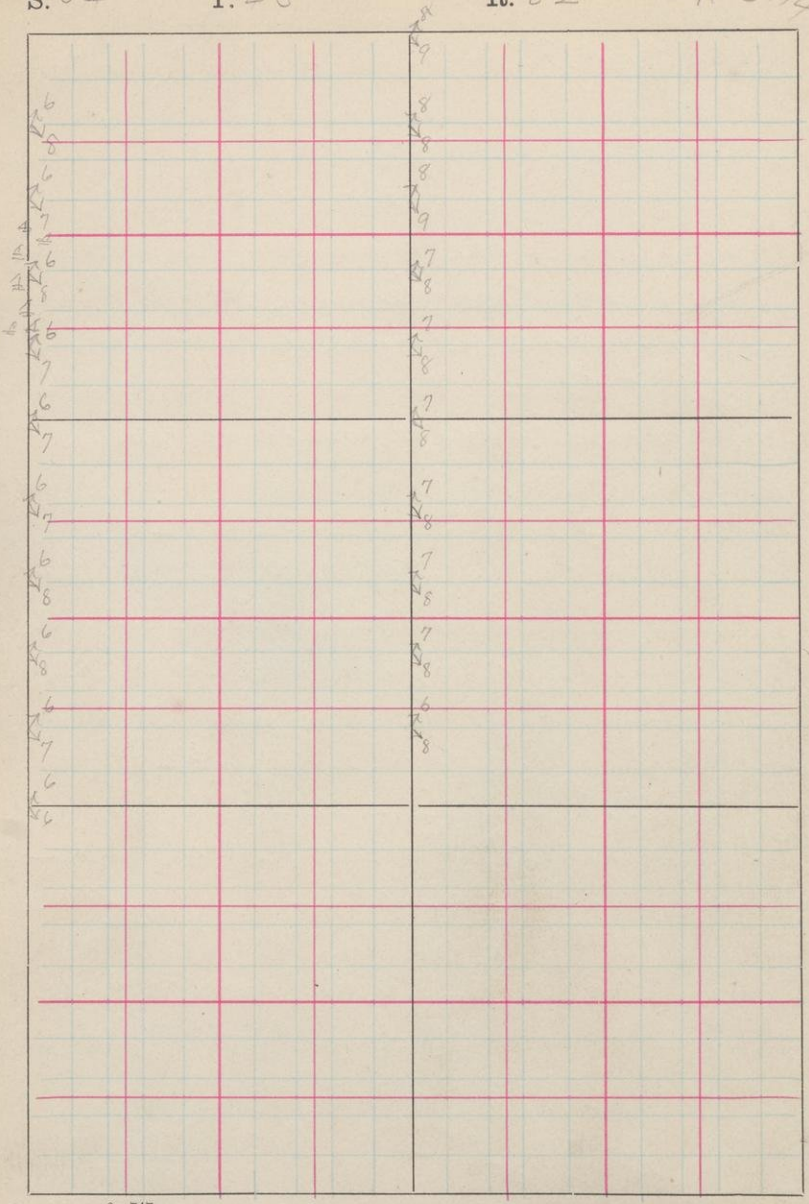
32666 1875 N. 930 W. N.E. 20-43-32
Ch + Sz. A banded grey slate and chert similar to the slates in the Ry. cut and ~~for~~ to those some distance down the river from this point
Just south a few step from 32666 is a narrow band of chert breccia

32667 1700 N. 800 W. N.E. 20-43-32
Ch + Sz. like 32666 At this point the rocks bend abruptly from a strike of S. 40 E. & W. 20 N. (See sketch)

32668 500 W. 500 N. N.E. 20-43-32
Qtz. A band of quartzite similar to that found farther south near the conglomerate

32669 50 South of 32668. A black slate
Bz. Sz.

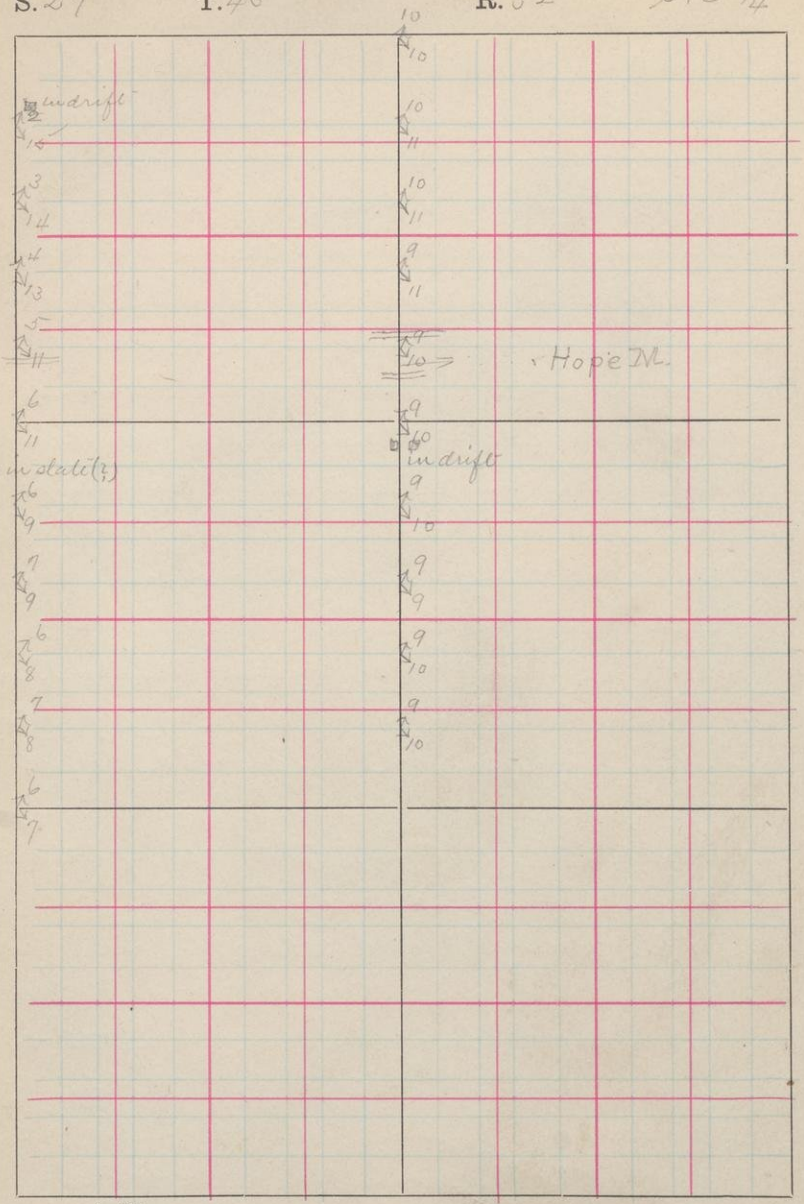
S. 34 T. 43 R. 32 N. E. ¼



6—747

32670 1600 ft 576 N. 1. E 21-43-32
32671 a black graphitic slate. The
S2. G. slates in this knob are black, graphitic
pyritiferous, and contain thin bands
and lenses of a fine chert.
At the Lincoln and Great Western
mines these rocks form the hanging
wall, the dip being to the south.
On the foot wall the rock is more
cherty being a banding of ore and
chert which grades into the rich
bodies of ore. The ore at the
Lincoln strikes 20 S. of W. and pitches
high to the east. No water comes
into this mine below the 300 ft. level
At the Paint and Monitor mines the
dips to the north, and with these
as with the Lincoln the hanging
wall is more slaty, the foot being a
banded ore and chert.
The chert occurs with all the ores
and has become so recognized as being
necessary to the formation of the ore
that explorers look for the cherty
bands in these slates as a point
at which to begin exploration

S. 27 T. 43 R. 32 S.E 1/4

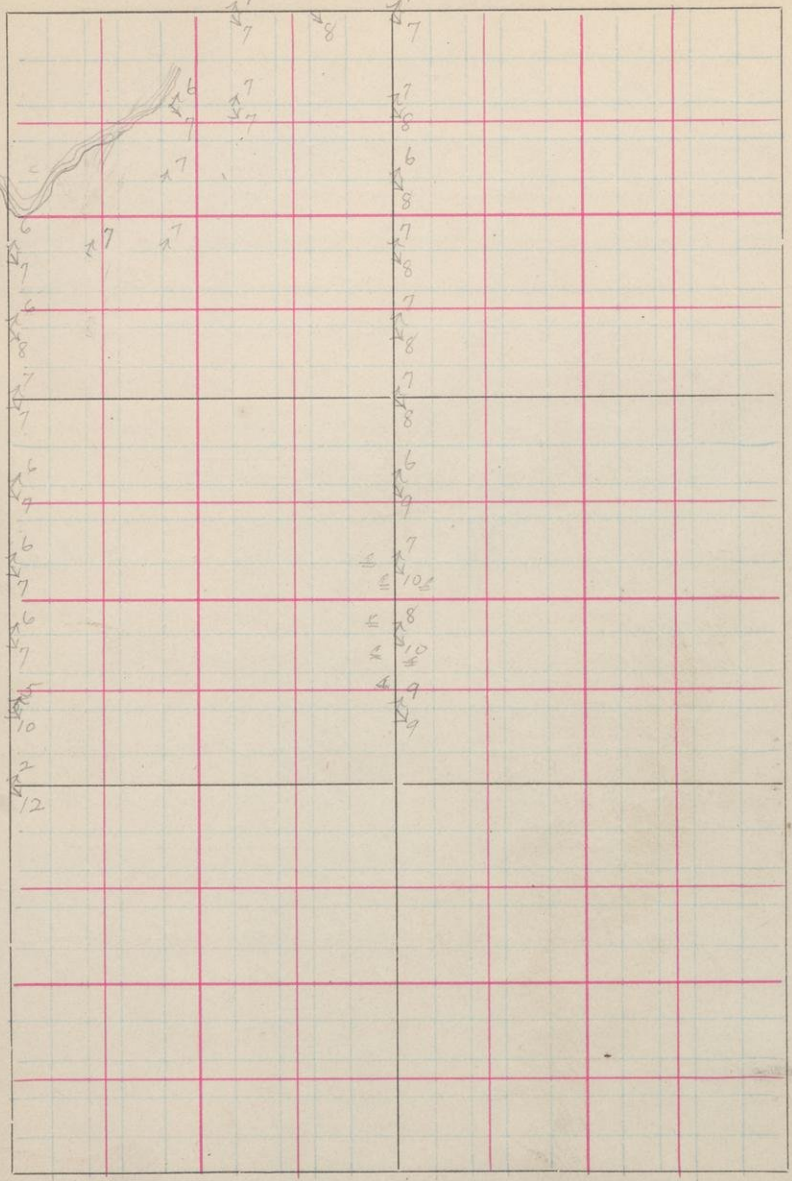



6—747

32672 370 W. 1350 N. S.E. 21-48-32
32673 a banded grey and black slate
Ch. 82. with thin quartzite bands. This rock is very much contorted and is quite like that at the Ry. cut West of the Lincoln mine
The slate are very pyritiferous the pyrite forming a filling between the layers

32674 1250 N. 150 W. S.E. 21-48-32
32675 Slates forming the hanging foot wall
Ore & C. (32674) of a small body of ore at the Crystal Falls mine The ore seems to have been only a richer phase of these slates. The dip of the foot is to the west and above the slate the rock seems to be a little more cherty.
32675 is from numerous large fragments on the dump. The rock is very graphitic, did not see it in place

S. 27 T. 43 R. 32 N. E. 1/4



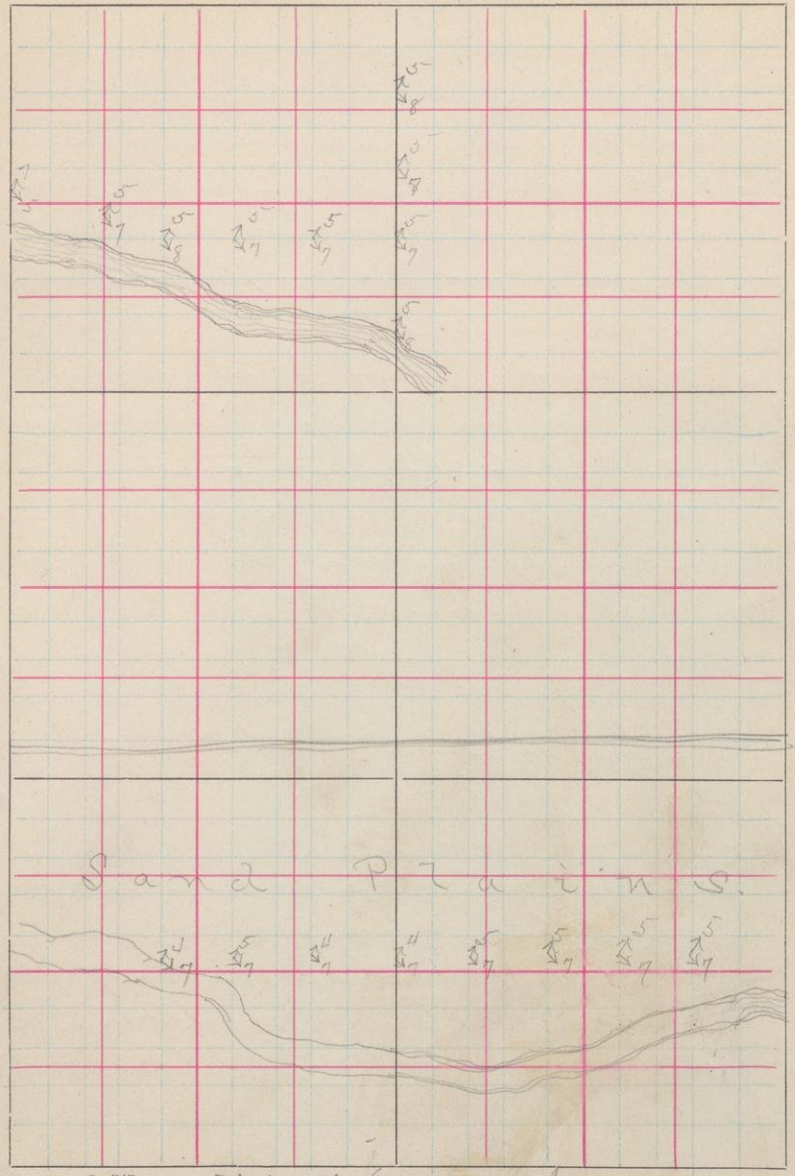
6—747

32676 1000 N. 100 E S. E. 21-43-32
B2.52. Black and grey pyritiferous slate
20 paces east a shaft has been
sunk in the graphitic slate
and material taken out contains
so much pyrite that the odor of
the sulphur ($SO_3$) is plainly detected
at a distance of some paces from
the dump.

32677 800 N. 1060 W. S. E. 25-43-32
Greenstone amygdaloid.

32678 1260 N. 1680 N. S. E. 25-43-32
G.A. Schistose amygdaloid.
The rock that follows to the
east of this link of attraction

S. 3 T. 12 R. 32 N. E 1/4




6—747

N. 1/2 of N.W. 1/4 Sec. 3

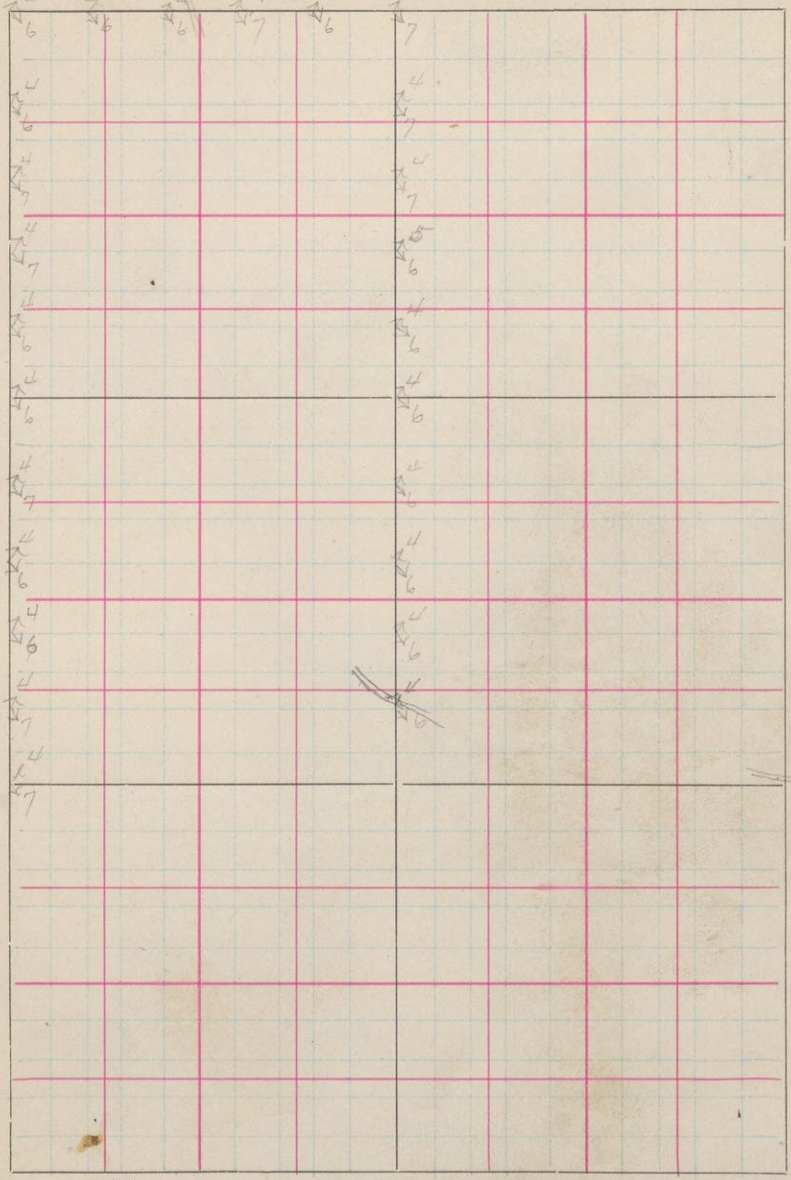
32679 1300 N. 1600 N. S.E. 20-43-32
G.A. Like 32678

32680 550 N. 850 W. S.E. 18-43-32
G.A. An amygdaloid with crystals and patches of carbonate iron

32681 1550 N. 1000 W. S.E. 24-43-32
Is this a true slaty lean or a slaty amygdaloid, with magnetite?

32682 400 W. 50 N. S.E. 24-43-32
G.S. Large exposure facing south. Schistose greenstone. Schistose structure about E.P.W.

S. 34 T. 43 R. 32 N. W. 4



6—747

32683 460 W. 10 N. S.E. 24-43-32
Q.S. Similar to 32682 480W the same rock is exposed again

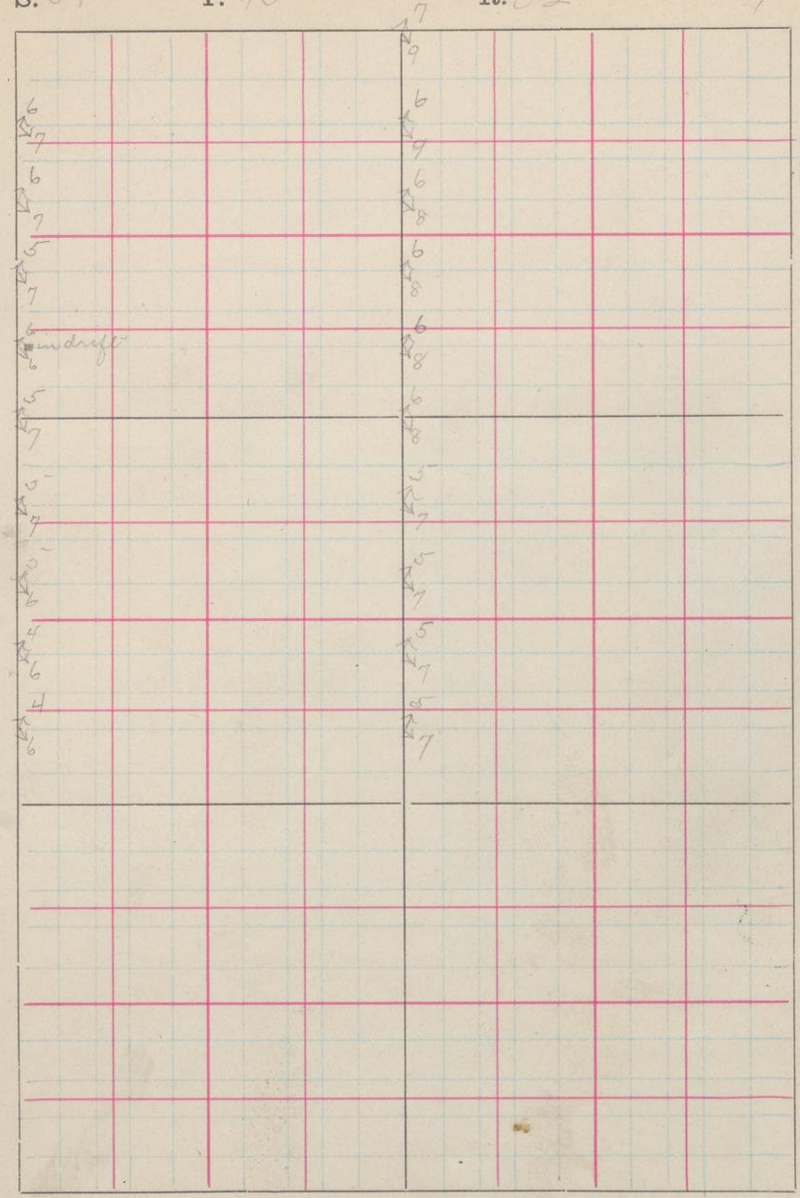
32684 1250 W. 1500 N. S.E. 26-43-32
Ch. Banded chert from a test pit

32685 1700 N. 1500 W. S.E. 26-43-32
32686 A purplish black slate lying to
B2.82. the west within 8 feet of the greenstone shown in 32686 The slate probably belongs with the slates of the Armenia

32687 400 N. 100 W. S.E. 36-44-32
A.D. A very dense black eruptive The rock is badly shattered, and no trace of structure to be seen The exposure is large The rock looks more as though it belongs with the older eruptives than with the coarse diabase

32688 150 steps south of 32687
G a similar rock The specimen looks somewhat micaceous

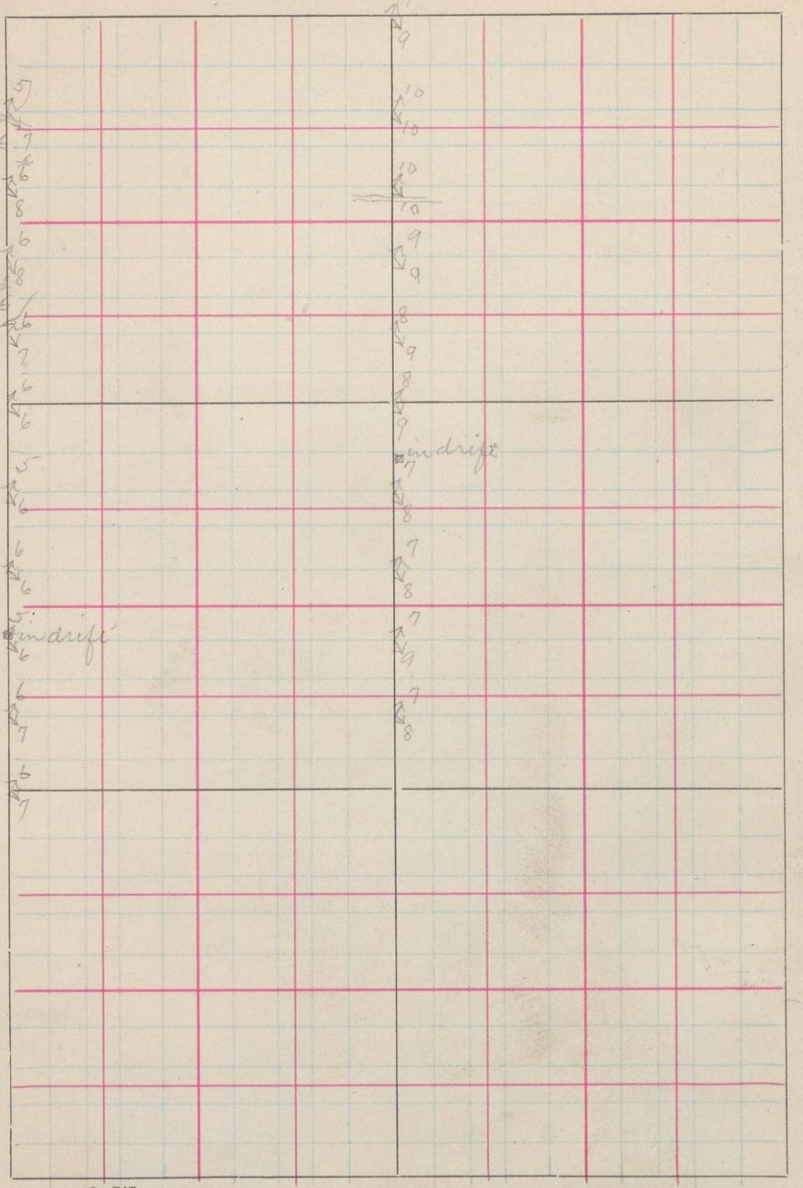
S. 34 T. 43 R. 32 N.W.¼




6—747

32689 Q. 400 E 100 S. N.W. 31-44-3 L.
A ledge on river of rock similar to 32688-87 The rock here seems to show traces of an E & W structure

S. 27 T. 43 R. 32 S.W.¼

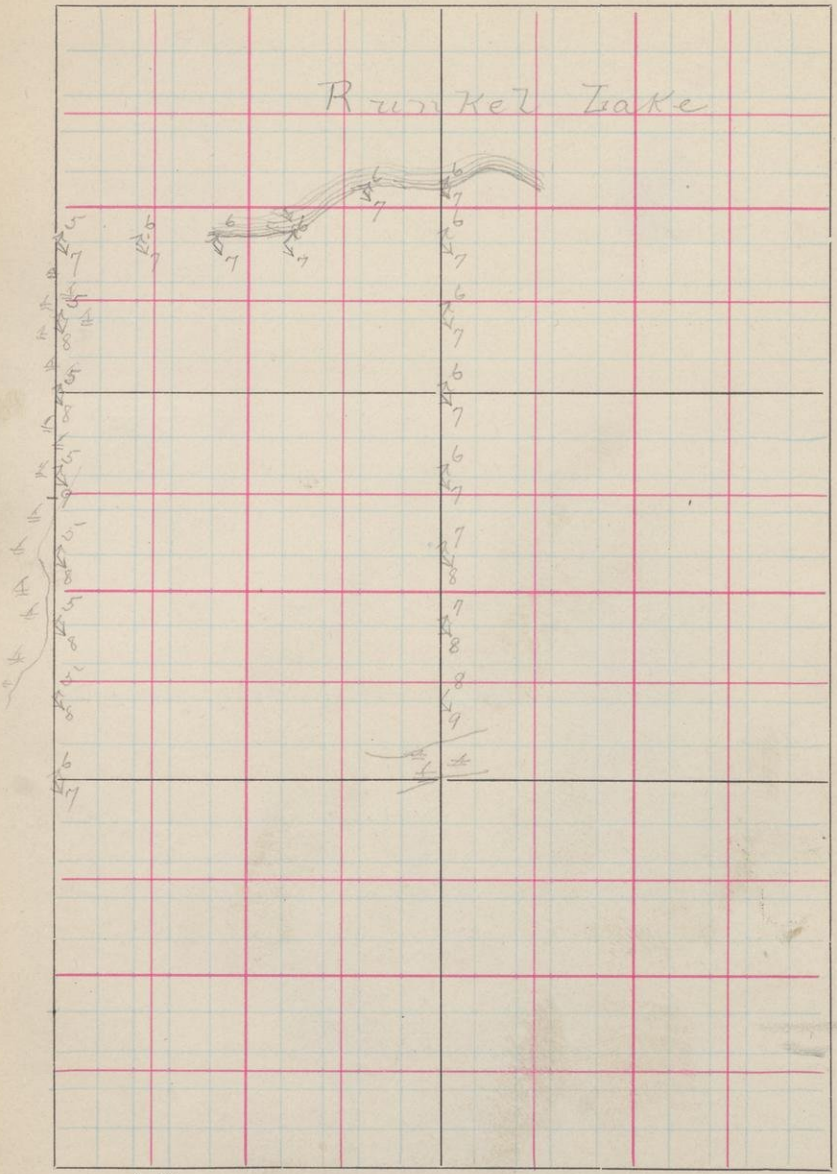


Blank Odd Pages

81-101

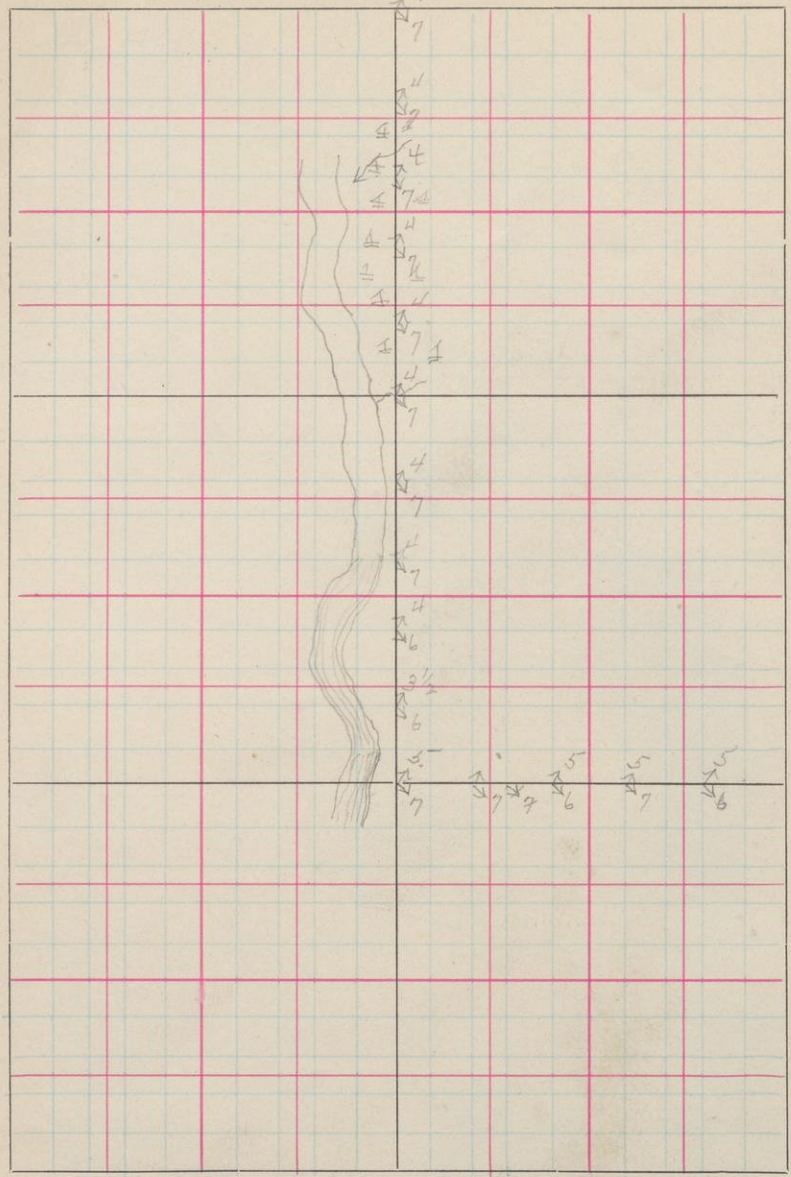
Skipped

S. 27 T. 43 R. 32 N. W. 1/4




6—747

S. 33 T. 43 R. 32 W. E. 1/4



6—747

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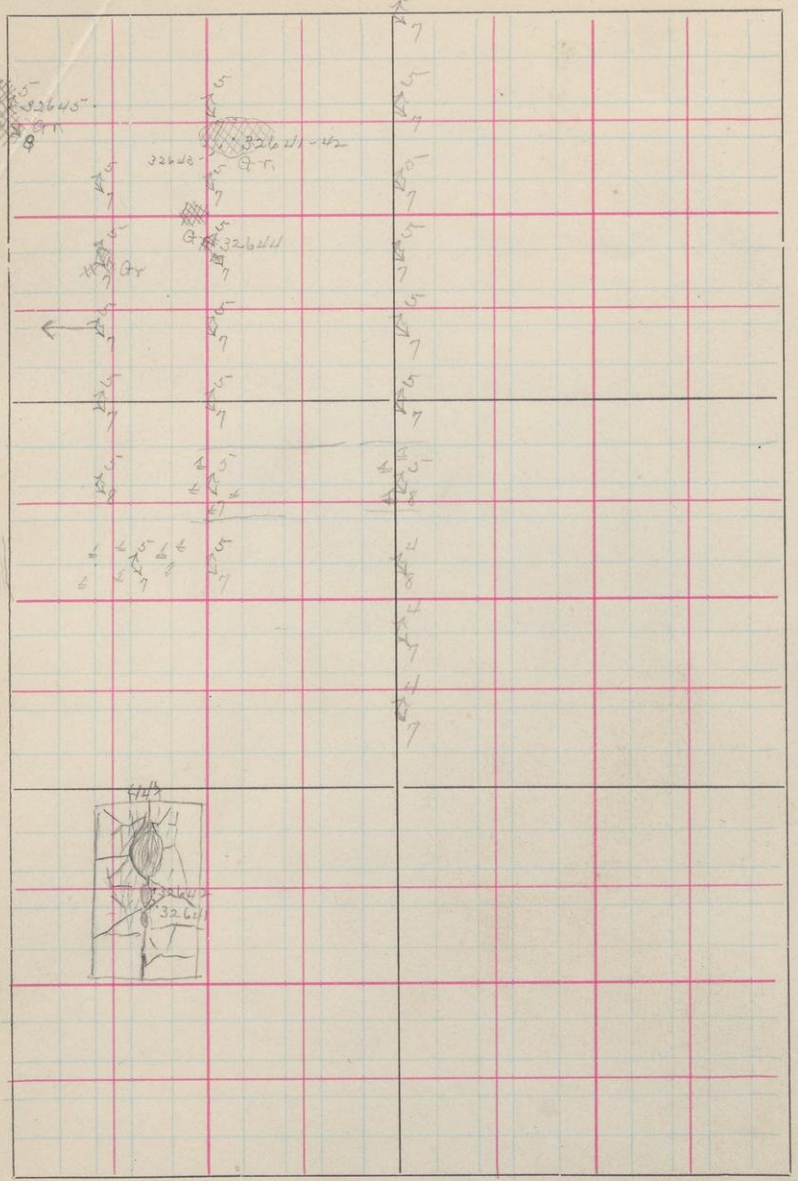
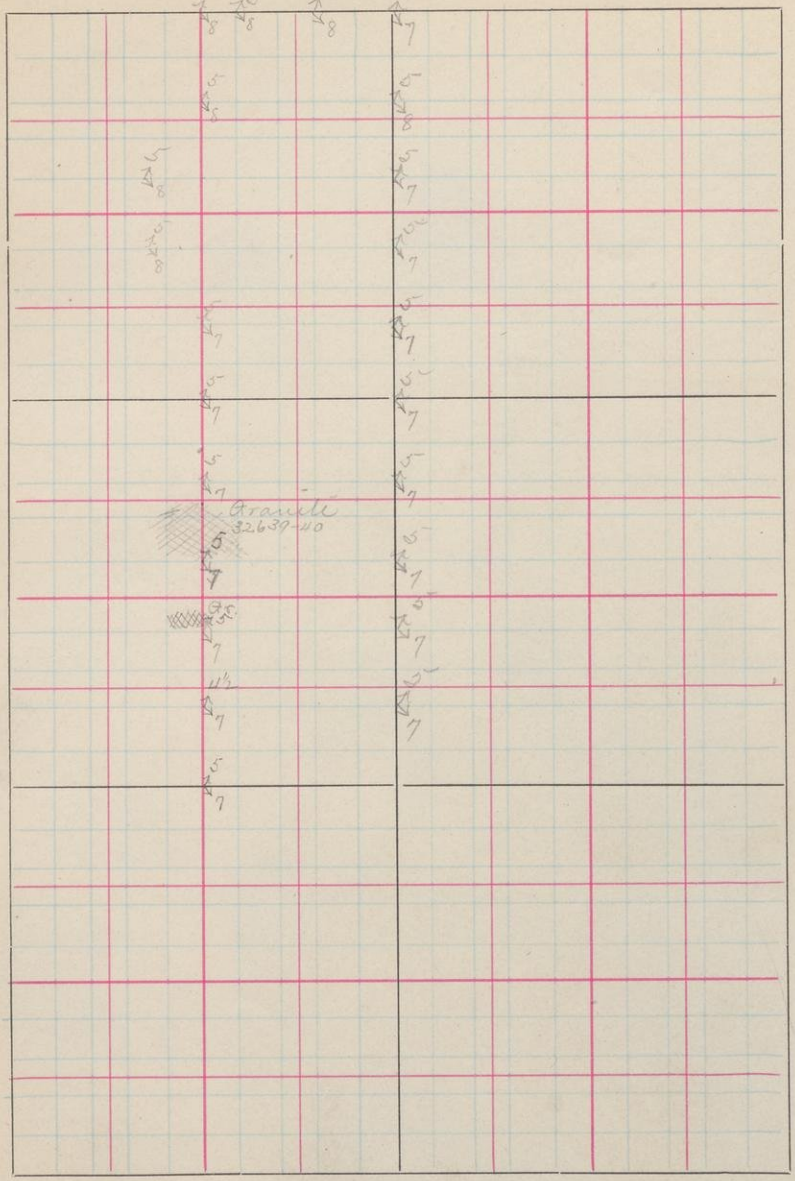


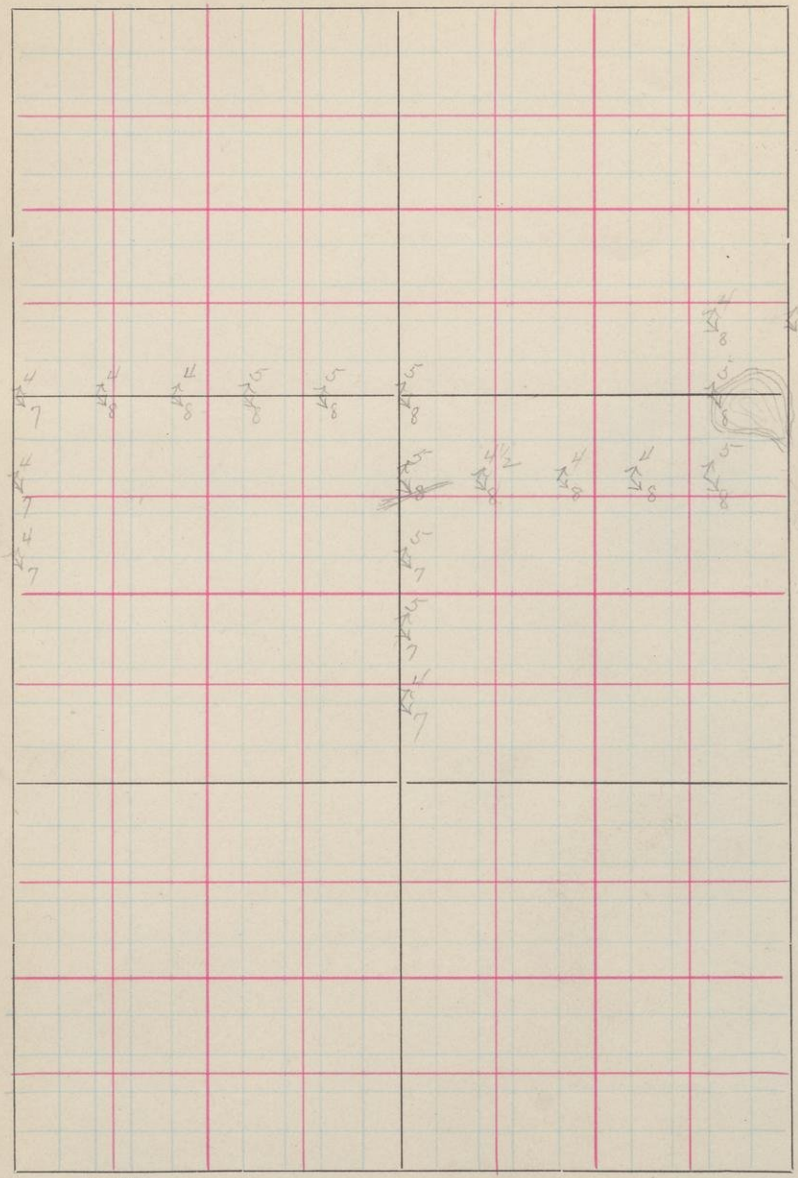
6—747

S. 28 T. 43 R. 32 N. E 1/4



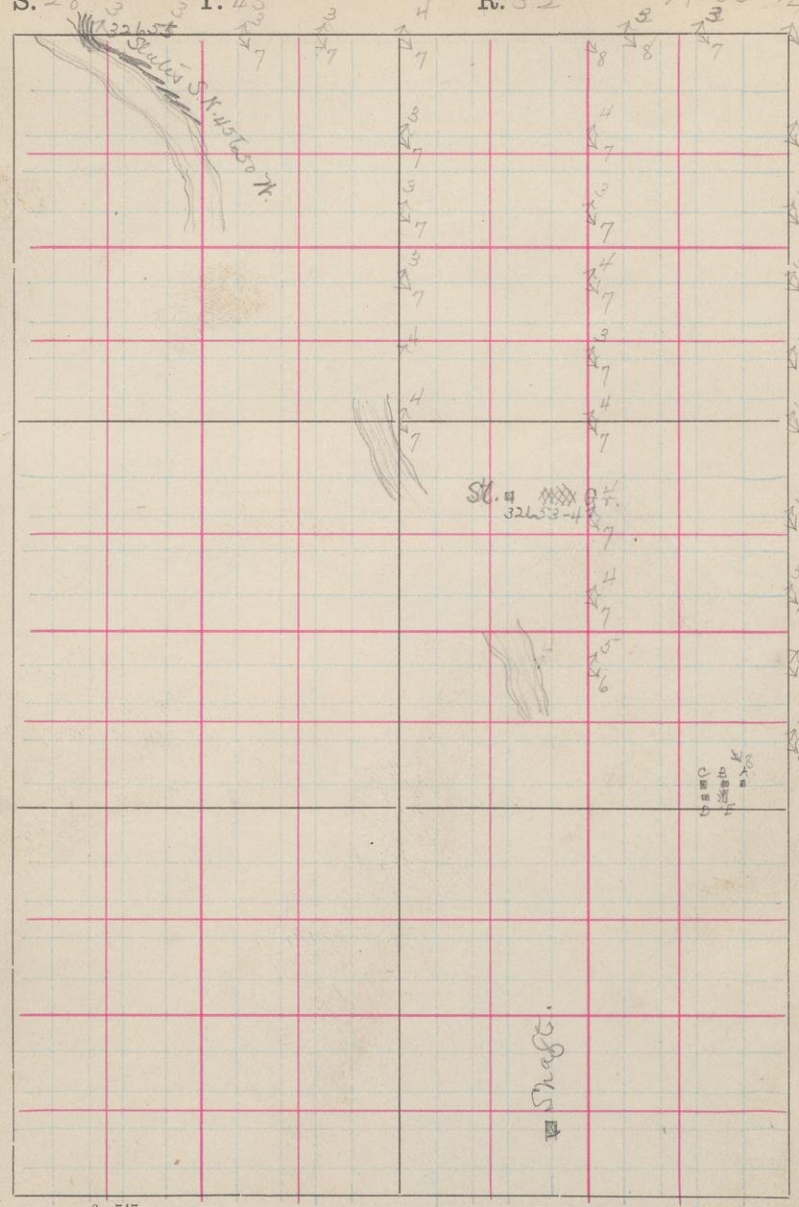

6—747

S. 21 T. 43 R. 32 S. E. 1/4



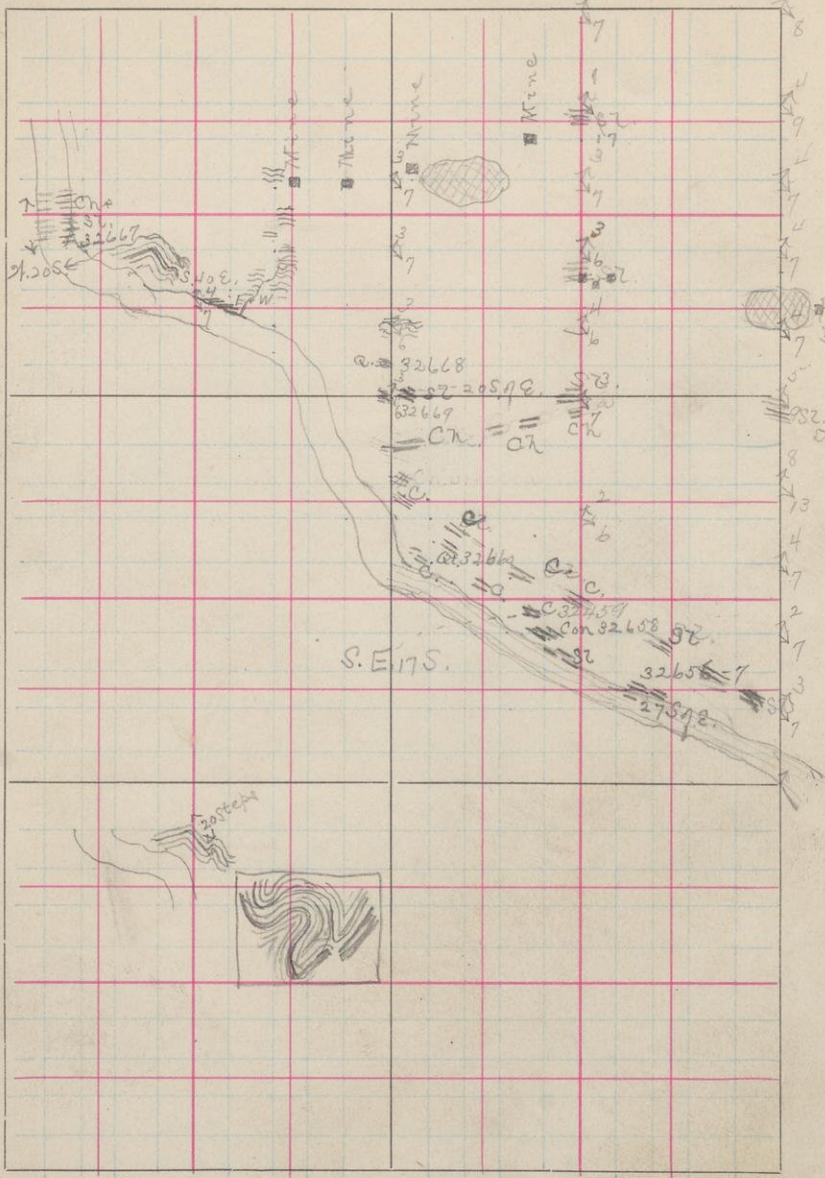
6—747

S. 28 T. 43 R. 32 N. W 1/2



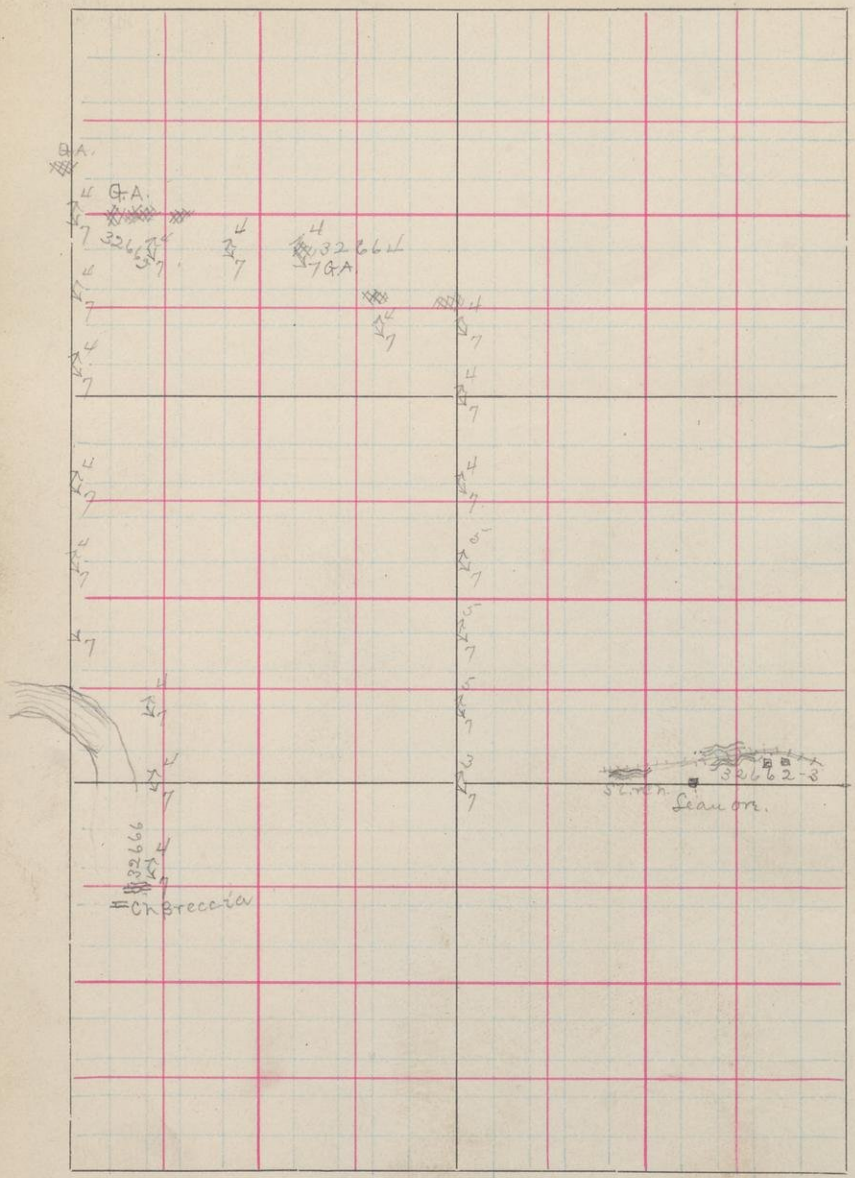
6—747

S. 20 T. 43 R. 32 W. 4th P.M.



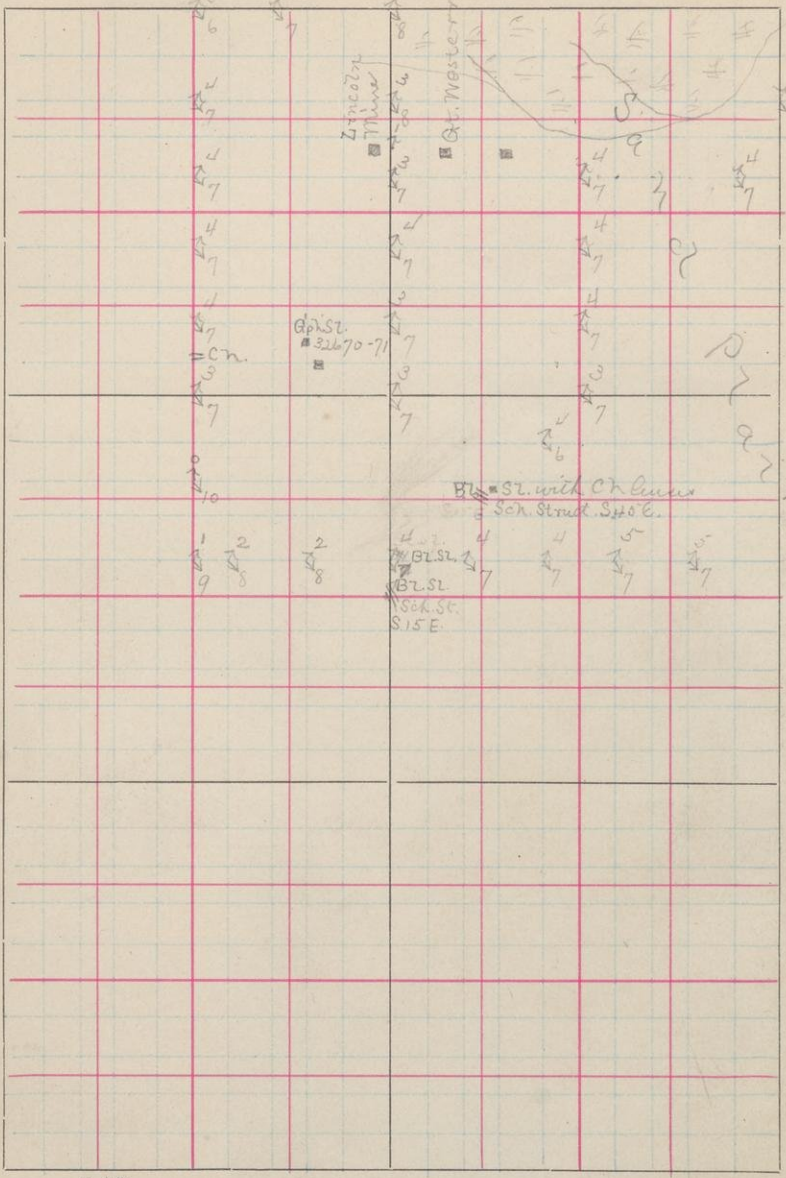

6—747

S. 20 T. 43 R. 32 N.E. 1/4



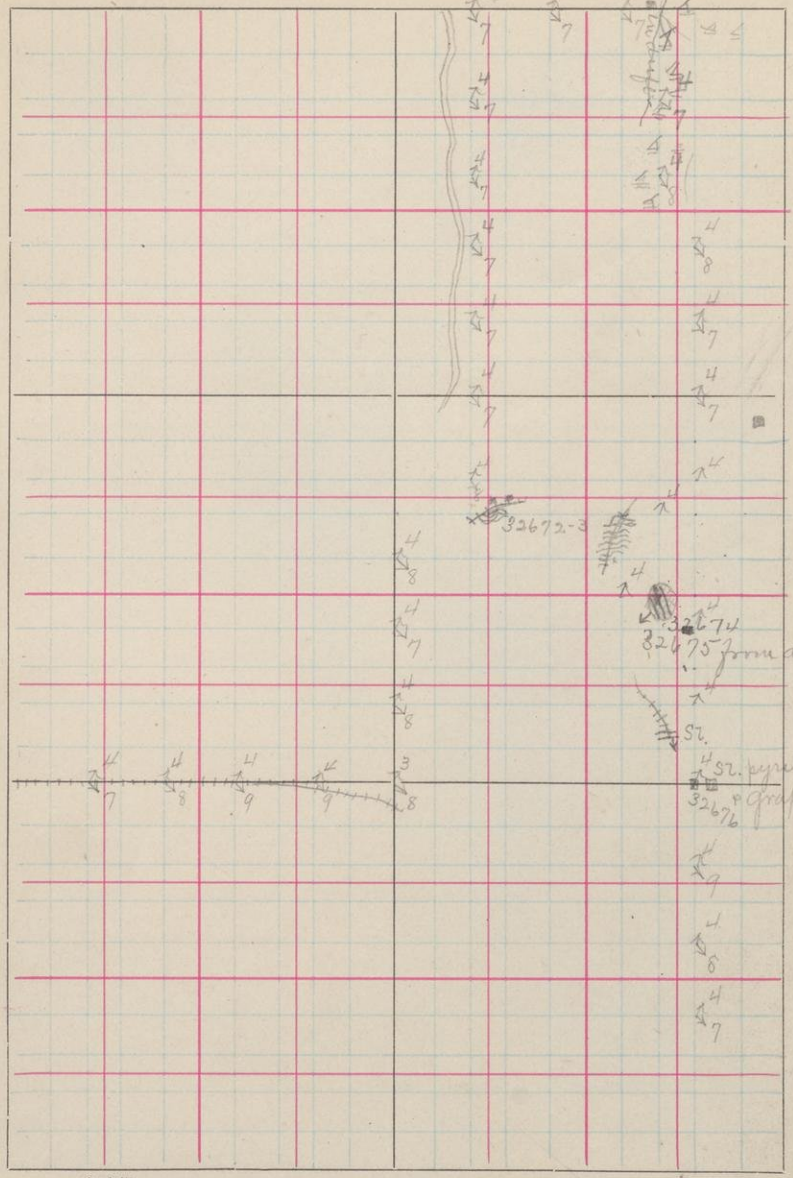

6—747

S. 21 T. 43 R. 32 D. W. 41



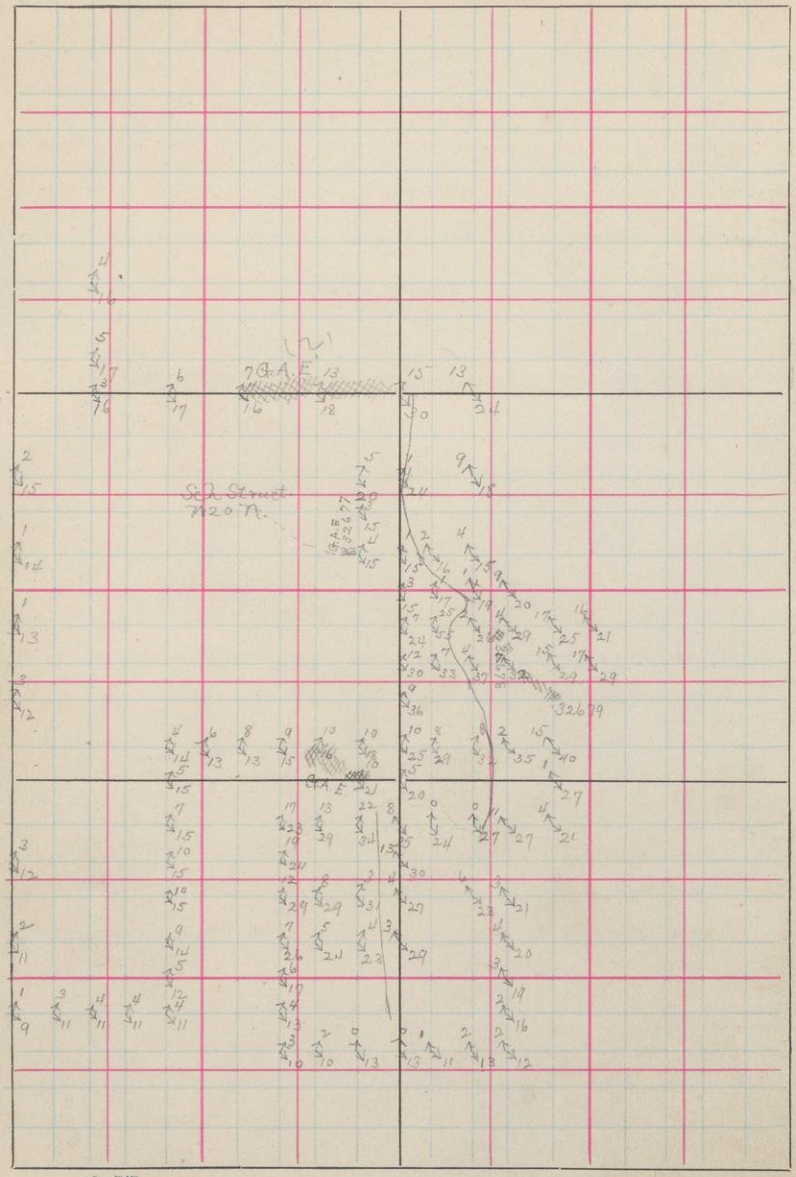

6—747

S. 21 T. 48 R. 32 N.E. ¼



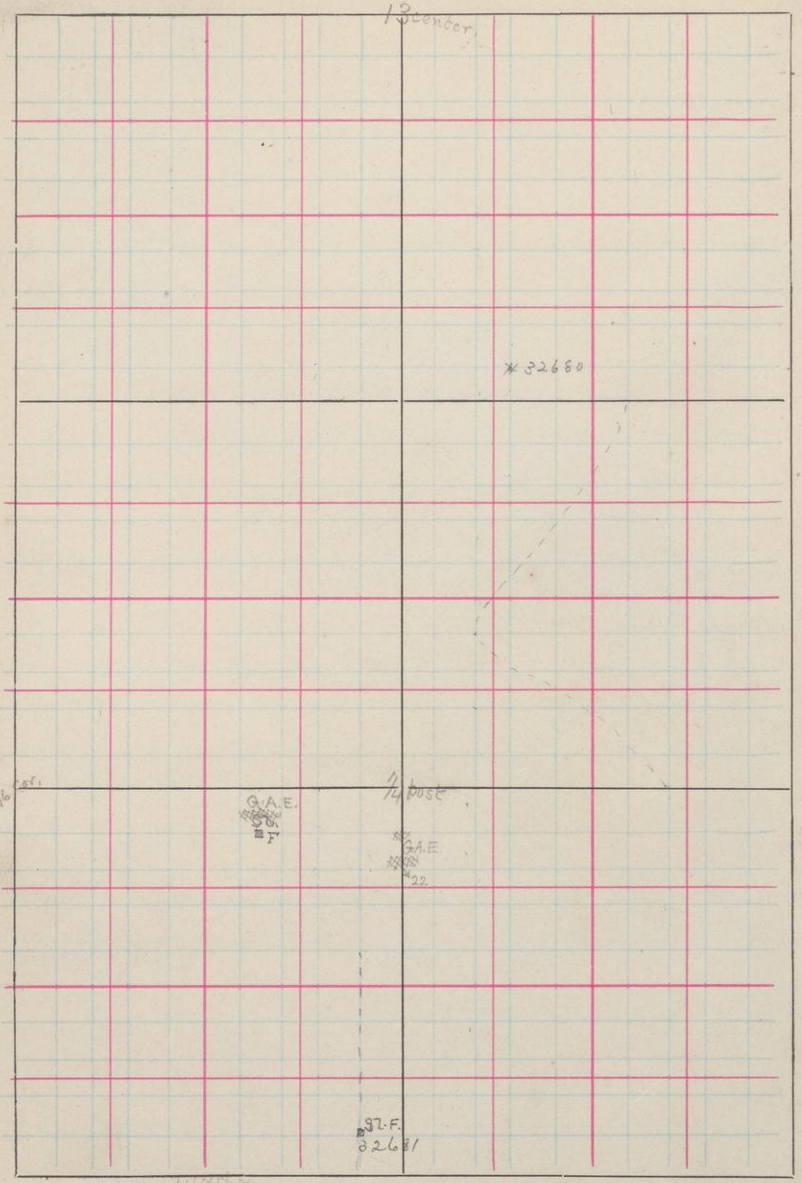

6—747

S. 25 T. 43 R. 32 W. 1/2




6—747

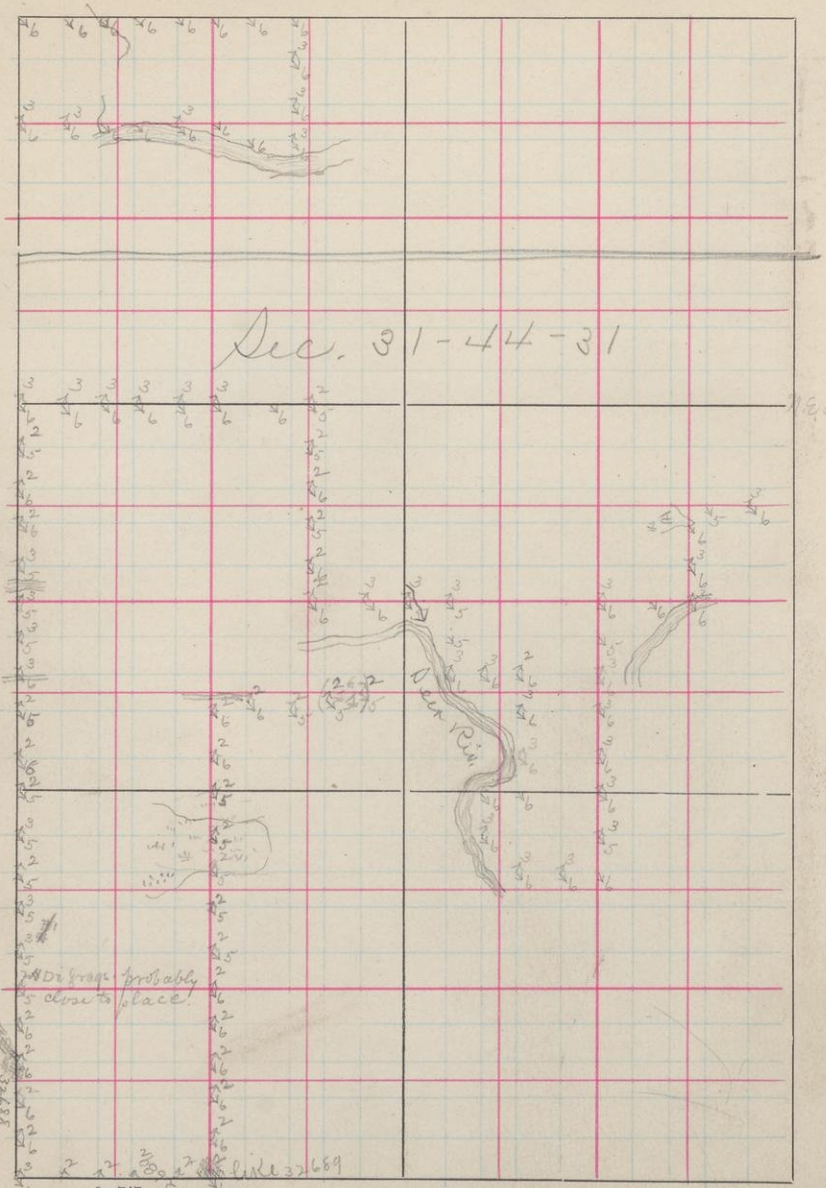
S. 13-24 T. 43 R. 32




6—747

G.C.

S. 32 T. 44 R. 31




6—747

< 20 ft. > looking S. at S. side of Ry. cut

Lincoln & Gt. Western dipping S. Ore Sticking 20° S. 70° W.
Hanging wall more shaly than foot which is
banded chert and ore
Paint & Monitor dip N. Hanging and foot both
the Lincoln
Anywhere they find a chert band in the slate
formation they explore for ore
as the veins the rock pitch high especially in
the Lincoln where the pitch is to the west at 30°

232641-2

Sept. 92

5 - 7 add 2.
8 - 10 " 3
11 - 13 " 4
14 - 15 " 5
16 - 18 " 6
19 - 21 " 7
22 - 24 " 8
25 - 27 " 9
28 - 30 " 10

October.

1 - 3 add 11
4 - 7 " 12
8 - 11 " 13
12 - 15 " 14
16 - 21 " 15
22 - 31 " 16

N.W. 5 - 2 to 3. E.

N.E. 6 2 to 3

N.W. 6 { 2 on East side
1 " W. "

N.E. 1 1 E to 0.

N.W. 1 Line on W side