# Central Missouri: [specimens] 15001-15259. No. 79 1888

Haworth, Erasmus
[s.l.]: [s.n.], 1888

# U. S. GEOLOGICAL SURVEY

## FIELD SECTION BOOK

No. 79

1888

Central Missouri

Erasmus Haworth

15001 - 15258

# SURVEY OF THE PRE-CAMBRIAN ROCKS OF THE N.W. STATES.

## 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 figure attached, showing the amount and inclination of the dip. Denote slaty or other very plainly bedded rocks by lines running in the direction of the strike, with figures and a dip arrow attached as before. In all cases where there is the least doubt about the true bedding directions, 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 as 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.

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, for instance: 4025 250 *N.*, 300 *W.*, *Strike*, *N.* 6° *E.*, *Dip*, 50° *E.* Then follow with as full a description of the ledge as possible.

3. The ruling of the left hand page is also arranged so that a smaller scale can be used. Each one of the black lines may represent a section line and the red lines quarter sections and "forties." The scale of the maps may thus be reduced, if desirable, to two inches to the mile (the ordinary town plat scale.)

4. Collect a specimen from each separate ledge of rock, or wherever there is a change of rock on any one ledge. In case of trips made on foot or in canoes, for long distances, neighboring ledges, unquestionably of one kind of rock, need not be sampled, the position and extent of the ledge being marked on the map, with a note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples, 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 § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. In all cases collect chips for slicing. All specimens are to have numbers painted on them, in white on a black background, in the field.

5. 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., etc.

#79

For convenience and accuracy the colors shown on the opposite page, will be used in this note book. Contact lines between any two where traced accurately will be represented by an unbroken black line thus ———, but where there is any uncertainty regarding the exact location of boundaries the division line will be represented by a broken line thus - - - -.

= Granite.

= Porphyry.

= Limestone.

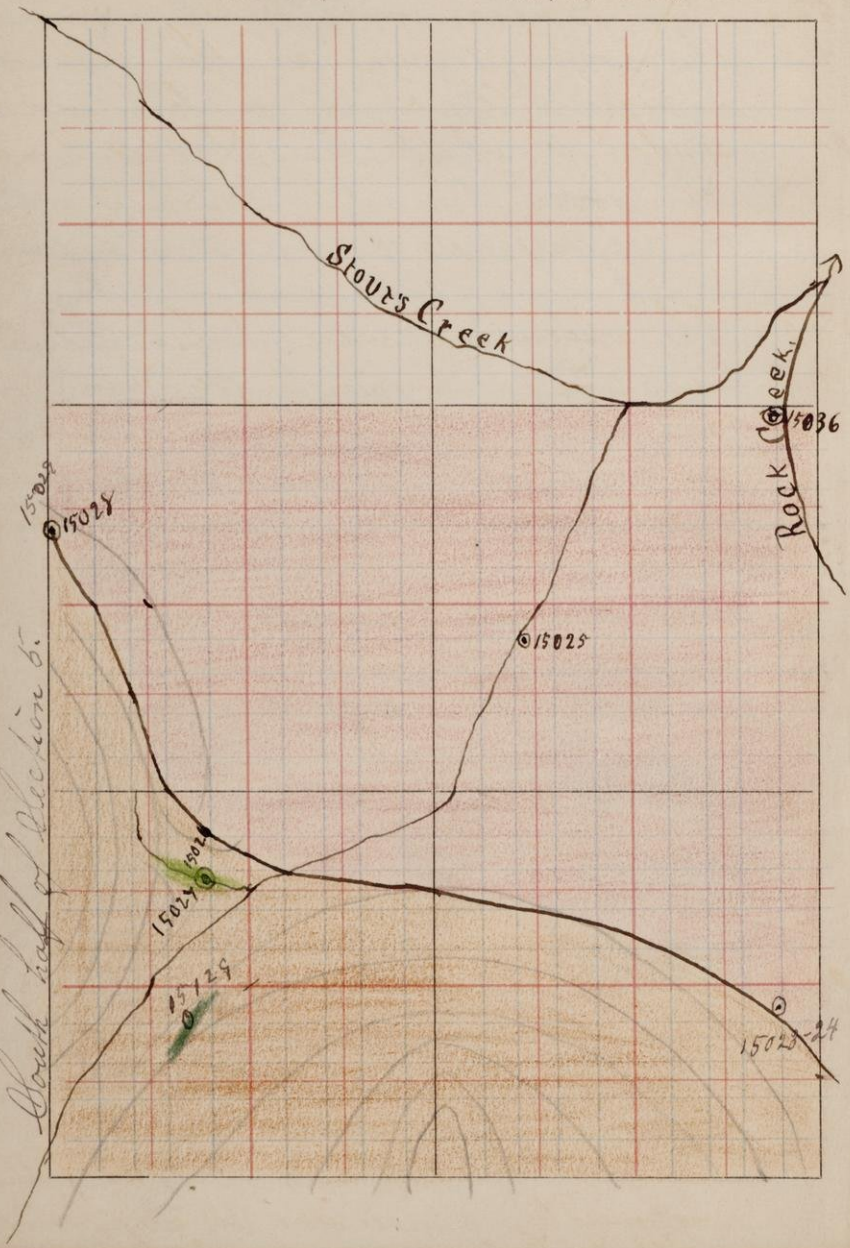
= Sandstone.

= Dyke-rock.

F. = Flint-rock, or Chert.

1/2

T. 23, N. R. 5, E. Section 5



~~15022~~ ~~This specimen was taken from the porphyry bluff at the foot of a high hill, and is a fair representative of the neighboring porphyry.~~

See page 9

15023 & 15024 The specimens were taken from the line of contact between the granite and porphyry. The contact line seems to be pretty plainly marked if one makes a superficial observation; but to find the exact division between the two is not easy. Only a few feet on either side of the line we find characteristic rocks.

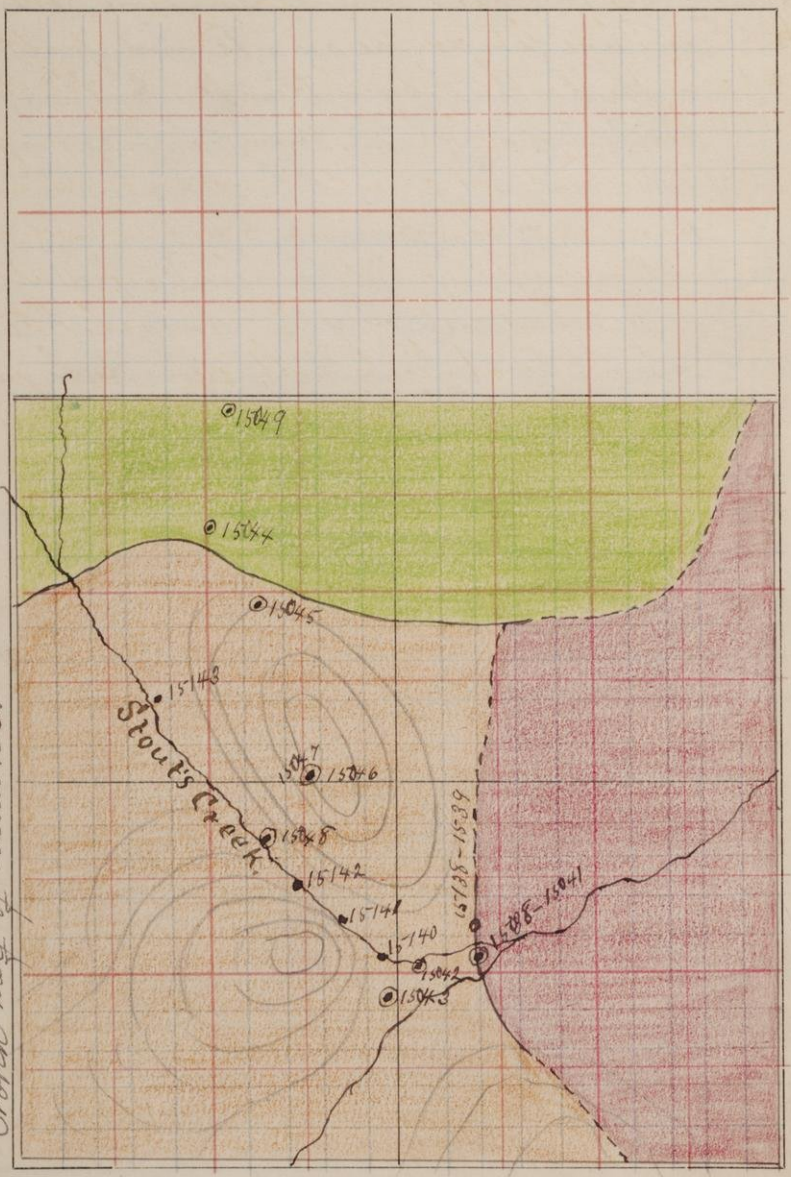
15025 Granite, taken from the right bank of the little branch. Large exposures of granite occur here.

15026-27 This is a very interesting exposure of coarse sand-stone or conglomerate. Porphyry boulders as big as a man's head, and considerably water worn are very abundant in the rock, showing that this conglomerate is younger than the neighboring porphyry.

See P. 5-6.

1/2

T. 33 S. R. 5 E. Section 6.



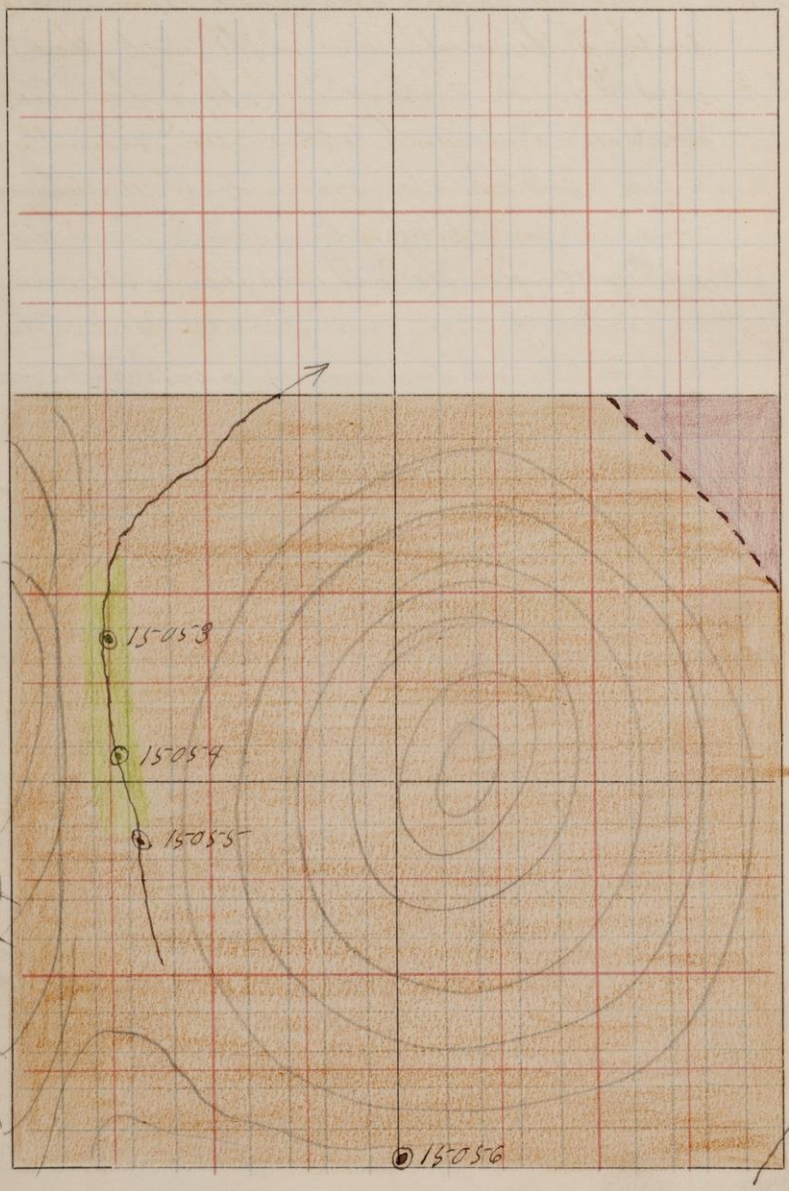
15038 to 15041 These specimens were taken from the contact line between the granite and porphyry, on the north slope of "Bunkers Hill", the location of which is shown on the map. To the east the granite is very abundant, and many large boulders from 4 to 8 ft. in diameter are scattered over the surface evidently never having been very far removed. The division line, at first sight, seems to be quite plain, but careful examination in some places showed that there was no seam, or fissure, between the two kinds of rock. 15038 was taken so as to show the two phases. '39 is porphyry 6 in. away, '40 is porphyry 15 in. away, and '41 is porphyry 40 ft. away.

15138 & 15139 This locality seemed to be so interesting that I visited it a number of times, and finally gathered a new set of specimens. '38 is granite and '39 is porphyry from just across the creek to the north. They were about 27 yds. apart. The bank on the north side is quite low and the rock exposures are not abundant. On the south side there is a high bluff reaching fully 300 ft. at a point about 300 yds. up the stream from the contact line.

See P. 52

2/2

T. 33 N. R. 5 E. Section 6.




South half of Section 6.

15053 & 15054 Along the ravine at a place from 1/4 to 1/2 mi. south of the north line of the map there is a very peculiar looking rock. It is of almost ashy whiteness and seems to have been originally a coarse conglomerate composed of porphyry boulders and porphyry gravel. As these boulders decayed shells of decayed matter would be formed. In many instances the central part of the boulders are comparatively sound. 53 & 54 are samples of this rock.

15055 This is a porphyry which fairly well represents the porphyry on the hills at the head of the ravine. There is nothing peculiar about it or its mode of occurrence which would distinguish it from other porphyries.

15056 Porphyry taken from the summit of a high hill known as "Compton Mt." The whole of the country to the east, south and west is a maze of porphyry hills, with but little difference in the character of the rocks, so far as their macroscopic appearances are concerned.

3½

T. 33. N. R. 5. E. Section 5.

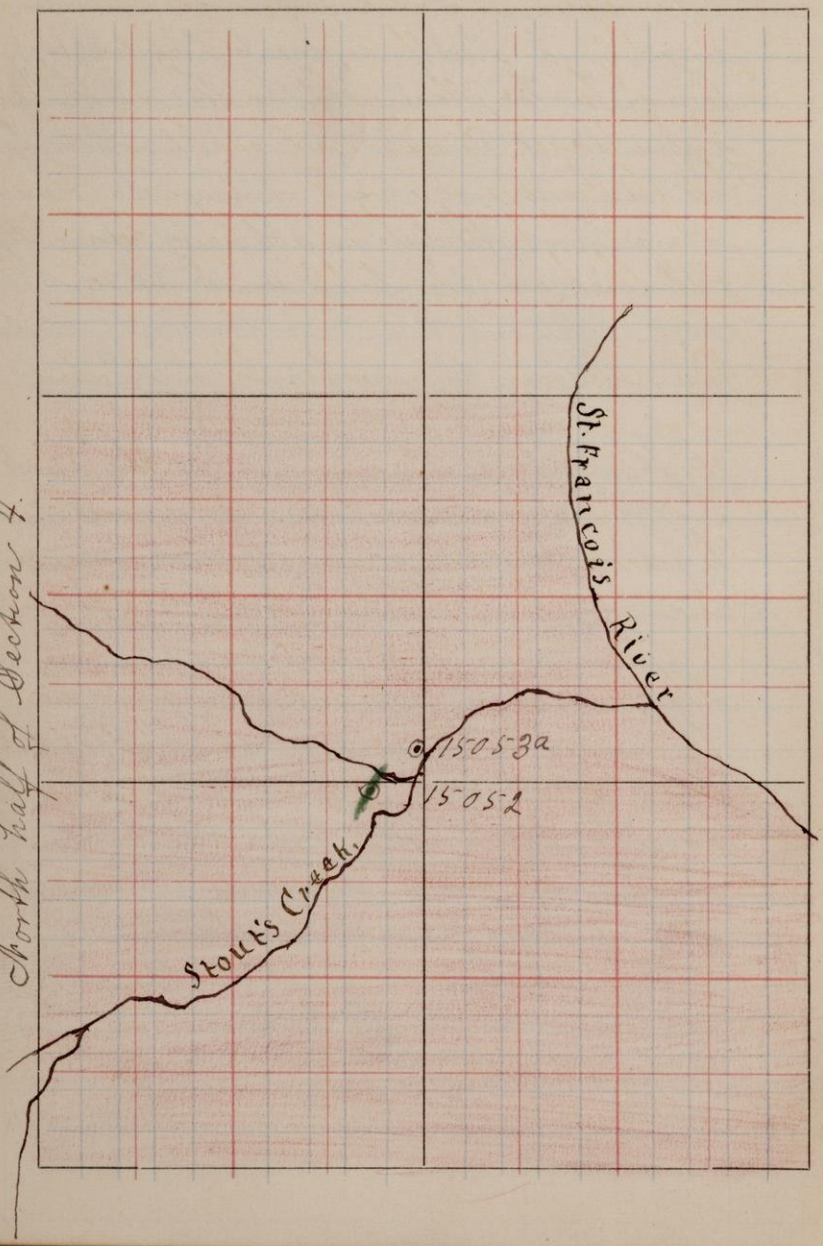
15037 This speciman of granite came from the north bank of Stout's creek about 1/2 mi. below the old Henson mill. There are heavy exposures of granite for a considerable distance up and down the creek. This would be a splendid place to open up a quarry. In the Summer of '86 a little work was done here, but railroad facilities were so poor the work was stopped.

15050 This granite speciman is from the road-side by the school-house on the "Gravel Road". The granite extends farther north here than in some other places.

15051 This is about the same as 50.
The area on this map north of Stout's creek represented as a granite area is generally covered with soil. But in a great many places the rocks are exposed, and in others granite boulders cover the surface, so there can be no doubt whatever with reference to the nature of the underlying rock.

4 1/2

T. 33. N. R. 5. E. Section 4.

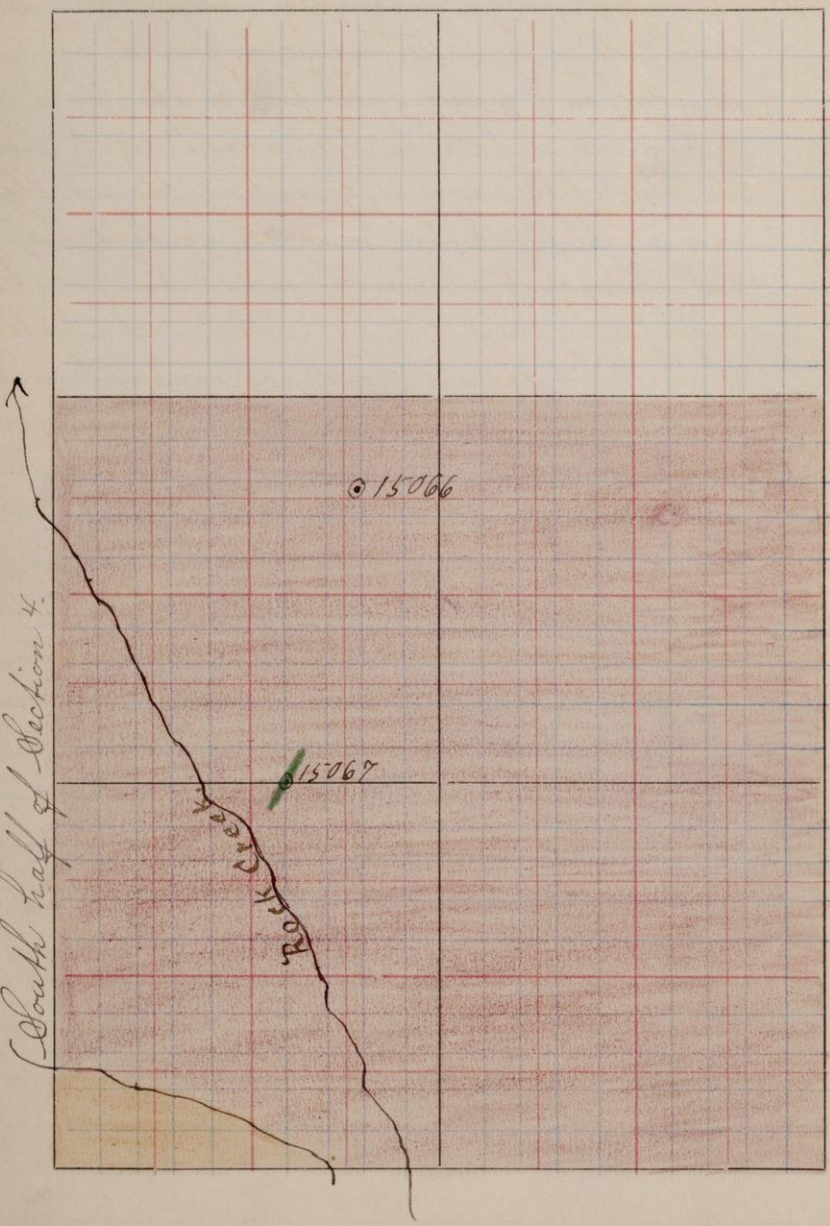


15052 This specimen is a dyke rock. It was found in a small ravine which runs through Mr. McAllen's field on the north side of Stout's creek. The dyke itself could not be found, but the boulders were very numerous, and were so large that the dyke must have been fully 2 ft. thick, and probably much more.

15053a This specimen is granite. It was taken from the left bank of Stout's creek just at the point where the creek leaves the bluff and bears east into the St. Francois.
The granite here were unusually fissured into angular blocks like the porphyries, but otherwise seem to be good granite.
The portion of this section which lies to the east of St Francois was not examined in detail, and therefore is not colored on the map.

6 1/2

T. 33. N. R. 5. E. Section 4.

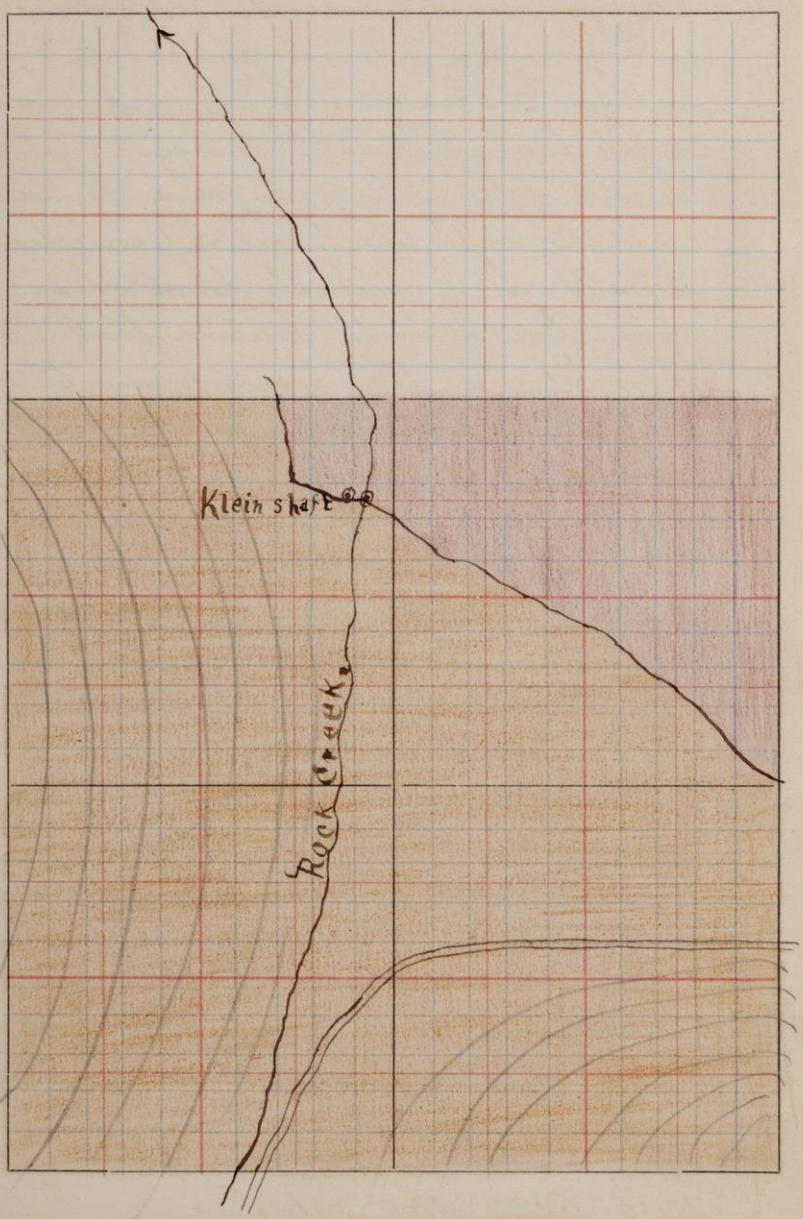


15066 This specimen is a granite taken from the east side of Mr. McAllen's field. I could find no ledge and consequently took a specimen from a big boulder in the ravine.
The whole of this section, excepting the small area in the S.W. corner is in the granite area, and although it is generally covered by soil the granite boulders and occasional out-croppings of the solid granite leave no reasonable doubt that the whole of the are is underlayed with granite.

15067 This is dyke rock taken from the ravine just south of the house of John Burk.
The dyke is in the solid granite, is at least 3 or 4 ft. wide, and may be more. It trends N.E. and S.W. Just west of it about 2 rds. another dyke crosses the ravine with the same trend. The whole country through here seems to be full of small dykes, especially to the S.E. of this place. Usually nothing can be seen excepting the boulders which lie on the surface. In every case yet observed in which the trend of the dyke could be determined it was N.E. and S.W.

7 1/2

T. 33. N. R. 5. E. Section 9



15108
to
15128

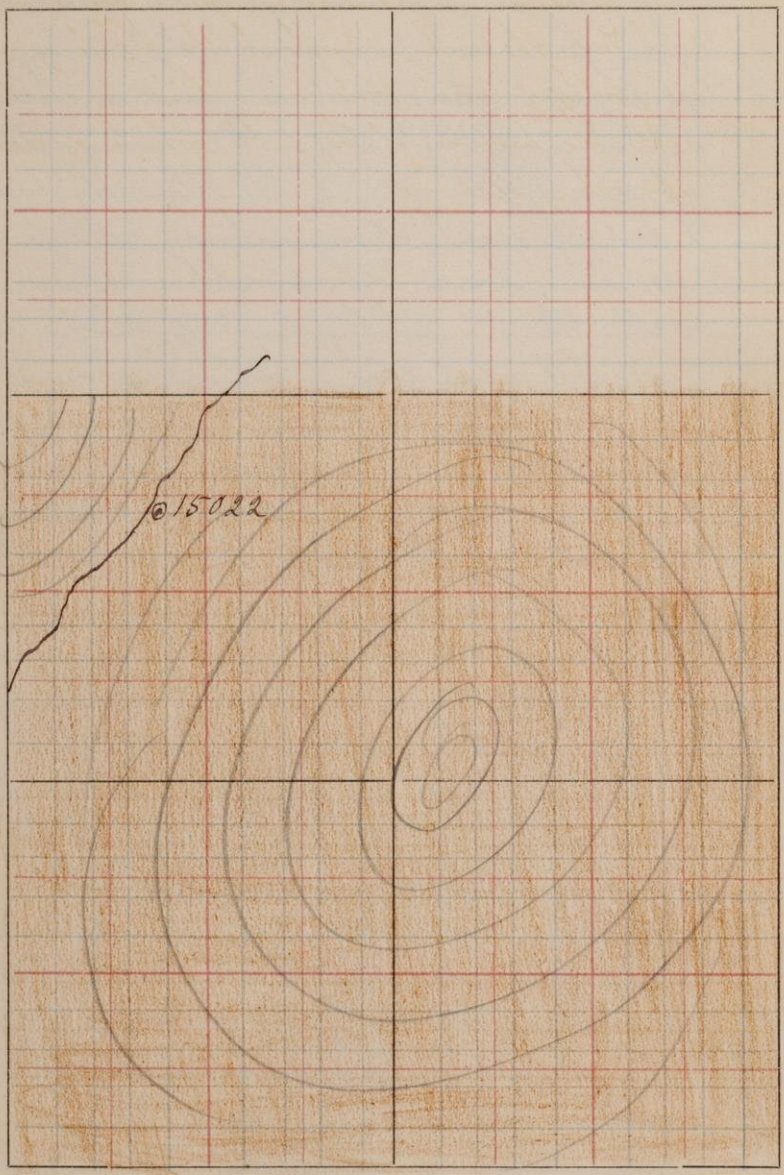
Just on the west bank of Rock creek 30 yds. above the contact line between the granite and porphyry, as shown on the map, a shaft has been sunk 30 ft deep. It is now filled up to a depth of 18½ ft below the surface. I had the water dipped out and collected specimens from different places along the walls. This is a most interesting place. We have what seems to be a change from the non-crystaline to the crystaline condition ~~and the~~ by gradual transitions, and the whole can readily be seen by examining the walls of the shaft. There is an absence of any appearance of intrusive rock. The changes are much more rapid than one would have suspected, usually being quite complete within 2 ft. or less. At the N.E. corner near the surface is one of the coarse spots. Immediately below it the rock is not macroscopically crystalline, but a few feet lower the coarseness of grain again becomes apparent, and at the depth of 18 ft the rocks on the north, west, ~~and~~ south sides are quite coarse. Specimens were gathered as follows

15108, Klein shaft, middle of N. wall 3 ft. 8 in.
15109, Adjoining 108 on the E.

See P. 57

8 1/2

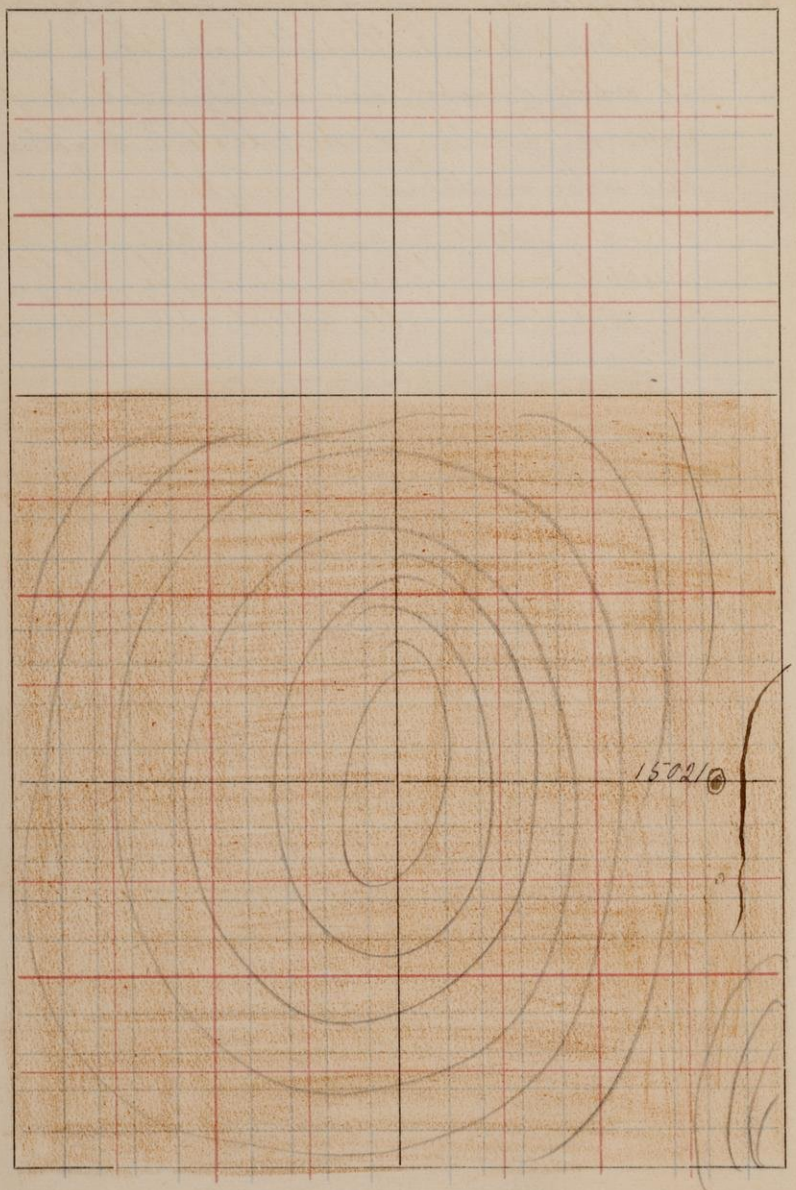
T. 33. N. R. 5. E. Section 8



15022 This section is wholly occupied by Rock creek Mt. The rocks throughout the whole section are porphyry, and there is nothing to contrast with the portions of the hill which extend into other sections.

9 1/2

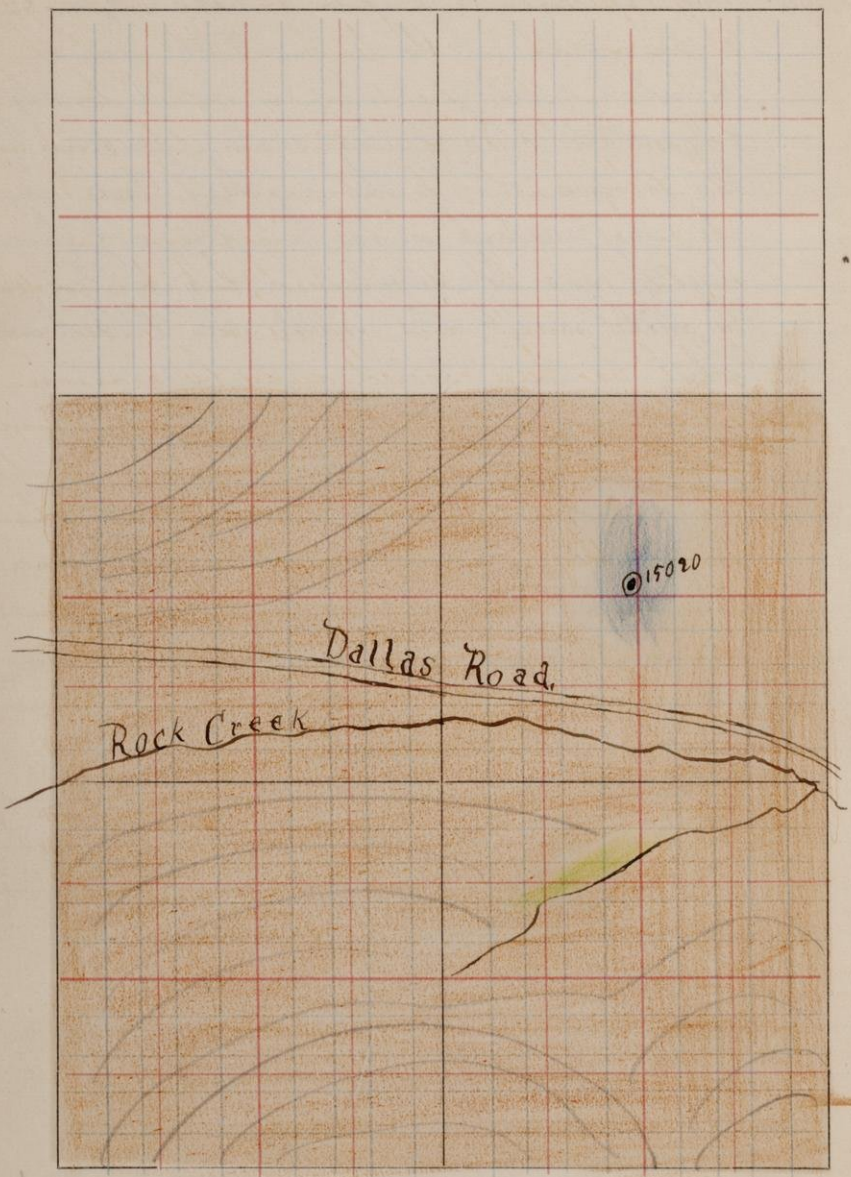
T. 33 N. R. 5 E. Section 7.



15021 This specimen is porphyry taken about 75 yds. up the hillside from the ravine. The whole country around is solid porphyry. I traveled through the eastern portion of the section, along the northern line and also the western side but did not pass directly over the summit of the hill. The hill is locally called the Blankenship Mt.

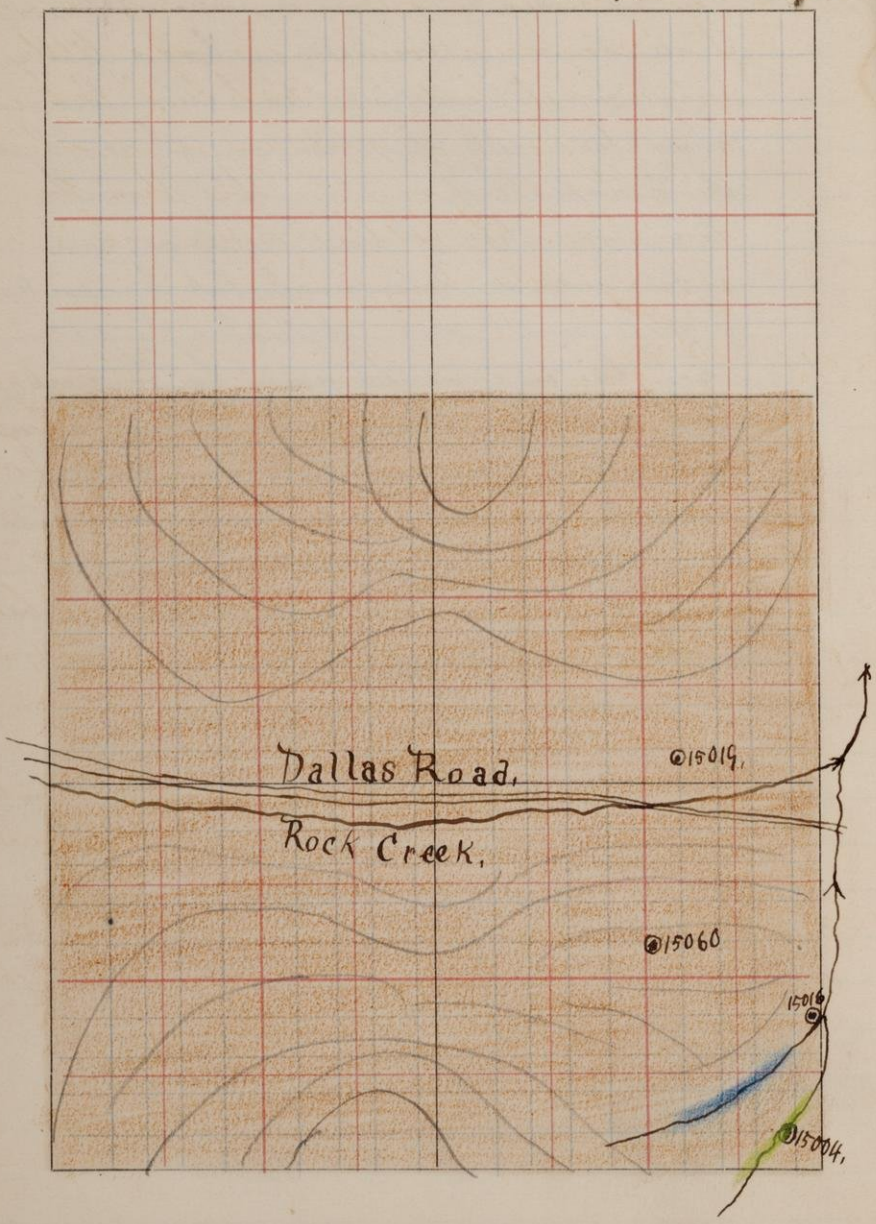
10 1/2

T. 33 N. R. 5 E. Section 18.



15020 This specimen is a poor variety of limestone. It was found in the little field N. of the Dallas road. The field in on rather low ground between Rock creek mountain on the east and the Blankenship mountain on the west. The exact extent of the limestone area could not be determined, but it is evidently quite small, and represents a larger mass which has been carried away by erosion. Rock Creek runs through the section from east to west dividing it into almost equal parts. On the south of the creek near a little branch there is a very small exposure of a fine grained sandstone, the location of which is shown on the map.

11½ T. 33 N. R. R. 5 E. Section 17



15004 This specimen is a coarse sandstone, or a fine conglomerate occuring along a little ravine which leads into Rock creek. It has many fragments of porphyry in it which shows that the porphyry is older than the sandstone. The bedding of the rock is approximately horizontal.

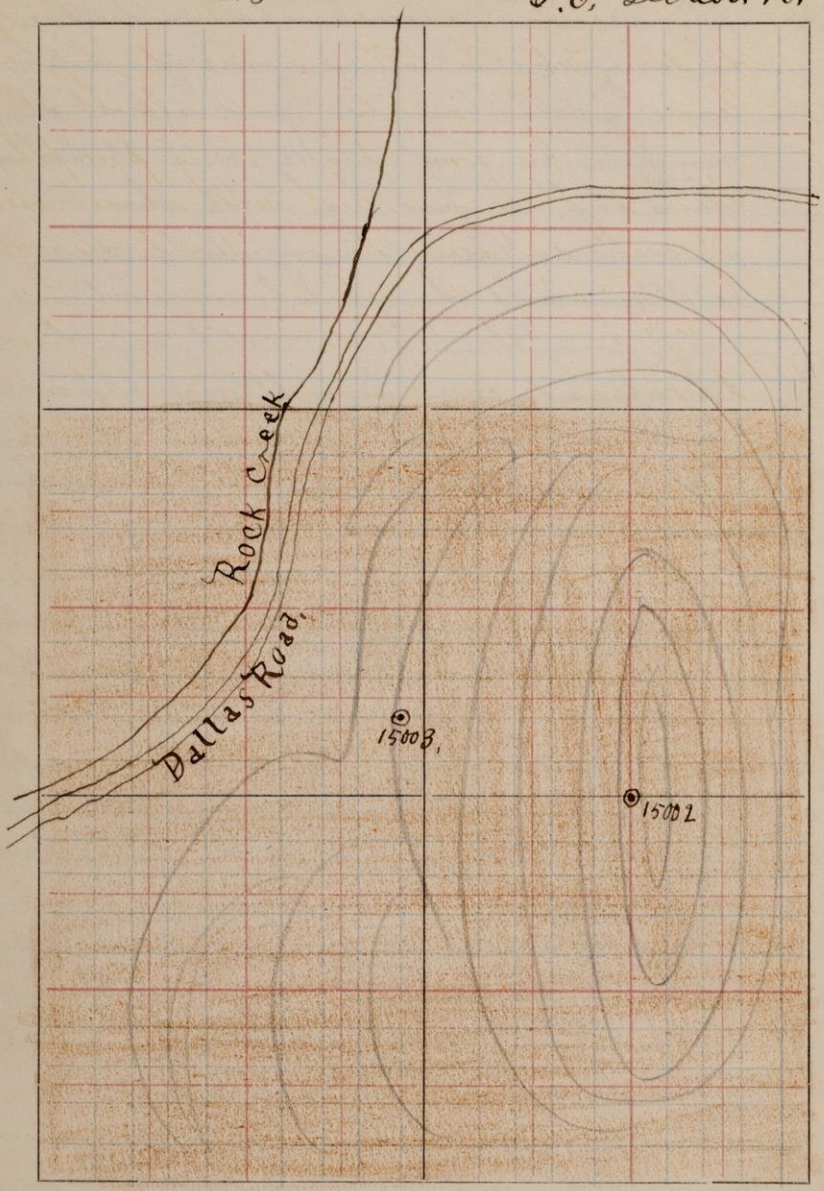
15016 This specimen came from a ledge of porphyry by the side of the branch as shown on the map. Macroscopically it shows the flow structure remarkably well.

15019 Porphyry, from the bluff on the north bank of Rock creek on Mr. Payne's farm, nearly 1/4 mi. W. of E. line of Section. It has been studied and described in my Dissertation under No. 287 and is a remarkably good illustration of what I have called the "Poicilitic" structure.

15060 This rock was taken west and a little south of Mr. Payne's house. It is a remarkably light colored and flinty porphyry.

12 1/2

T. 33. N. R. 6. E. Section 16.



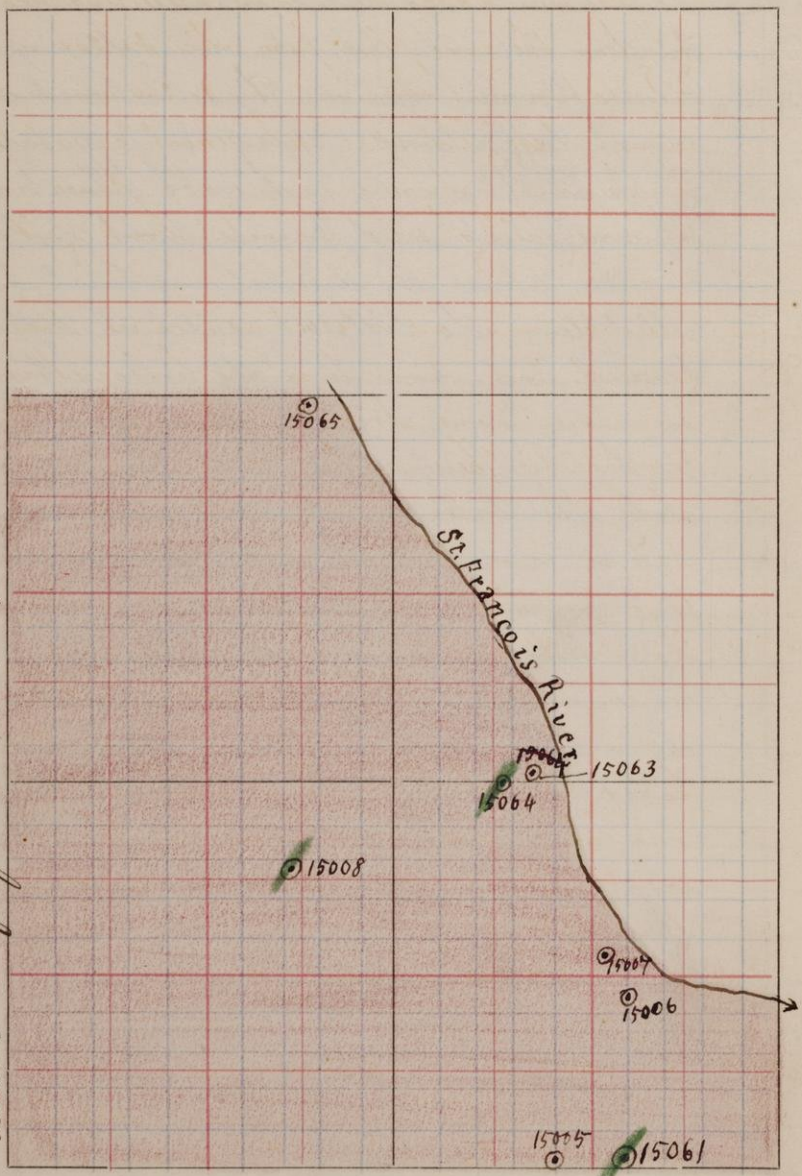
15002 This section is almost wholly occupied
& by "Blue Mt." The hill is a mass of porphyry,
15003 ledges of which can be found almost all
around it. In some places it is precipitous,
bluffs 20 ft. or more high, with almost verti-
cal walls extending for considerable distances.
In other places the detrital material has
rolled down the hillside until it is of even
descent, and one can well ride up or down
it. Specimen 2 is from the summit of
the hill; number 3 is from the western
slope about half way down the hillside.

It is on the south-eastern portion of this hill
that the so-called "asbestus mines" are located.

Extending southward from the Blue
Mt. for a number of miles, is a row of por-
phyry hills which are very steep and high.

13½

T. 33, N. R. 5, E. Section 3.




South half of Section 3.

15005 This specimen of granite is very interesting because it is from the same place from which No. 267 in my Dissertation was obtained. This No. 267 was noted on account of its "feld-spar enlargement" crystals. The specimen is from a ravine at a place where there are falls of solid granite about 15 ft. high.

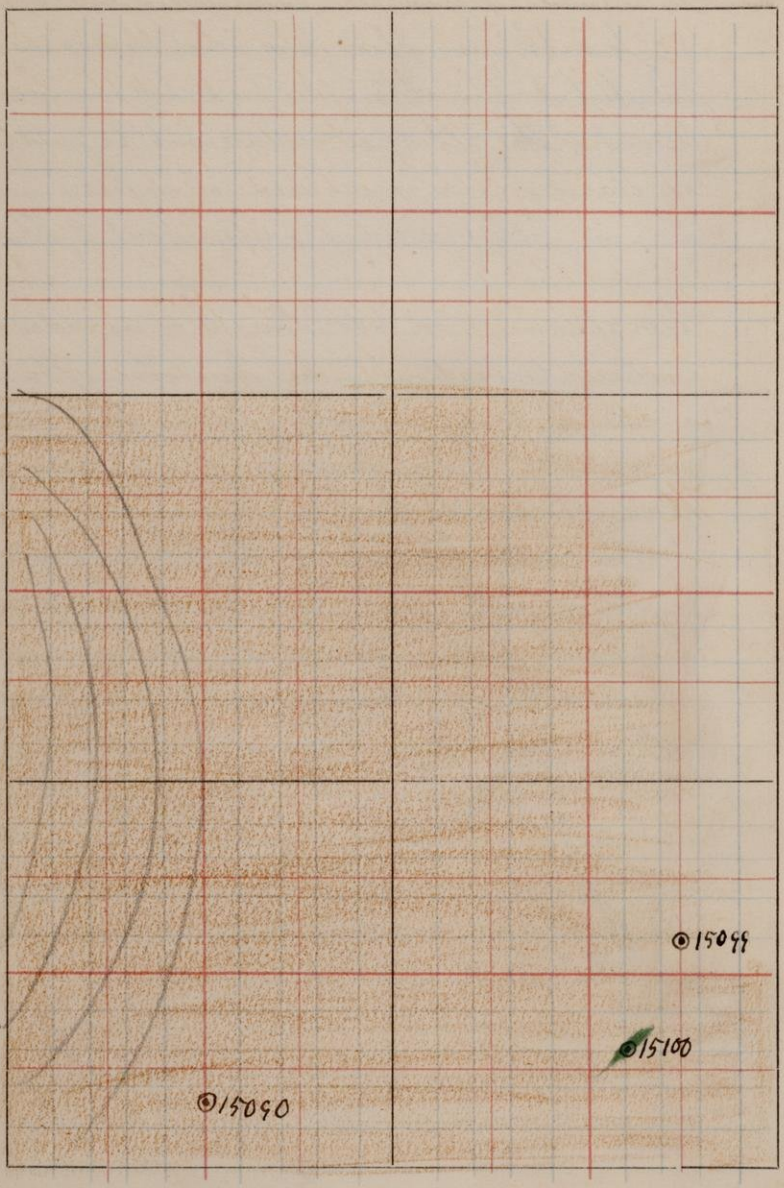
15006 & 15007 These specimens are interesting because they show gradual transitions from the holocrystaline structure to one strongly approaching the porphyritic. There is a high bluff here about 300 ft. above the water level in the river. No. 6 is from the side of the hill and is a fairly good granite. No. 7 is from the extreme summit and in its every appearance is closely allied to the porphyries, and in fact must be called a porphyry. There is a vertical wall fully 20 ft. high at the point from which it was taken, and the fissures in the rock are exactly the same as those so common in the porphyries, dividing the rock masses into angular blocks of varying size.

15063 This specimen in appearance is about half way between granite and porphyry. It was taken from a boulder. The surface at this point is covered with loose rock, some of which are

See P. 59.

14 1/2

T. 33. N. R. 5. E. Section 15



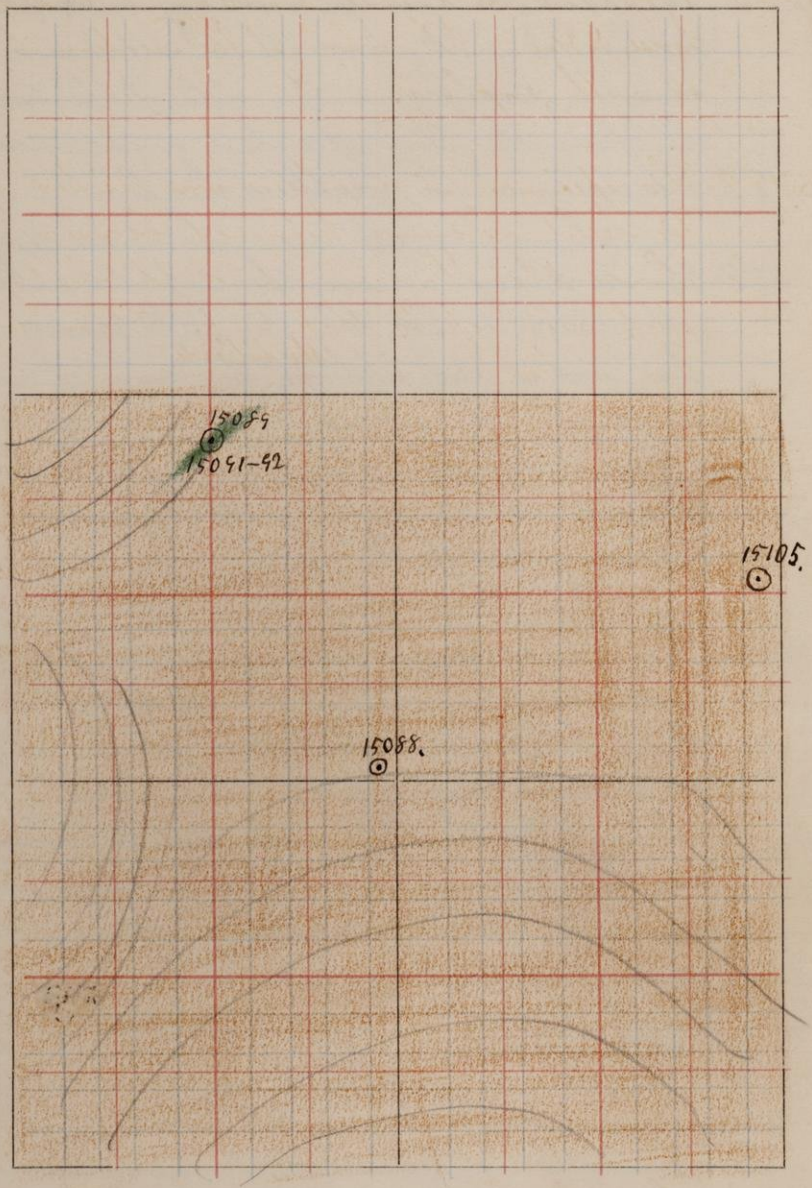
15090 This number is from the porphyry of the S.E. part of Blue Mt, just above the so called asbestus mine. The porphyry on this side of the hill all shows the flow structure quite well, especially on the weathered surfaces.

15099 This porphyry is from the top of a steep hill called "Bald Mt." The hill stands out alone and is very like the frustrum of a cone in shape, the upper diameter being about fifteen rods, and the height 300 or 350 ft. Macroscopically the porphyry seems to be very glassy.

15100 This is a very peculiar dyke rock which came from an old shaft to the S.W. of Bald Mt. a few rods, at a place where prospecting was done a few years ago. The size of the dyke could not be determined as the surface was entirely covered with soil. The exact location is about 100 yds. east of John Inman's house.

15 1/2

T. 33 N. R. 5 E. Section 22.



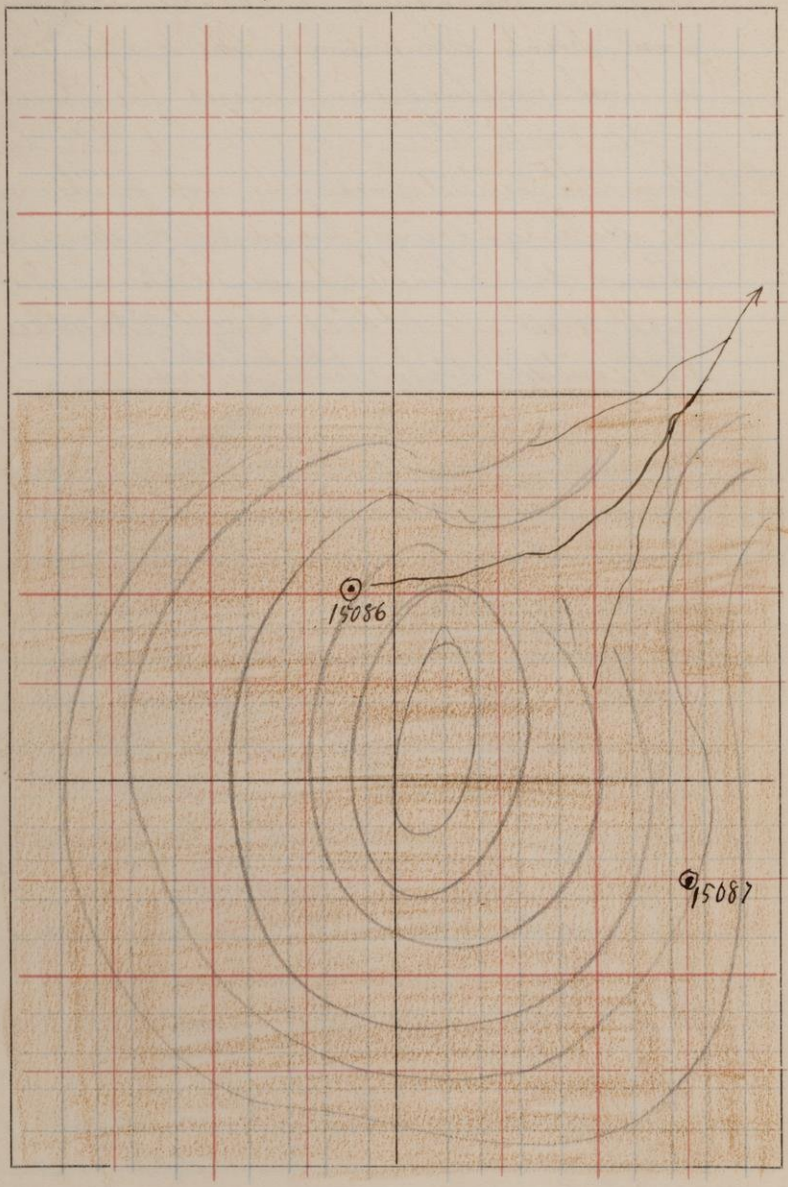
15888 Porphyry, in ravine south of G. McDowell's house ¼ mi. The whole of the section is covered with porphyry.

15889 This specimen of porphyry was picked up in the field, and was preserved because it showed the flow structure the best of any rock seen up to that time. Of course it had rolled down from the hillside above.

15891 & 15892 These two specimens are dyke-rocks from the S.E. corner of Blue Mt. near the "asbestus mines." Each is from a boulder taken out in mining years ago.
The detrital material at this place is quite deep and in a few places, spread out in thin sheets, an inferior grade of asbestus is found. Some little mining for it was done years ago but nothing discovered further than that above described. In a few other localities from 2 to 5 mi. away indications of similar occurances were noted. It is quite evident that in order for asbestus mining to be successful the original home of the asbestus must be found which probably is some of the numerous dykes, indications of which are so abundant.

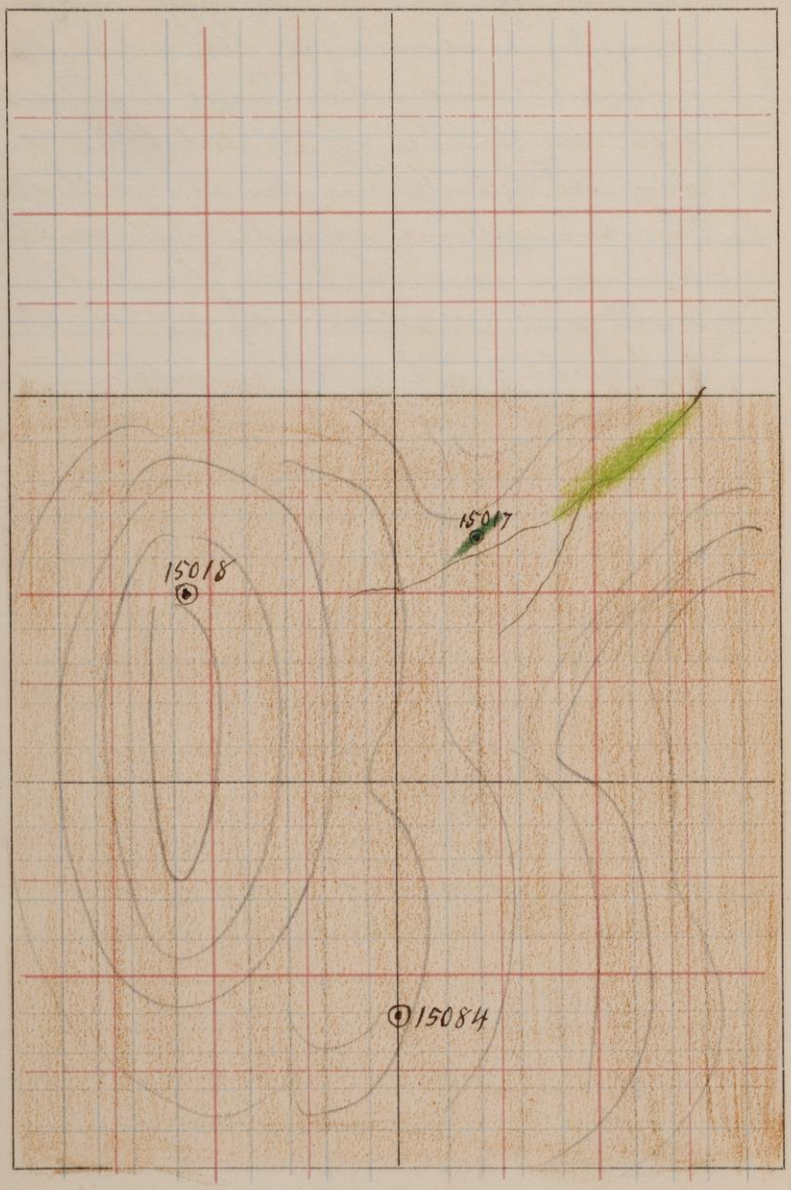
16 1/2

T. 33 N. R. 5 E. Section 21



15086 & 15087 These two specimens of porphyry were taken from points about ½ mi. apart. The former is from a ravine which passes the south side of the south hill of Blue Mt. The latter from the E. hillside near the top of the hill. The whole section is covered by a porphyry hill with no valley land of note. The north part is occupied by the southern extremity of Blue Mt., or rather a little hill which lies just south of Blue Mt.

17½ T. 33, N. R. 5, E. Sec. 20.



15017 This specimen is a peculiar dyke rock which occurs in a ravine near the north side of section 17. Quite a number of angular blocks were seen in the ravine, and finally the dyke rock itself was found cutting through the porphyry on the bank of the ravine in such a way that the right contact line was removed so that the width of the dyke could not be determined. The rock is a very fine grained one, and macroscopically seems to be almost amorphous.

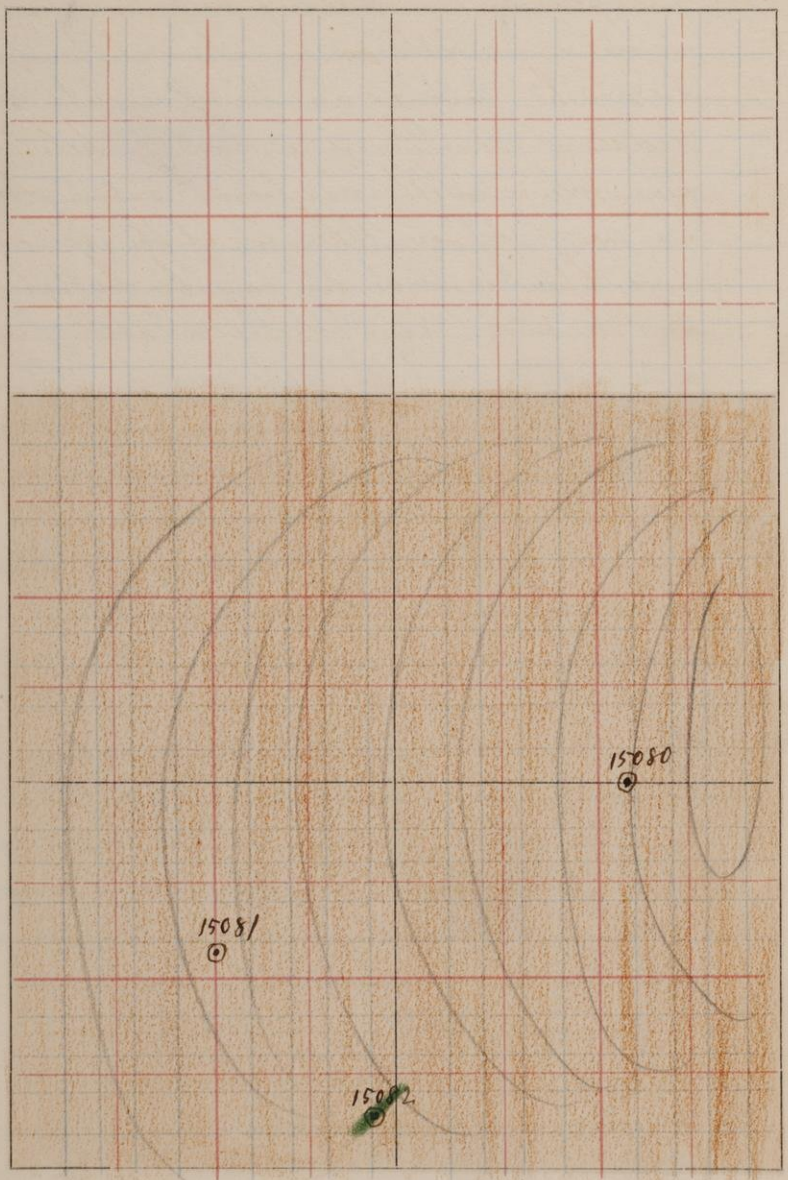
15018. This is a specimen of ordinary porphyry taken from the place indicated on the map.

15084 This also is ordinary porphyry taken from a ravine near the South side of the section.

The whole of this section is occupied by porphyry hills excepting a narrow strip of sandstone in a ravine in the N.E. corner, as shown on the map.

18½

T. 33. N. R. 5. E. Section 19

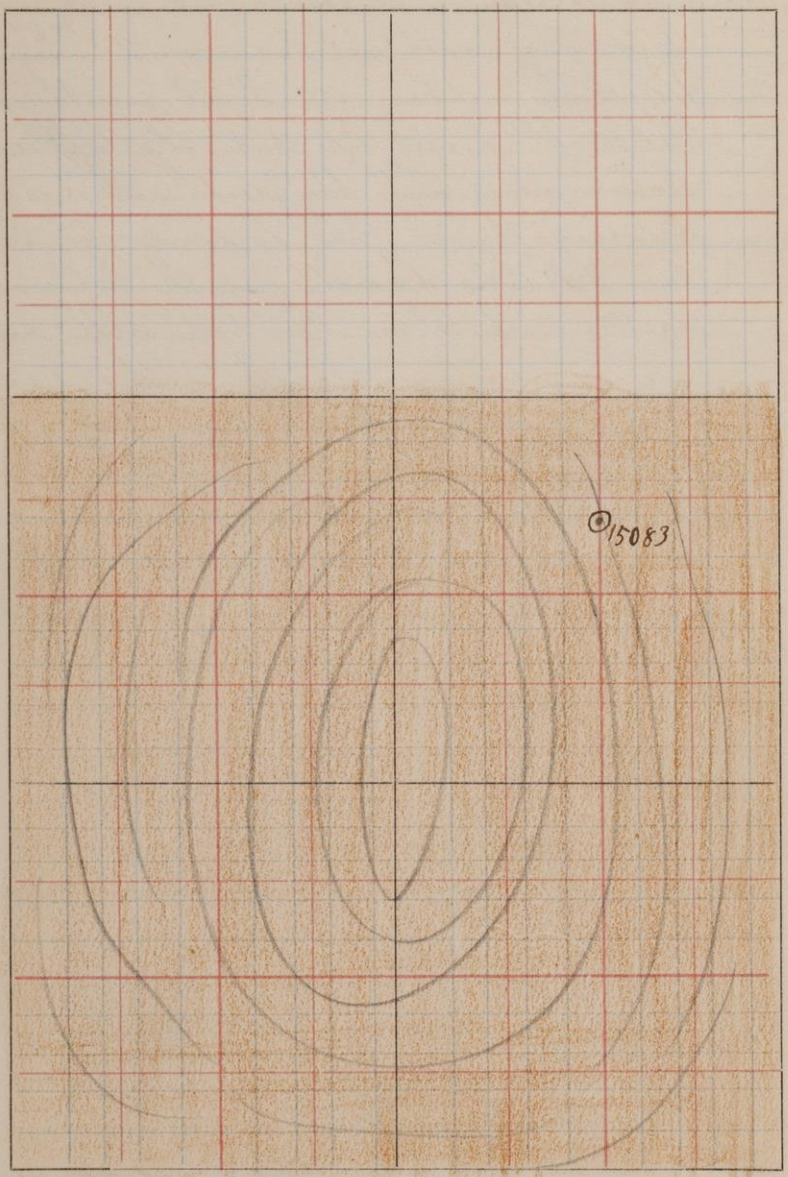


15080. & 15081. This section is nothing but hills of porphyry with ~~an~~ occasional small dyke. The ravines are lined with bold ledges of porphyry and the hillsides are strewn with boulders, some of which are very large. The location of the two specimens given can be better seen on the map than described with words.

15082. This is a dyke rock. The dyke itself could not be found, but on the S.W. slope of the hill the dyke boulders were numerous. This specimen is from one of these.

19 1/2

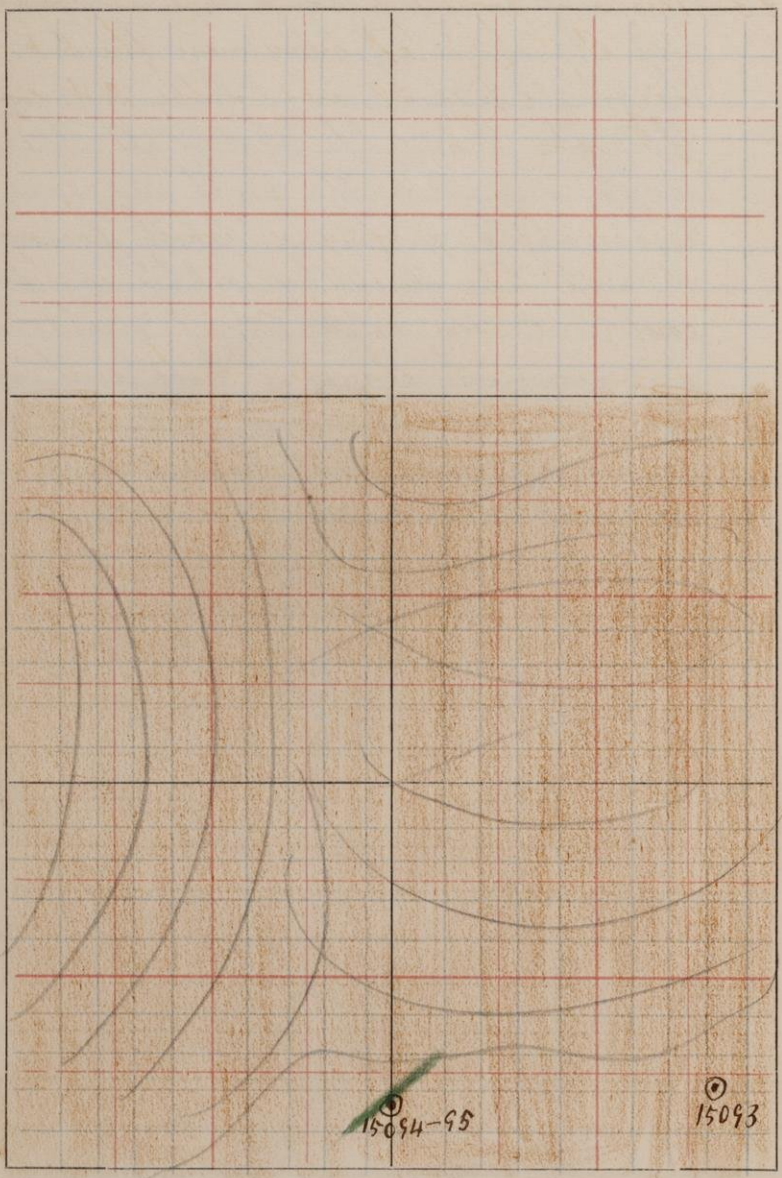
T. 33. N. R. 5. E. Section 30



15083- This section is simply a mass of porphyry hills. But one specimen was taken. The general appearance of the country and the rocks is very like that of all the sections near it to the north and east. Occasionally a ravine leads from the hillside into the valley either to the east or to the west. Along these ravines are numerous ledges of porphyry exposed. Also there are numerous "glades", or places on comparatively level ground over which the rock is exposed.

20 1/2

T. 33. N. R. 5 E. Section 28



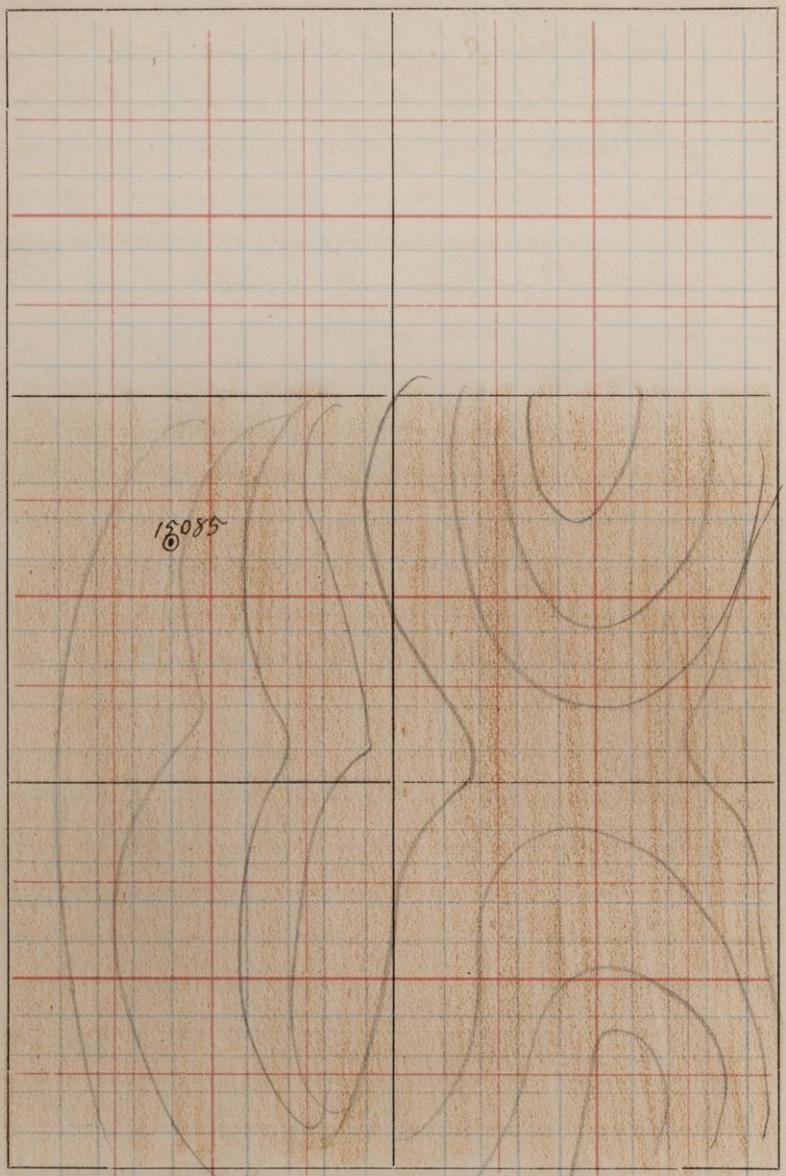
15093. This is a porphyry from the E. bank of the S. Rock creek, very near the S.E. corner of Section 29, and on the S.W. corner of Proctor Mt.

15094. This is also a porphyry which has nothing of a special interest about it so far as could be seen either in its field relations or in the character of the rock itself. Its location was near the half mile corner on the south side of the section.

15095. This is a dyke rock which came from a dyke fully 50 ft. wide and which had a N.E. and S.W. trend. Both the dyke rock and adjacent porphyry were badly fractured. The fissures in which were generally filled with quartz. The rock was a very fine grained one.

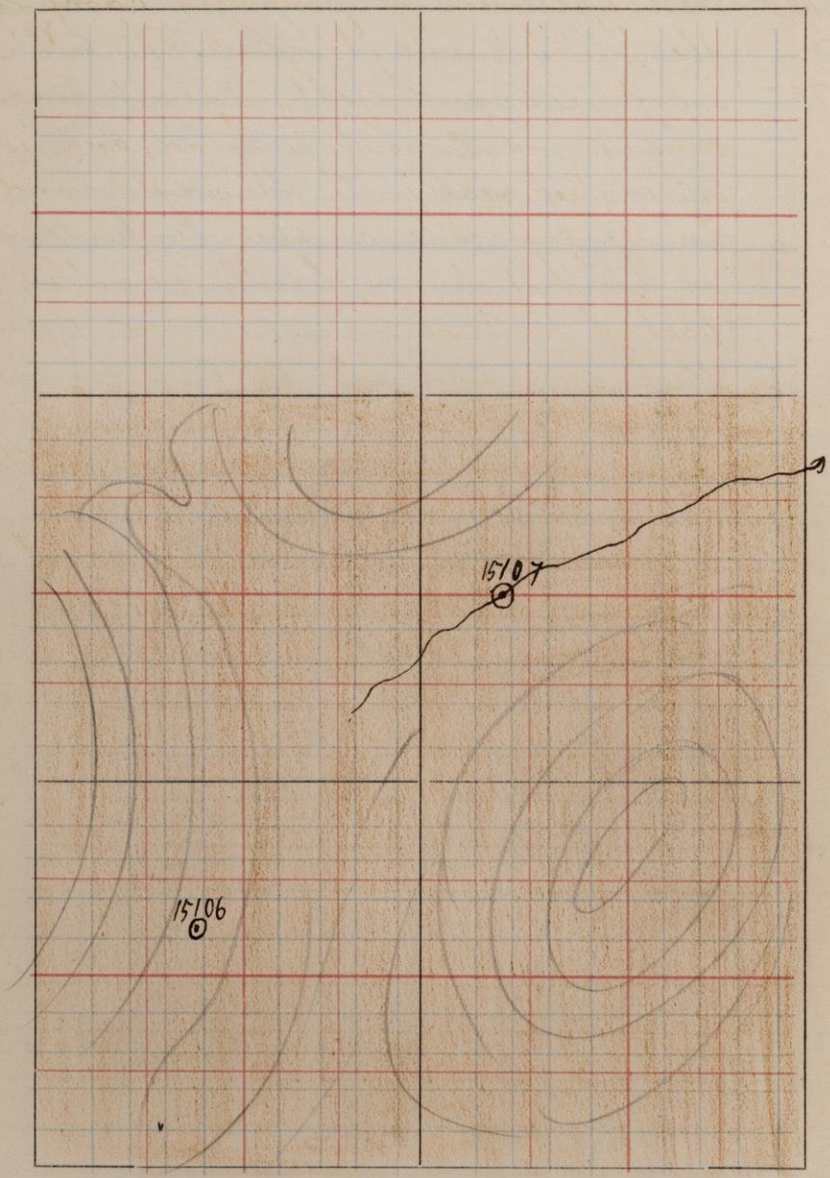
21½

T. 33 N. R. 5 E, Section 28



15085 This specimen is porphyry from the W. side of the S part of Blue Mt. The section is occupied by this hill. No important difference was noted either in the character of the rock or in the mode of occurance here, and a number of other porphyry hills already described.

22 1/2 T. 33. N. R. 5. E. Section 23.



15106 & 15107 These specimens of porphyry came from the Gace Mt. and its spurs. This hill is one of medium height, is about twice as long N. and S. as it is broad, and is quite steep nearly all the way around. On the East side a spur extends out so far that it can hardly be called a part of the same hill. A ravine rises on the E. side and flows N.E. to the river. Along this ravine the banks gradually become steeper until the river bottom is reached.

Specimen 106 came from the S.E. corner of the hill about half way up the side. No. 107 is from the bed of the ravine above mentioned.

23 1/2

T. 33 N. R. 5 E. Section 24.

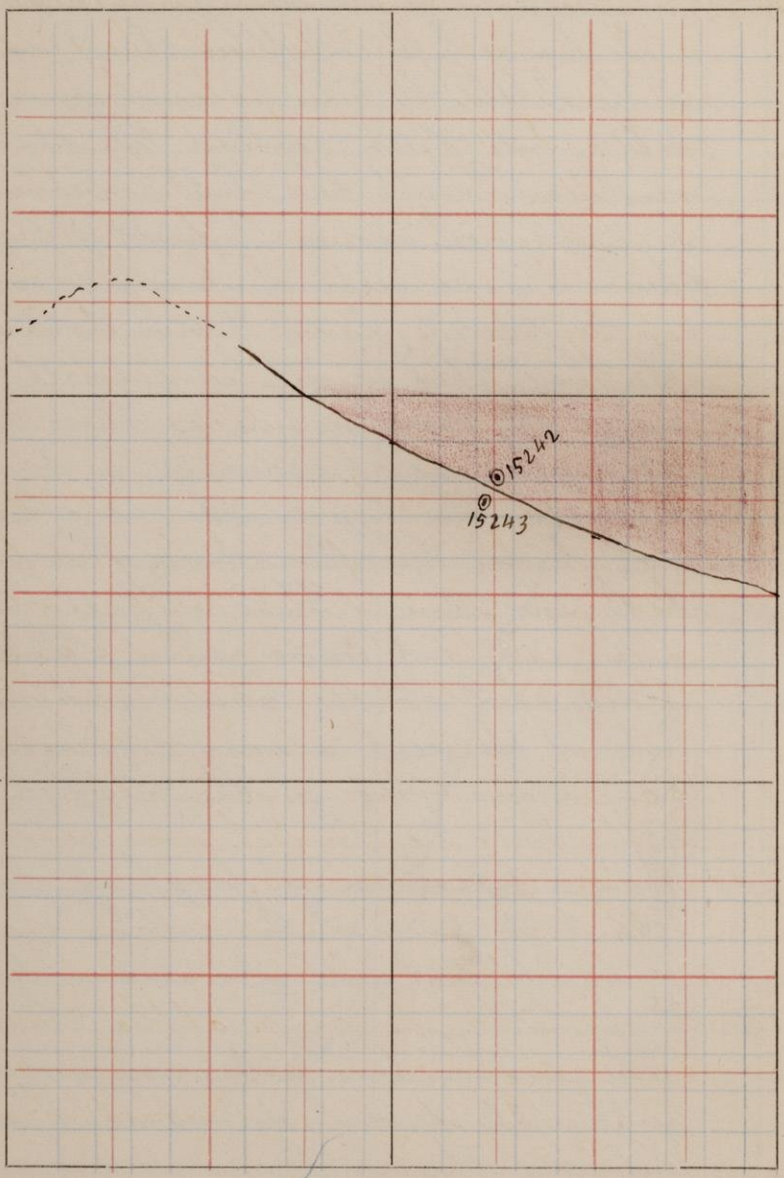
15015 This specimen of porphyry came from a steep and high bluff on the E. bank of the Little St. Francois river near the S. E. corner of the section. The stream runs nearly north. The bluff is from 100 to 125 ft. high and is composed of porphyry. There are many vertical fissures which can be traced from top to bottom of the bluff. They are all very small and are of the same nature as those found every where so abundantly in the porphyry. On top of the bluff two high finger like projections of rock are to be seen. One of these is fully 25 ft. high and not more than 6 ft or 8 ft. in diameter at the base. The opposite bank of the creek is very low and offends a good view of the bluff.

15257 This is a specimen of porphyry from the N. W. part of the section, and from the N. W. side of a tolerably high hill.

The section was not examined in sufficient detail to warrant me in coloring the map.

24 1/2

T. 33. N, R. 5. E. Section 14.



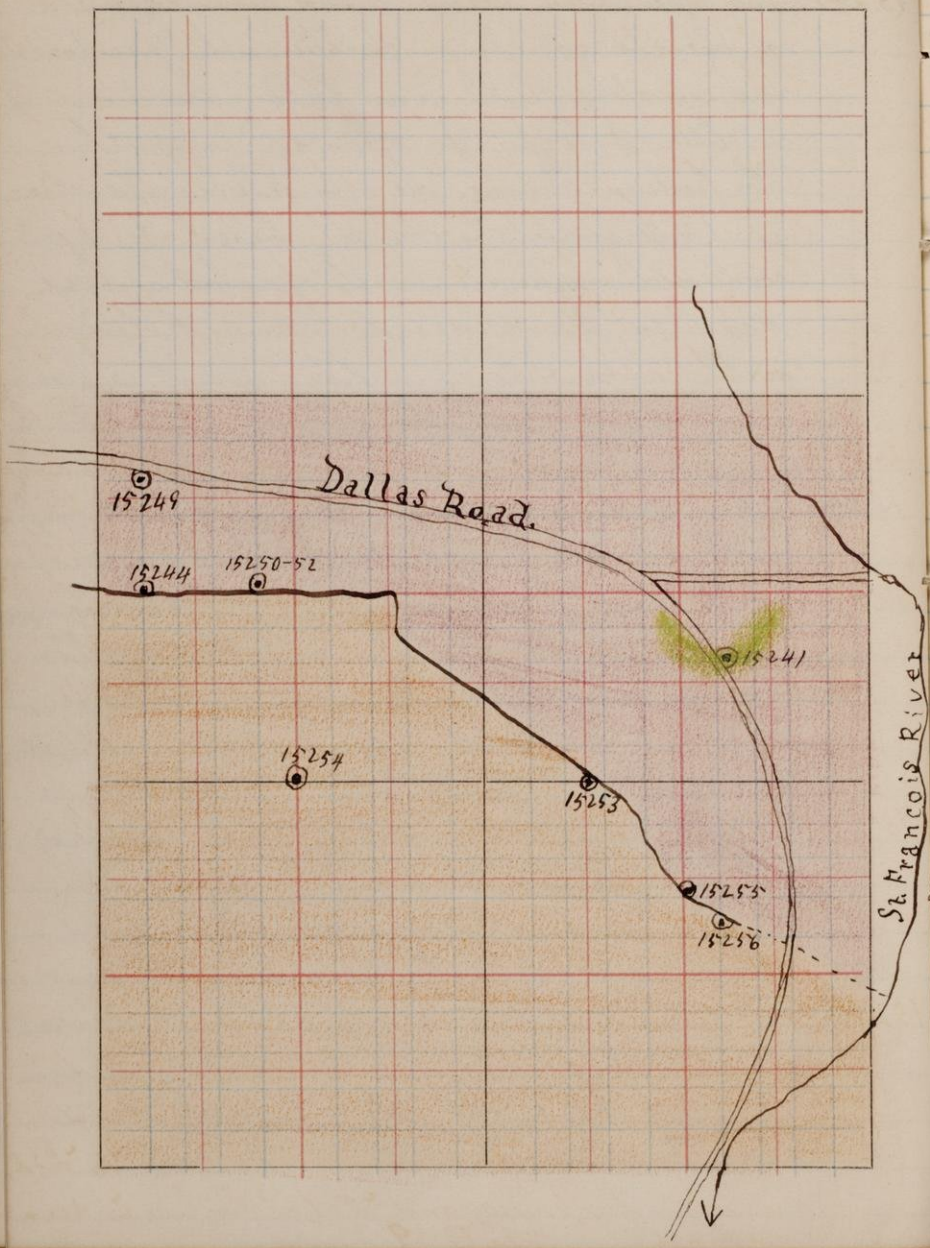
15242 This specimen came from immediately on the contact line, between the granite and porphyry. It was taken from a boulder, but as it showed in itself a transition from the coarsely crystaline to that which is much finer it is a valuable specimen. It probably had not been far removed from its original home. The granitic part is lighter in color than the other.

15243 This is a porphyry from the dump pile at the Martin shaft, and probably came from about 75 ft. under the surface, altho' there is a little uncertainty about it. A shaft was sunk with an angle of about 45° with the vertical on what was supposed to be the same vein which was worked at the Silver Mines.

This section was not examined in sufficient detail to warrant me in coloring the map, altho' I almost know that the whole of it is porphyry South of the contact line marked.

25 1/2

T. 33. N. R. 5, E. Section 13



15241 This is a very coarse sandstone or a conglomerate. In comparatively small area, with the surface exposure as shown on the map is covered with this kind of a rock. The bedding slopes gently with the surface. The rock itself is almost entirely composed of small boulders and coarse gravel of porphyry cemented largely with iron-oxide.

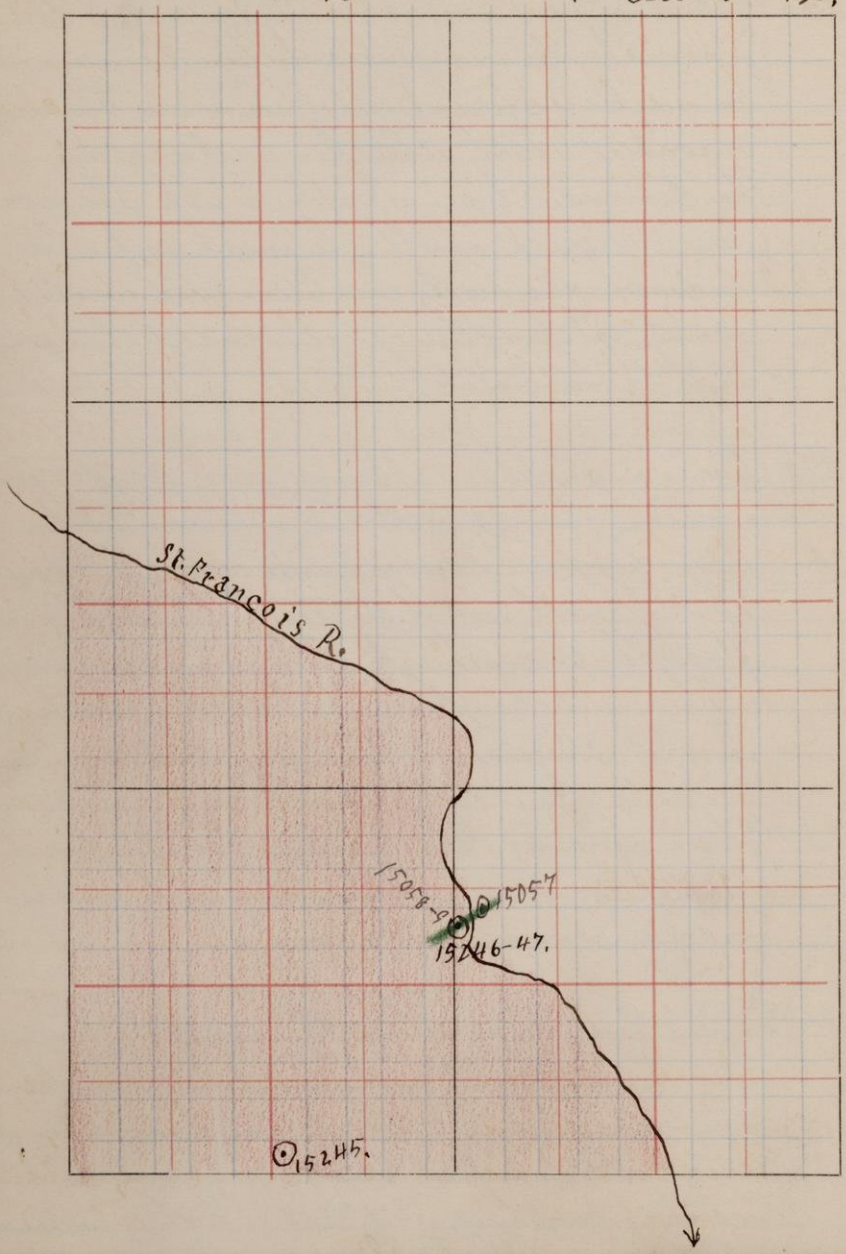
15244 This is a porphyry thrown out in digging a cellar immediately on the contact line between the granite and porphyry. At the south end of the cellar the rock is porphyry; at north end it is granite. It is caved in and partially filled with water, so that the contact could not be seen.

15249 This is granite. The surface for all the granite in this section is level, and is mostly covered with soil.

15250-52 These were taken from the contact line. A rock was found which seemed to show the transition. I blasted out a portion of it and obtained 250, which is granite, 252, which is porphyry, and 251, which is intermediate. See P. 59.

26½

T. 33. N. R. 5 E. Section 12.



15245 This is a specimen of quartz from the "Apex" shaft, and was taken because it so well represents the corrosive action of water upon quartz under certain conditions.

15246 Quartz-diabase, from a dyke at "Silver Mines." It was in small boulders, the exact location of the dyke not being known. It is very similar to No's. 15001 and 15045.

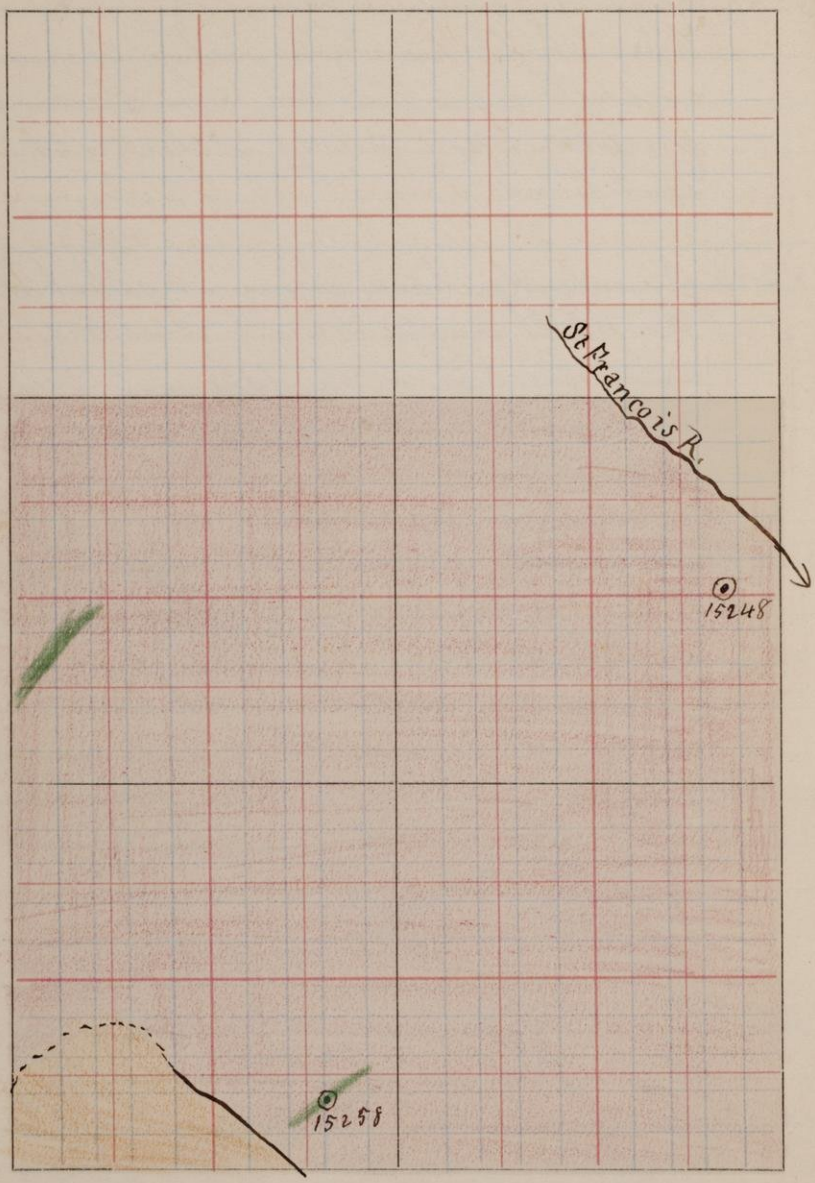
15247 Dyke rock from a big dyke just N. of a path leading down to the river at "Silver Mines."

This place called the "Silver Mines" is very interesting. The country rock is granite. Quite a number of dykes cross it at different places bearing about N. 75° E. In one or more of these places it seems the fissures was not filled with lava, but was left to be filled subsequently with vein stuffs. Here we find evidence of fumerole action. There are fluorite, lepidolite, topaz and wolframite, which indicate it.

See P. 60.

27 1/2

T. 33 N. R. 5 E. Section 11.

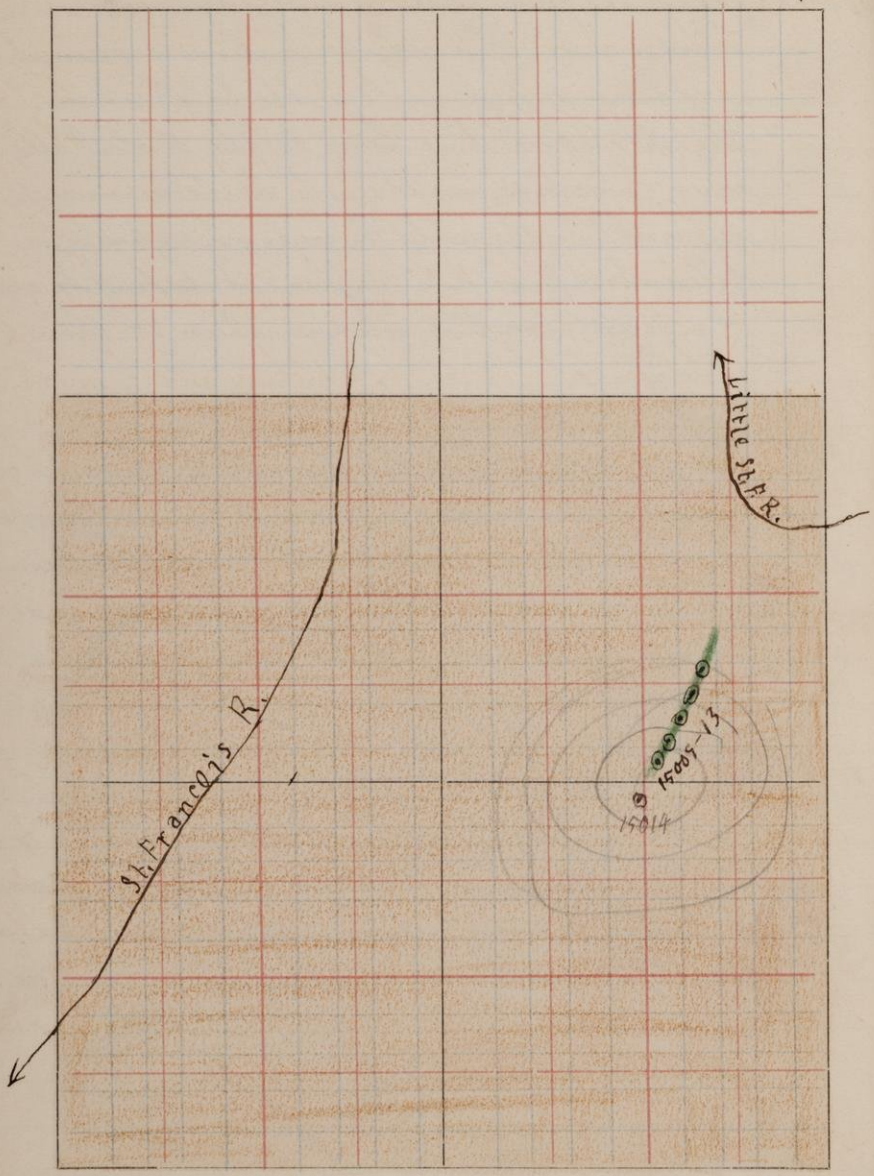


15248- Granite from the bed of a ravine called "Mud creek." This whole section is granite excepting a portion in the S. W. corner, here the contact line bears to the N., but the exact boundary could not be determined on account of the soil. The rocks are exposed in different places to a sufficient extent to admit of a quite positive determination of their character.

15258- This is a dyke-rock taken from a boulder in a branch of the roadside 1/4 mi. E. of Mr. Mayer's. It represents a number of large boulders which seem to be piled up winrow like trending N.E. and S.W. It is very probable that they are representatives of a large dyke concealed from view by the soil covering. Exactly the same kind of boulders occur in a ravine in Mr. Lisander Ashlock's field just W. of his house in Section 10. They are peculiar in having a very rough surface where they have been weathered.

28 1/2

T. 33. N. R. 5. E. Section 26.



15009-13 The principal interest in this section is in connection with the so-called "Tin Mines". These are located on the N. side of "Tin Tak," a steep porphyry hill about 400 ft. high. There is a very large dyke exposed on the northern side of the hill and which was the cause of a big excitement about 20 yrs. ago. The dyke is near 50 yds. wide and is filled with a very black, compact glassy rock, which is much more perceptible crystaline at the base than near the top. No. 9 is from a boulder near the top of the hill at a point the highest up of which any dyke boulder was seen.

No. 10 from the tunnel highest up on the hill, which the miners call tunnel No. 4

No. 11 from tunnel No. 3.

No. 12 " " " 2.

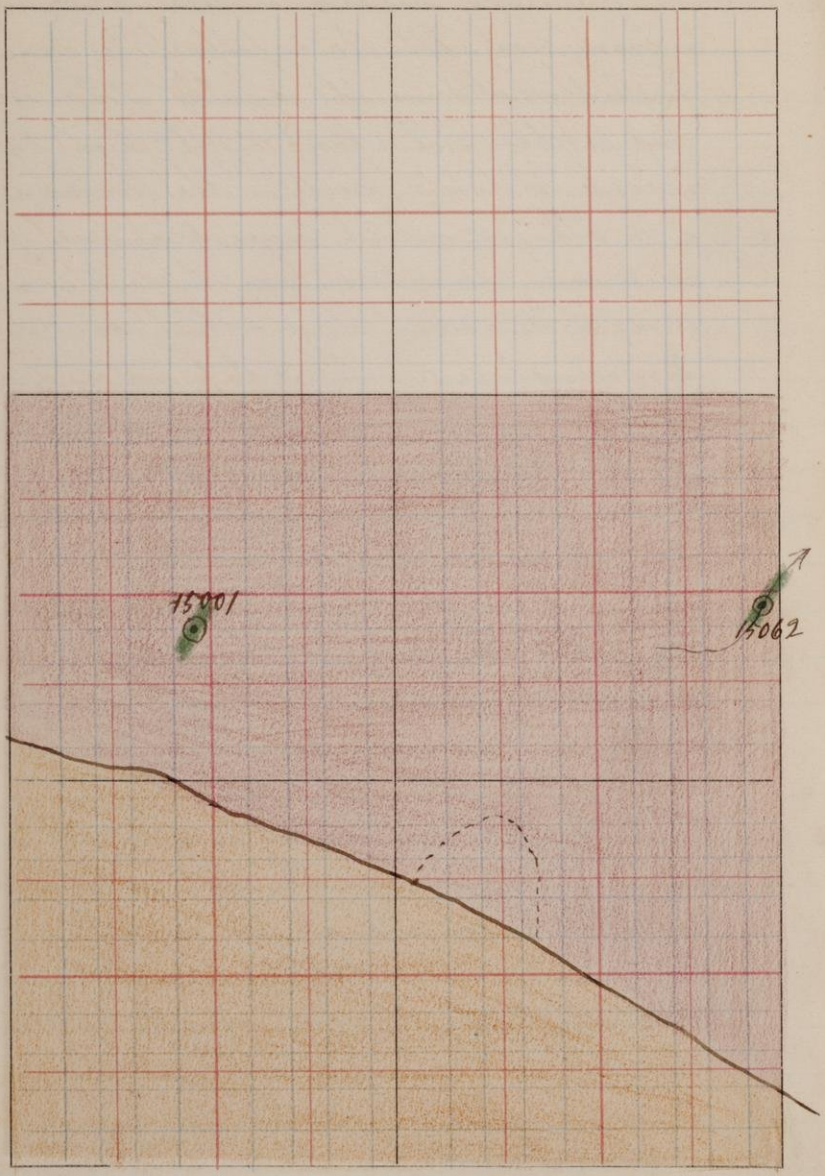
No. 13 " " " 1.

These tunnels were driven horizontally into the hill 100 ft or more, and the specimens were taken from the dump piles at the several locations. The vertical distance between tunnels No. 1 and 4 is about 175 ft. Rocks from this dyke were described quite fully in my dissertation.

15014 A porphyry rock from the summit of "Tin Tak."

29 1/2

T. 33 N. R. 58. Section 10.

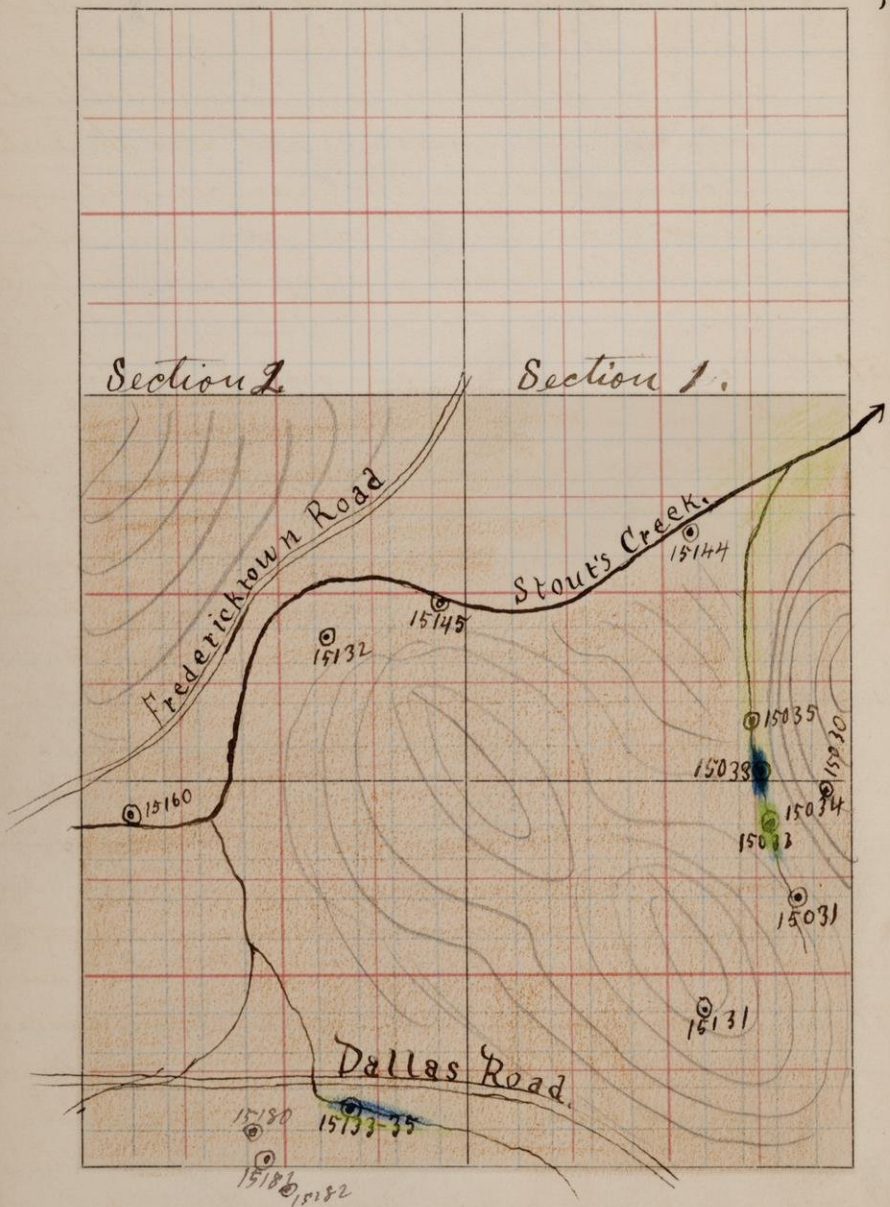


15001. This specimen is very interesting because it is a quartz bearing diabase-porphyrite dyke rock and is the one described so fully in my Dissertation. At the time I gathered the specimen I was unable to locate the dyke but found a place at which the boulders extended at least some distance under the soil and probably were immediately over the dyke itself. Only a few feet away the granite is exposed, and during a subsequent visit to the place I found a dyke 50 in. wide cutting through the granite and trending N.E. and S.W. There can be no doubt but that there are at least two dykes in this immediate vicinity. Porphyritic quartz crystals and feld spar crystals are very common, scattered all through the rock mass. Some of the feld spar crystals are nearly an inch in diameter.

15062 This is another dyke rock from a small ravine running N.E. It seems that the ravine is immediately over the dyke itself, which is a big one being at least 20 ft. wide. To the S.E. about 20 rds., across the section line, there is another ravine which also seems to follow a dyke. The two rocks seem to be identical and therefore a specimen of the latter was not taken.

36 1/2

T. 33, N. R. 4, E, Sections 1, & 2,



These two sections, are nearly all composed of porphyry hills. On the extreme N.E. along a small ravine, there are very narrow belts of limestone and sandstone and also the western extremity of the sandstone area described under Section 6. R. 5. The hills are very high and abrupt. The porphyry is exposed in nearly all places.

15030 & 15031 These specimens are coarse grained porphyry, the former of which came from Mr. Bartch's "gold mine," that is from the place where Mr. Bartch had dug a hole about 4 ft. deep in the solid porphyry. This is a good place to note the different degrees of crystalization in the porphyry. Along the walls of this one little hole several different degrees of crystalization can be seen, and they present such an appearance that it is positive no intrusive rocks are present.

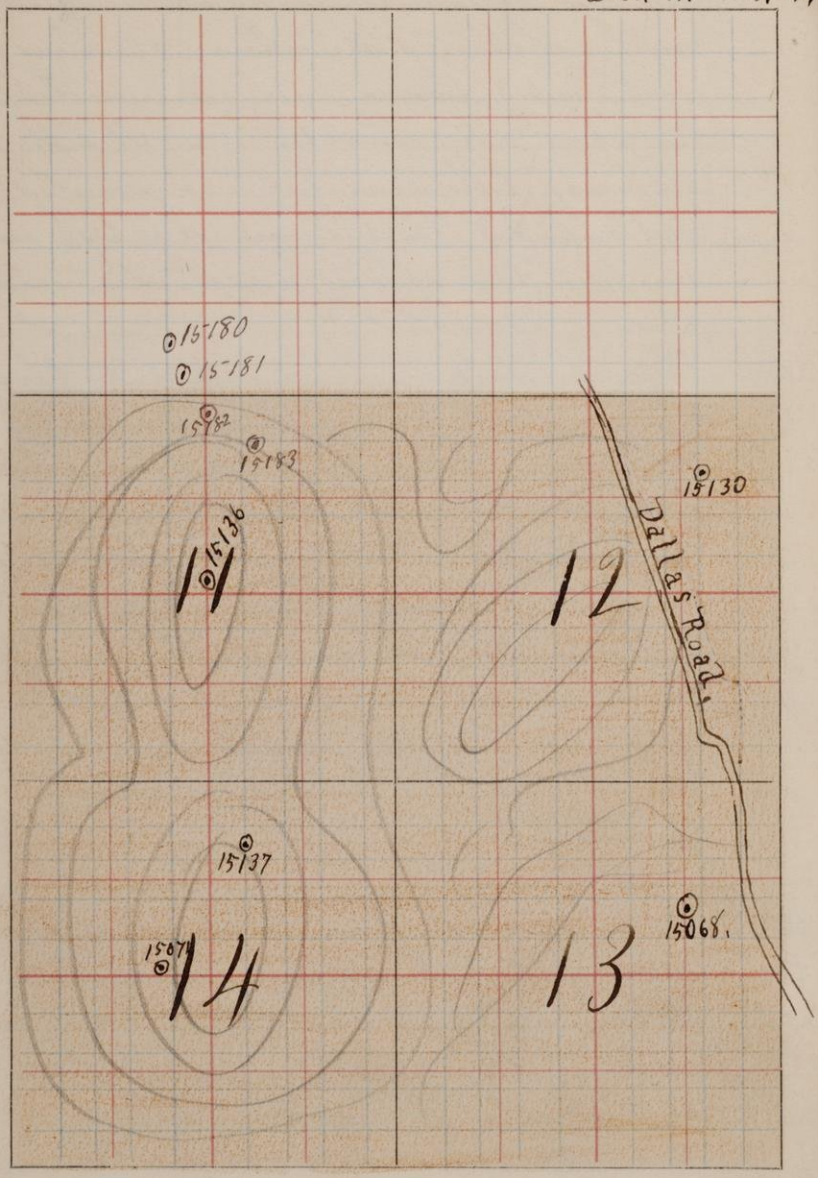
15032 & 15035 These are sandstone from locations as shown on the map. 35 is a fine grained rock and the layers were quite thin. 32 is more coarse grained. At this place there is a large boulder of

15034 porphyry imbedded in the sandstone from which specimen No. 34 was taken. The boulder is fully 3 ft. in diameter, and does not seem to be

See P. 61

37 1/2

T. 33, N. R. 4, E. Sect. 11. 12. 13. & 14

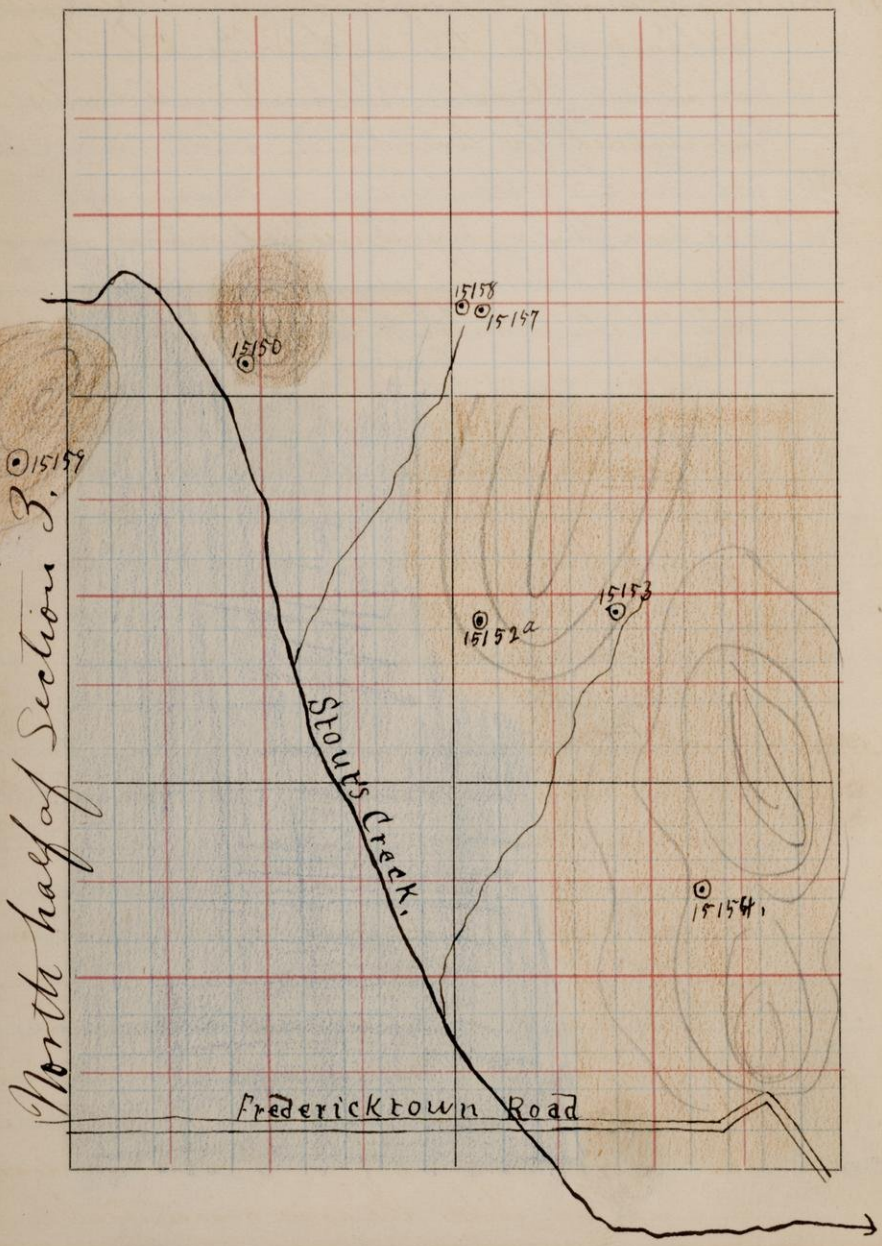


15068. These four sections are almost entirely covered with
& porphyry hills. The southern portion of 13 and
15071 14 slope off towards the large valley called
& the upper "Flat woods". The whole mass of hills
15130 are known by the name of the "Grassy hill".
& There is nothing of special interest about any of
15136 these specimens and macroscopically could not
& well be distinguished from many others.
15137

15180 These four numbers 15180-'83 are splendid
15181 illustrations of the transition stages of
15182 crystalization. The first came from the
15183 foot of the hill S. of Mrs. Henson's S. field.
The distance along the foot of this spur at
which such rocks are exposed is only a
few hundred feet. '81 came from 150 yds.
up the hill S. from '80. '82 came
from 150 yds. to the S.E. from '81.
'83, which is a good porphyry, came
from 3/4 the way ~~for~~ to the summit
of the big hill to the S.E. from '82.
There seems to be a perfect gradation
from the coarsest crystaline one
to the one which is the most porphyritic.

38 1/2

T. 33, N. R. 4, E. Section 3,



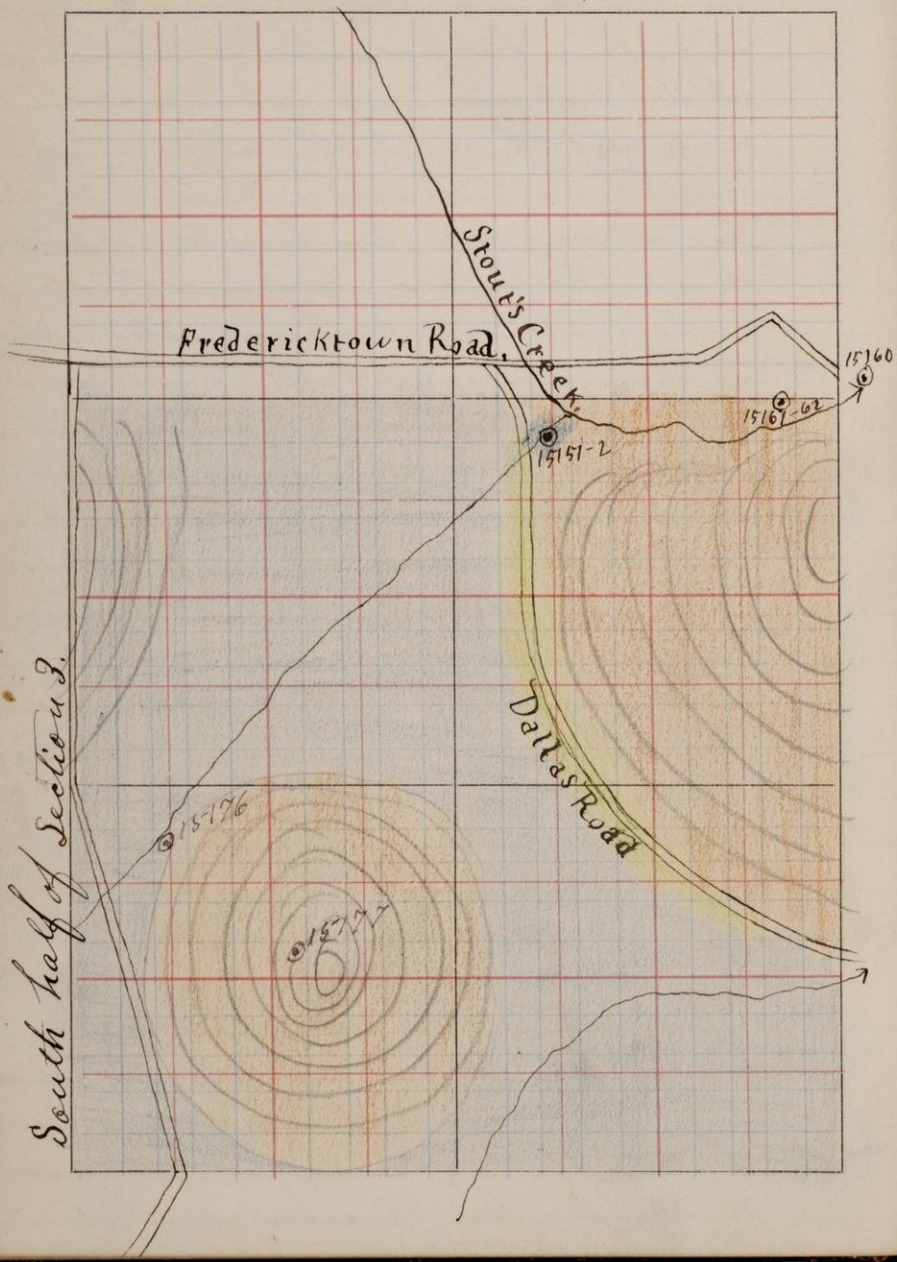
15150 This specimen of porphyry is from the little hill just across the Township line. The hill is small and almost circular and is entirely surrounded by limestone.

15157-8. We have here a very interesting change from the ordinary porphyry to a crystaline rock which seems more like granite than porphyry. These specimens are from the head of a ravine N. of the section line. The first is the crystaline, the second the porphyritic variety. They are not more than 15 ft apart. The ravine seems to be the dividing line between the two different kinds of rock farther down.

15152a & 15154 These specimens are the crystaline variety mentioned above and are located as shown on map.

15153 This is a porphyry and lies between 152a and 154. It was noticed that as we ascend the hill near 154 the change from the crystaline to the non-crystaline condition occurs, so that at the top of the hill we have the porphyry alone. Following down the creek we find the same coarse rock

39 1/2 T. 33. N. R. 4, E. Section 3.



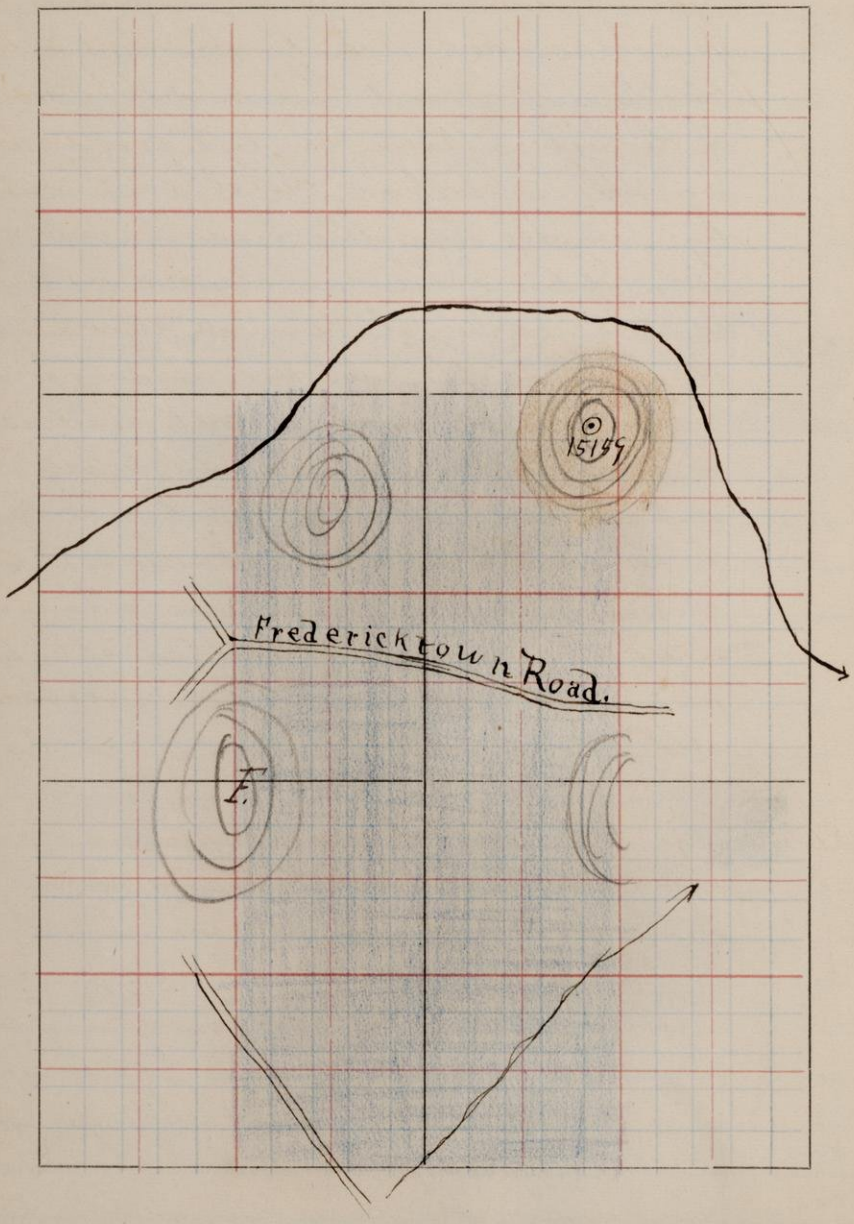
reaching almost all the way. A change occurs here which is easily seen and traced. At the creek almost immediately opposite the highest point in the road as it runs over the foot hill at the "Shut in" is the line between these two kinds of rock. At one place a ledge was found with a vertical face of 6 ft. or more, and in it the change occurs. At the middle of the
15161 & 2 bottom edge specimen No. 162 was taken. It is wholly crystaline as can be seen quite plainly with the naked eye. Either to the right or above the change occurs. Specimen No. 161 was taken 5 ft. immediately above 162 with absolutely no indication of a contact line between the two. On the right there is a fissure which might be taken for a contact line, but as there is none above it becomes probable that the one on the right is only a common fissure.

15151 This is a limestone with many small fragments of porphyry in it. The limestone is in the bed of the creek and extends up the hillside a short distance. The sandstone overlies the limestone and extends

See P. 62.

40 1/2

T. 33, N, R. 4. E. Section 4,

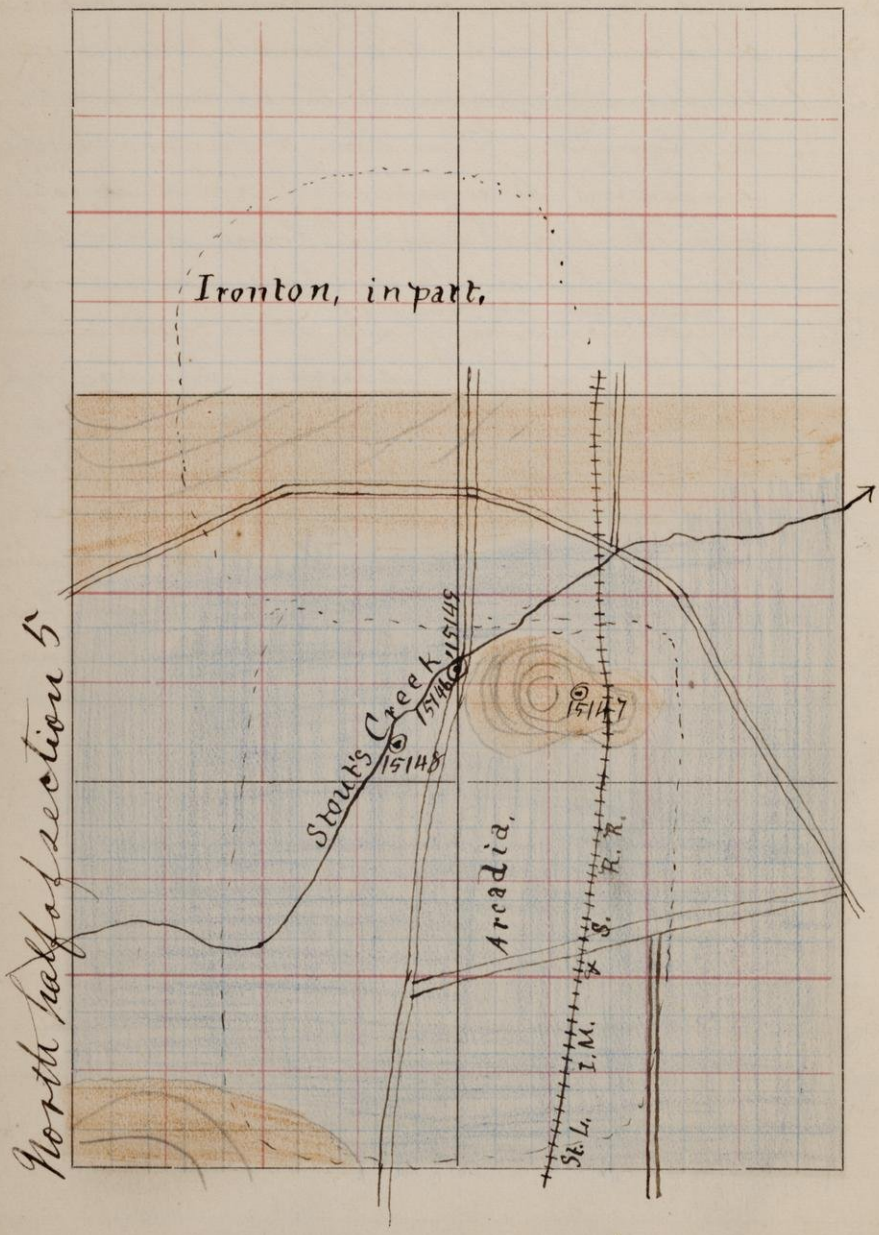


This section is nearly all limestone. In the extreme N.E. corner there is a circular porphyry hill about 1/4 mi. in diameter. Near the N.W. corner there is another elevation, but it is a limestone hill. Judge Russell's house stands here. He has quite a stone quarry opened. The rock is of the same general character as the limestone throughout the valley. In some places there is so much calcite in the rock that it is practically useless for building purposes. Along the west line of the section, near the middle, is another steep circular hill covered with flint rock but which has limestone at its base.

15159. This specimen of porphyry came from the porphyry hill in the N.E. corner of the section.

41 1/2

T. 33, N. R. 4. E. Section 5.




North half of section 5

15146 & 15149 These are specimens of porphyry breccia obtained from the bank of the creek at the iron wagon bridge between Ironton and Arcadia. It seems to be fragments of compact porphyry cemented together with lava which itself produced a porphyry upon solidification. No. 147 came from the summit of "Church hill" only a short distance away and is a very compact rock of conchoidal fracture and also shows the flow-structure very plainly. The probable explanation is that as the lava flowed down the hillside the first crust that was formed was broken into fragments by a second flow of lava thus producing the porphyry breccia.

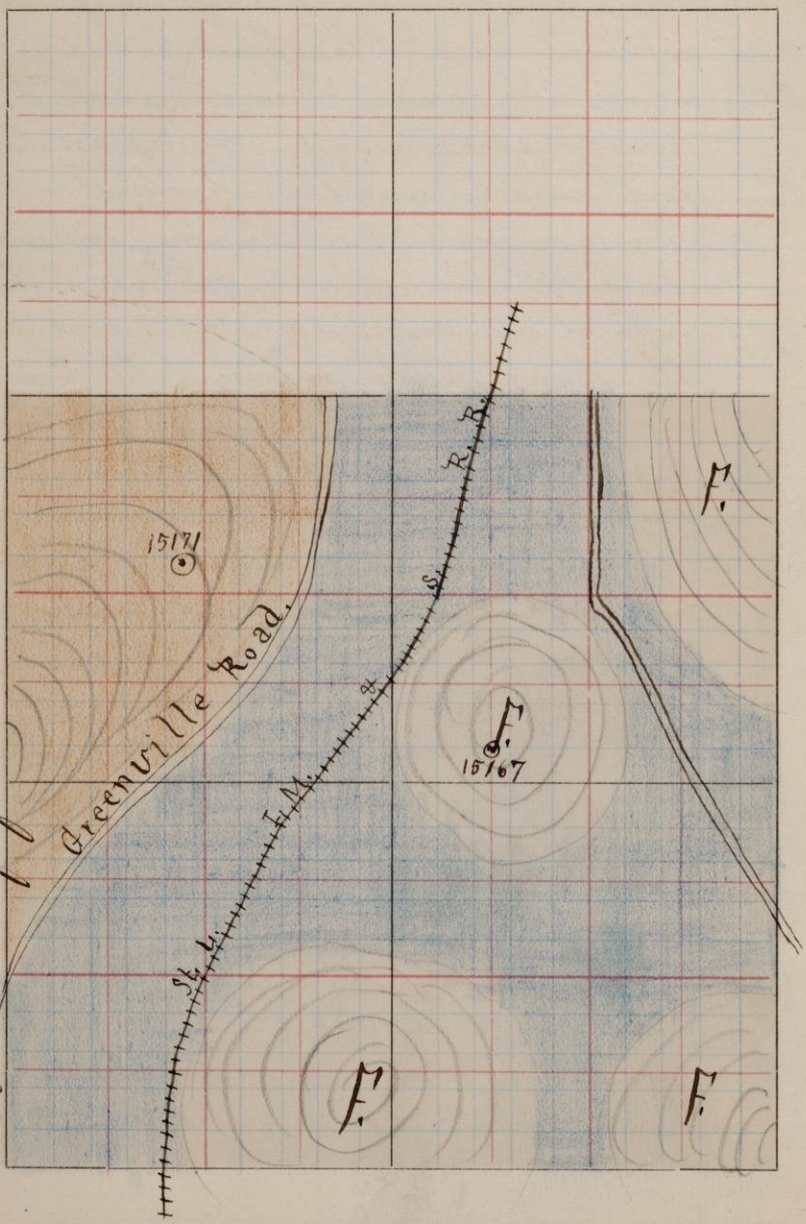
15147.

15148. This is a limestone taken from the creek bank just north of Mr. Dixon's livery barn.

The whole of this valley is covered with limestone excepting "Church hill" and its spurs.

42 1/2

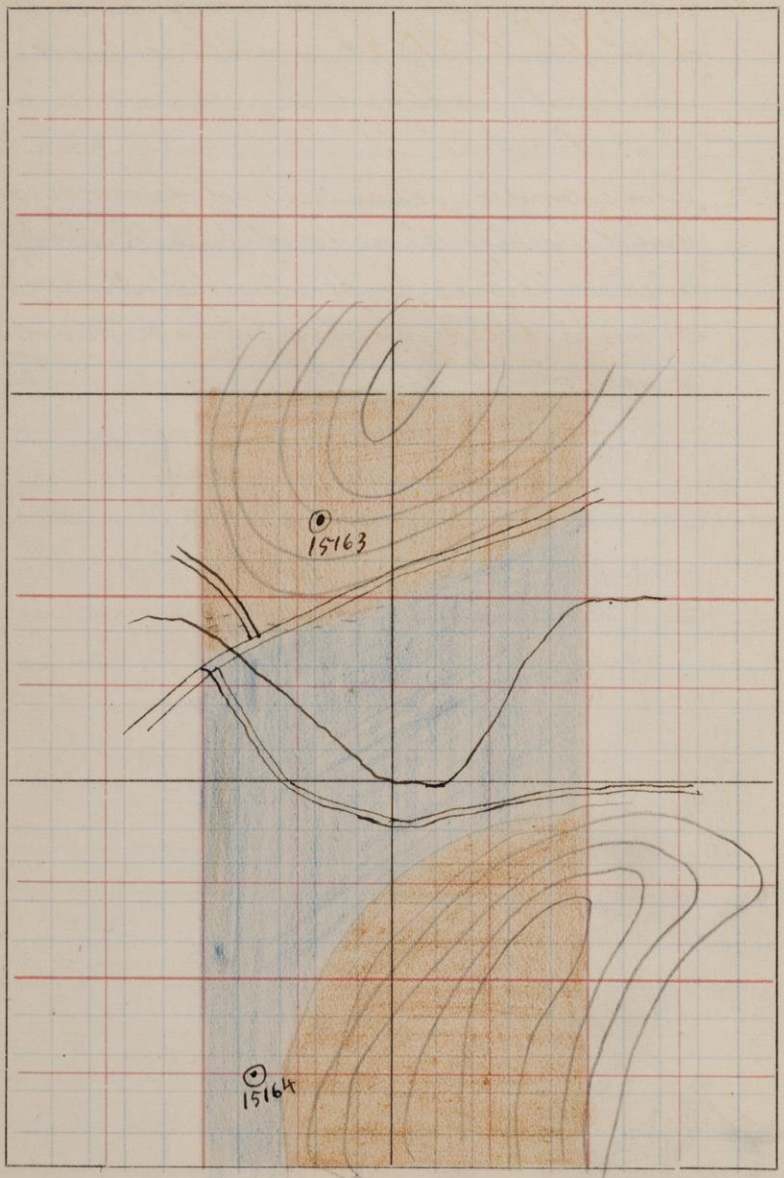
T. 33. N. R. 4. E. Section 5.



15167. Flint rock. In quite a number places in this township larger or smaller flint hills occur. They invariably have limestone at their bases, and in some undetermined way have an intimate connection with the limestone. The maps illustrate the relative positions of the limestone, flint and porphyry much better than can be given by short verbal description.

15171. This is porphyry from the N.E. side of Lewis Mt. just S. of Arcadia. All the low land of this map is covered with limestone.

40 1/2 T. 33, N. R. 4, E. Section 6,

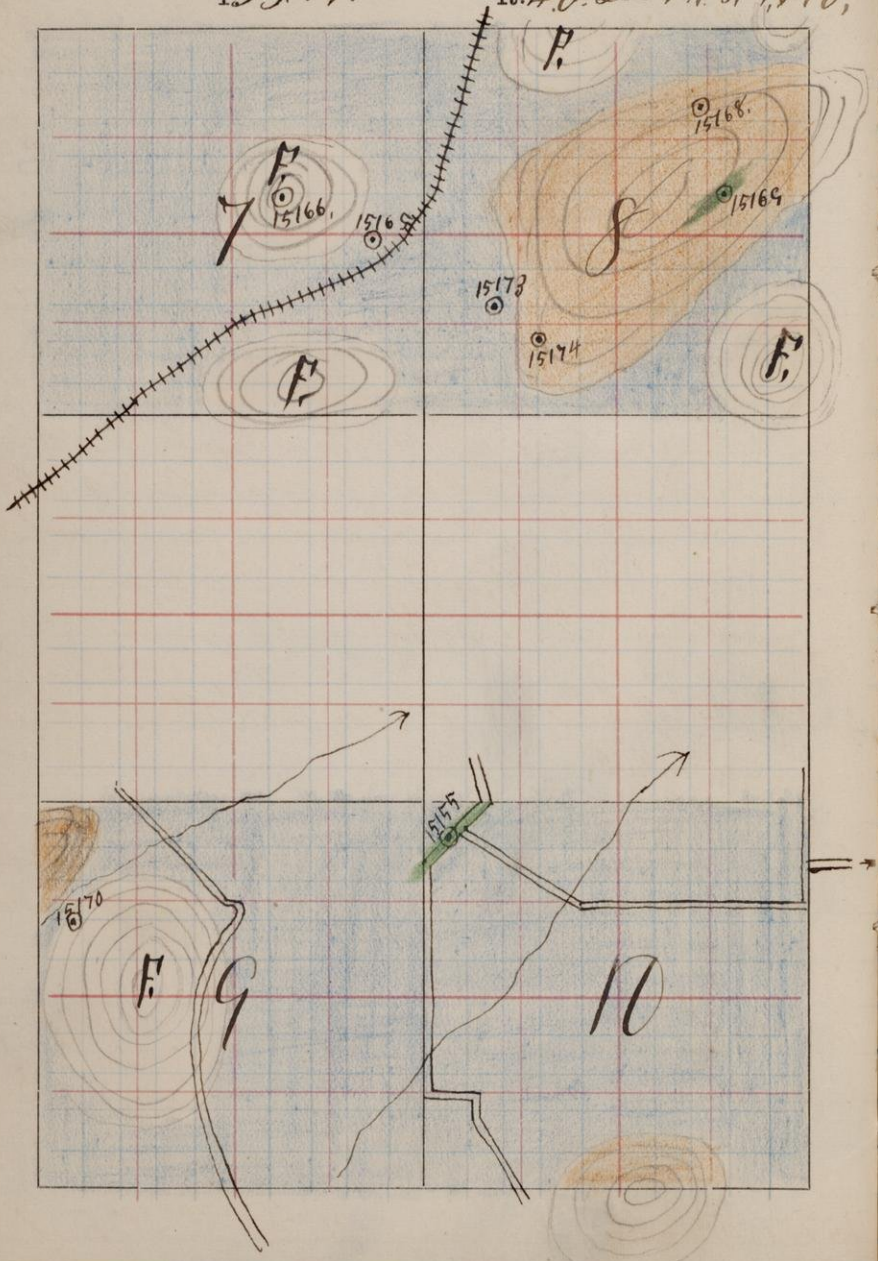


15163 - This is porphyry from the S.W. spur of Shepherd Mt. It is nothing more than ordinary porphyry.

15164 - Limestone - Lewis Mt. does not extend quite to the W. side of this T. but a neck of limestone reaches S. from Stout's creek to the larger body around Hogan.

44 1/2

T. 33 N. R. 4 E. Sect. 7, 8, 9 & 10.



15766- This is flint rock taken from a big boulder 4 ft. in diameter taken from the N. hillside N. of the switch of the railroad near "Pip-Pop."

15765- Limestone from the R. R. cut, just N. of switch near "Pip-Pop." Here is limestone at the greatest elevation yet seen. The R. R. cut shows quite heavy beds of well stratified limestone, some layers of which are nearly 2 ft. in diameter, and which dips to the N. quite gently, same as slope of the hill.

15768- Porphyry on N. side of hill as shown on map.

15769- Dyke rock on S. side of same hill, taken from a boulder. The dyke itself was not seen.

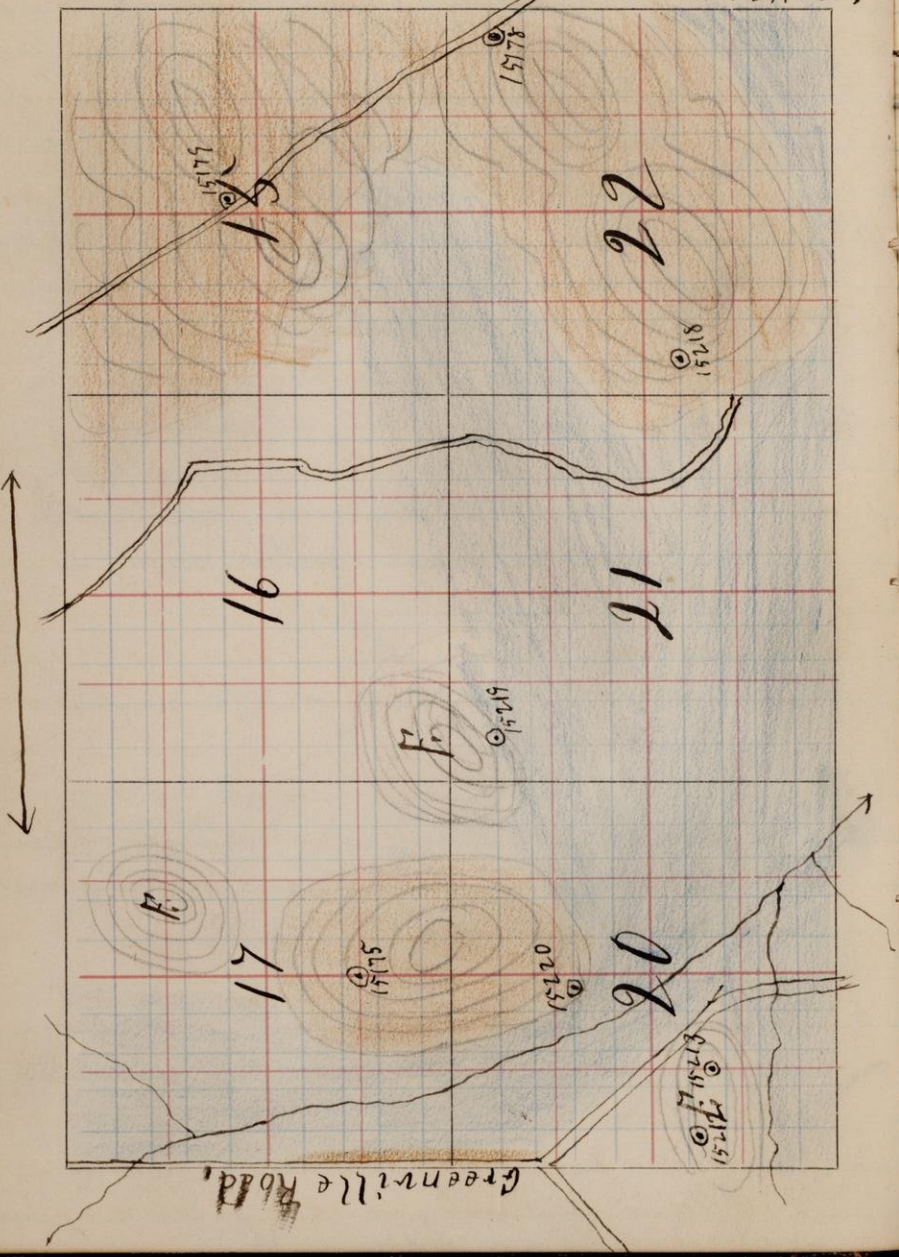
15773- Limestone just N. of Mr. Gully's house. It is very near the line between limestone and porphyry.

15774- Porphyry, from a point just E. of Mr.

See P. 62.

45 1/2

T. 33 N. R. 4 E. Sect. 15, 16, 17, 20, 21, & 22.



This map represents 6 sections.

15178 & 15179 & 15218 — All these are porphyries from locations as shown on the map and have no special properties which would distinguish them from others.

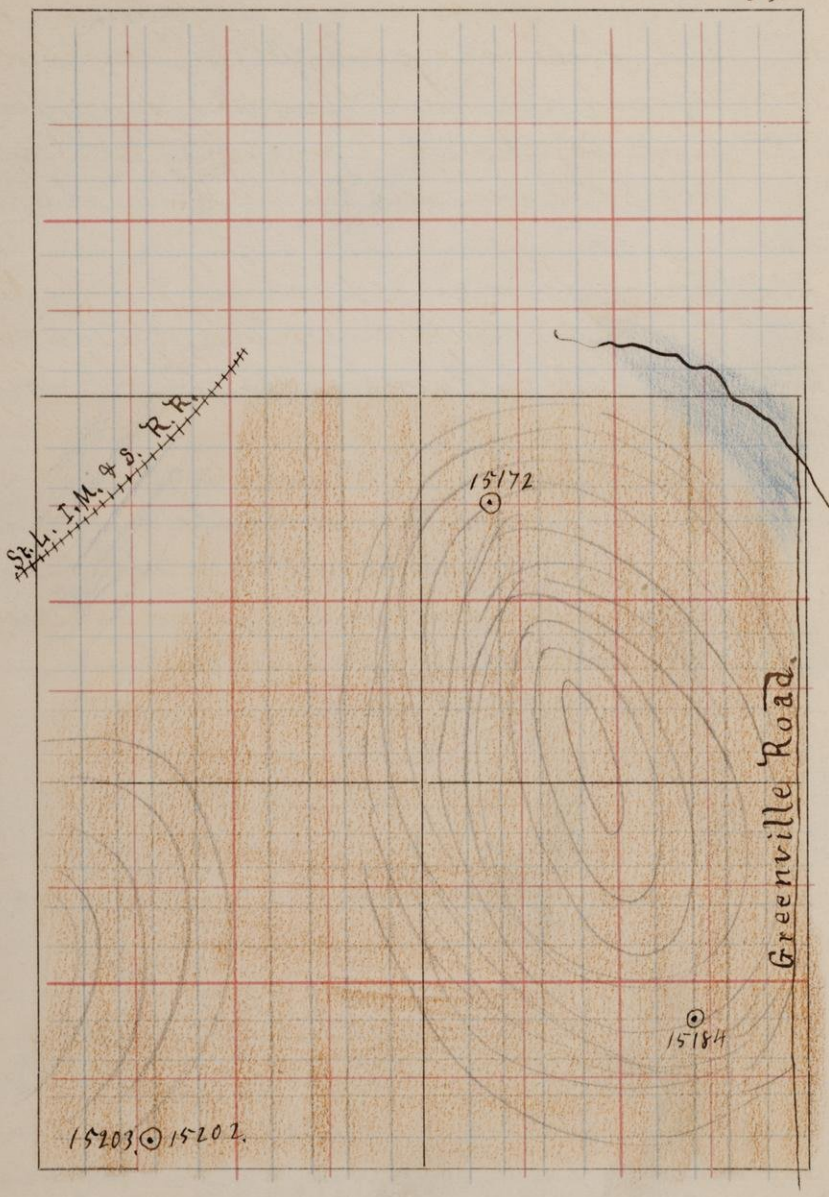
15219 — A very compact limestone from the base of a hill which is covered with flints.

15220 & 15175 — These are porphyries from the same hill. One from the north and the other from the southern extremity. The hill is of moderate height and is entirely surrounded by limestone.

15212 — Flintrock, which seems to be a sort of flint conglomerate. It is on the top of the hill and represents a kind often seen in this locality.

15213 — Limonite. These flint hills sometime have considerable deposits of limonite which seems to be of a fairly good grade. Years ago prospecting was done in a number of different places and the ore is still lying in heaps on the surface.

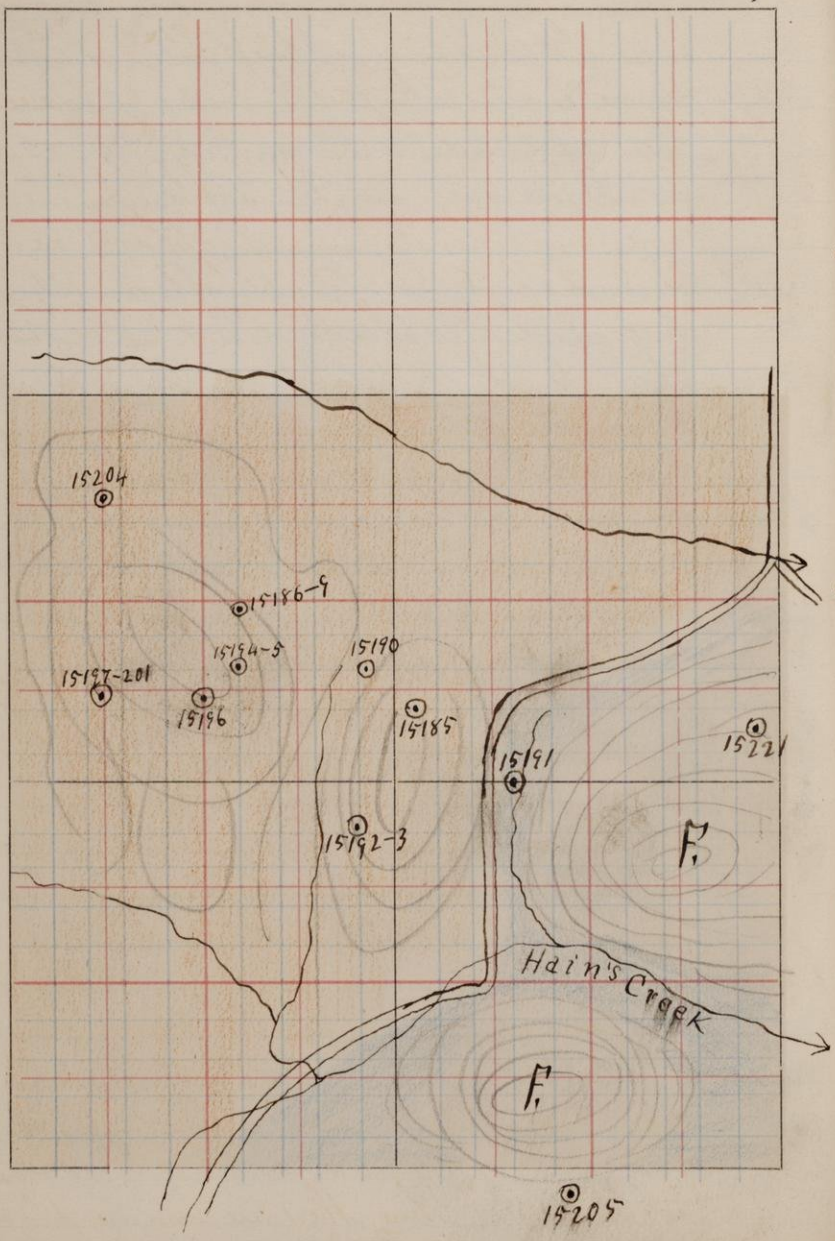
40 1/2 T. 33. N. R. 4. E. Section 18,



15172 & 15184 These are porphyries from the N. and S. ends of the long porphyry hill marked on the map. On the N. the rocks have the flow structure well marked, but it could not be so well seen on the S.

15202 & 15203 These are from an old shaft on the N.W. part of the "Clubbeetson Mt." The "Manganese Mt." of former days. The first shows the flow structure very well developed and was taken on that account. The second shows the manganese ore in little stalactitic formations which is very good evidence that it was deposited by water.

47 1/2 T. 33 N. R. 4 E. Section 19,



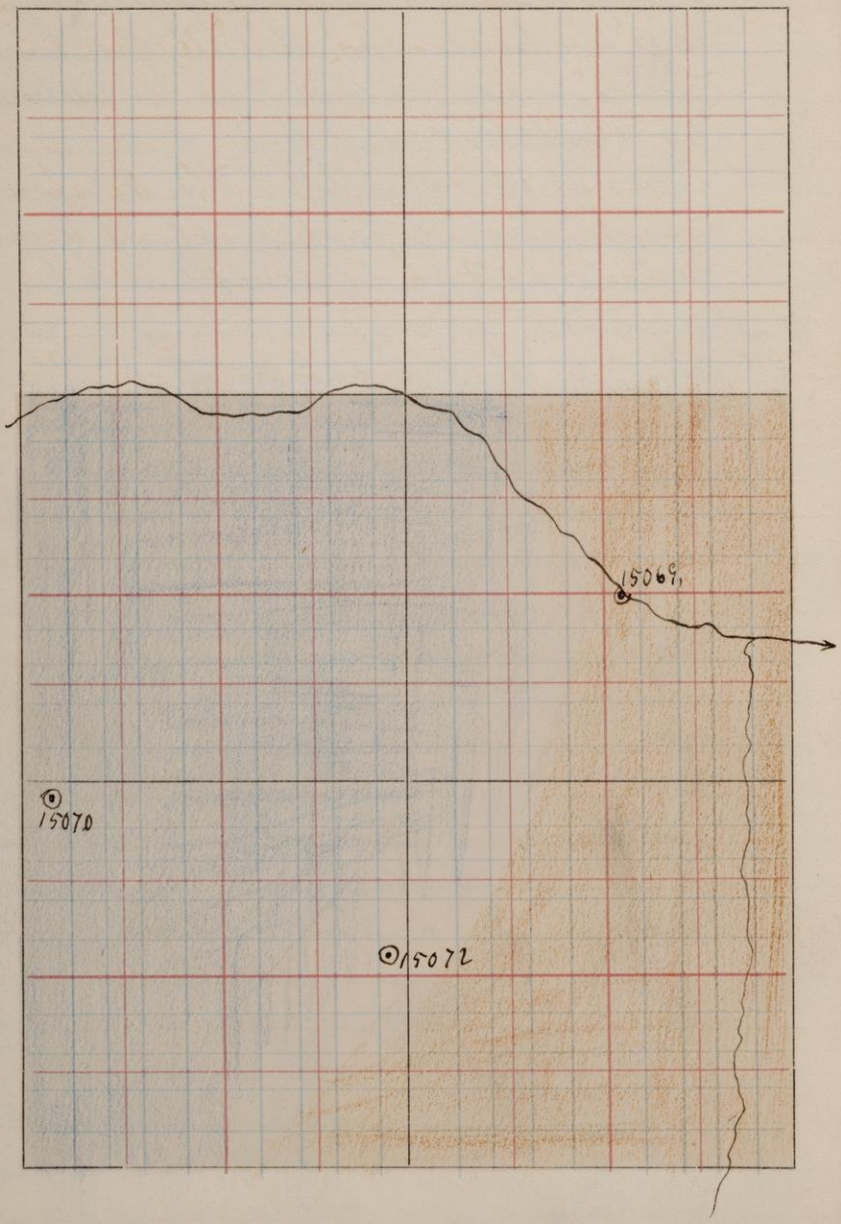
This section is a most interesting place. It is the location of the old "Manganese mines" on the Cuthbertson Mt. described by Pompelly in his Rep. of Missouri Geol. Surv. 1872. It is the place where limestone blends into porphyry according to his Rep. P. 26. Cuthbertson Mt. is irregular in shape sending a sort of spur to the N.W. and to the S.W. It bears positive evidence of being an old lava flow. There are large masses of rock all twisted and contorted just like lava frequently is.

The Manganese ore is often in a fine black powder, sometimes dry but often wet and "mucky." It is only occasionally in solid lumps of any much size. At other times it is in small masses or in a powder scattered through the numerous small openings in the lava. No other place in the whole area visited is half so changeable as this. There are many different looking rocks which at first sight seem to be entirely distinct, but which, I think, are closely related genetically. Thus, there are many places

See P. 63

48½

T. 33, N. R. 4, E. Section 24,



Section 23 is almost entirely in a level valley called the "Pepper Flat Woods". It is entirely under cultivation excepting the western part which is occupied by flint hills. No specimen was taken from it and it is not represented in this Note-Book by a map.

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15069 This is a porphyry taken from the creek bank just N. of Mr. Blanton's field, N. of the "Flat Wood" school house.

All of this Section is level ground and it is only here and there that the rocks are exposed. This specimen seems to be ordinary porphyry.

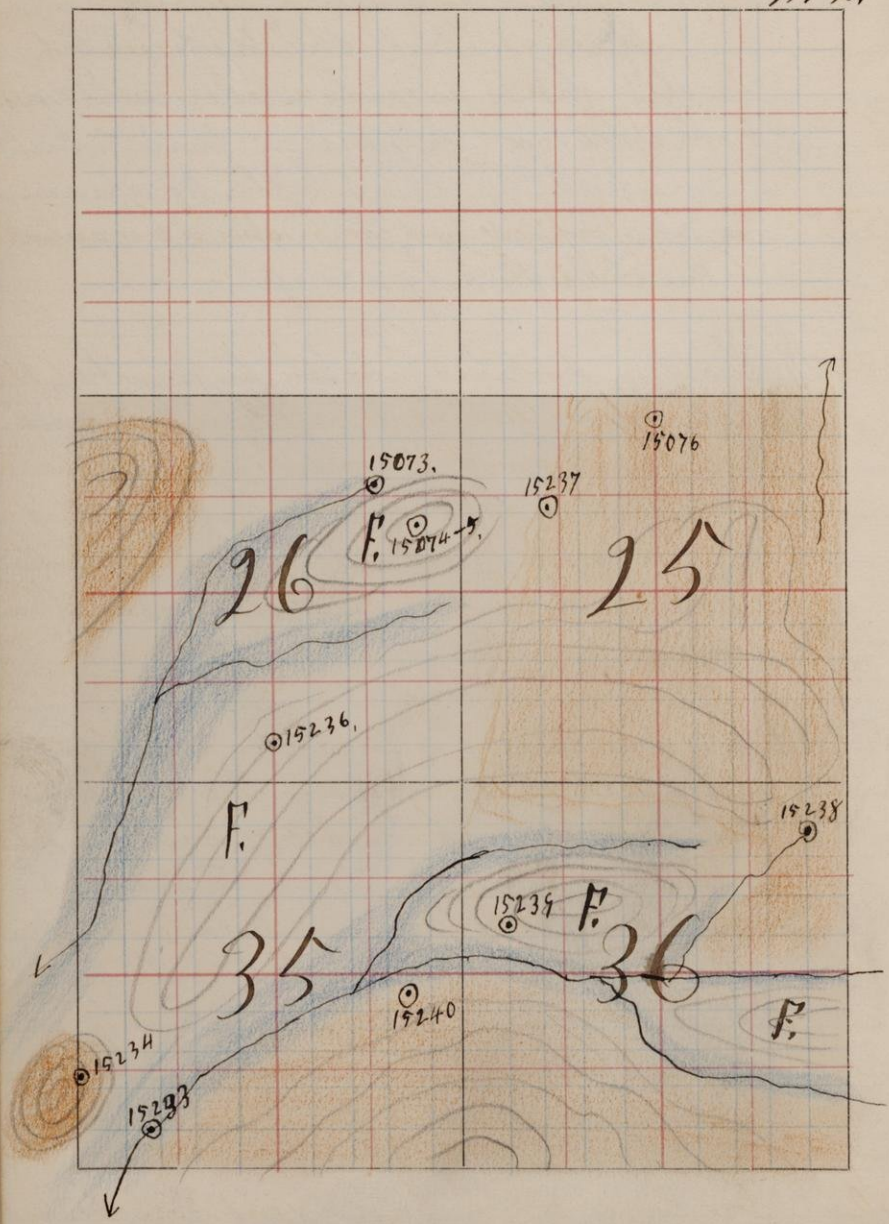
15070 This is lime stone from a well 20 ft. deep in the yard of Mr. Roebbel. No surface rocks are exposed in that vicinity.

15072 This is porphyry from a ledge by the roadside S. of the "Flat Wood" school house. There is an area here of only a few square rods over which the porphyry is exposed.

49 1/2

T. 33. N.

R. 4. E. Sections 25, 26, 35 & 36,



This map represents four sections. The interesting feature of this area is the alternate appearance of porphyry, lime stone and flint.

15076 This is a porphyry from comparatively low ground. The hill rises to the S.

15237 So, also a porphyry from the high part of the hill. It is interesting to note how the flint and porphyry meet here on the hill without there being any apparent break in the configuration. To the N. and S. valleys soon set in which divide the porphyry hills from the flint hills.

15238 This is also porphyry.

15239 Limestone, taken from a point fully 100 ft. above the valley, making it the highest limestone seen in this corner of the township.

15234 Porphyry, taken from hillsides as
15240 represented on the map.

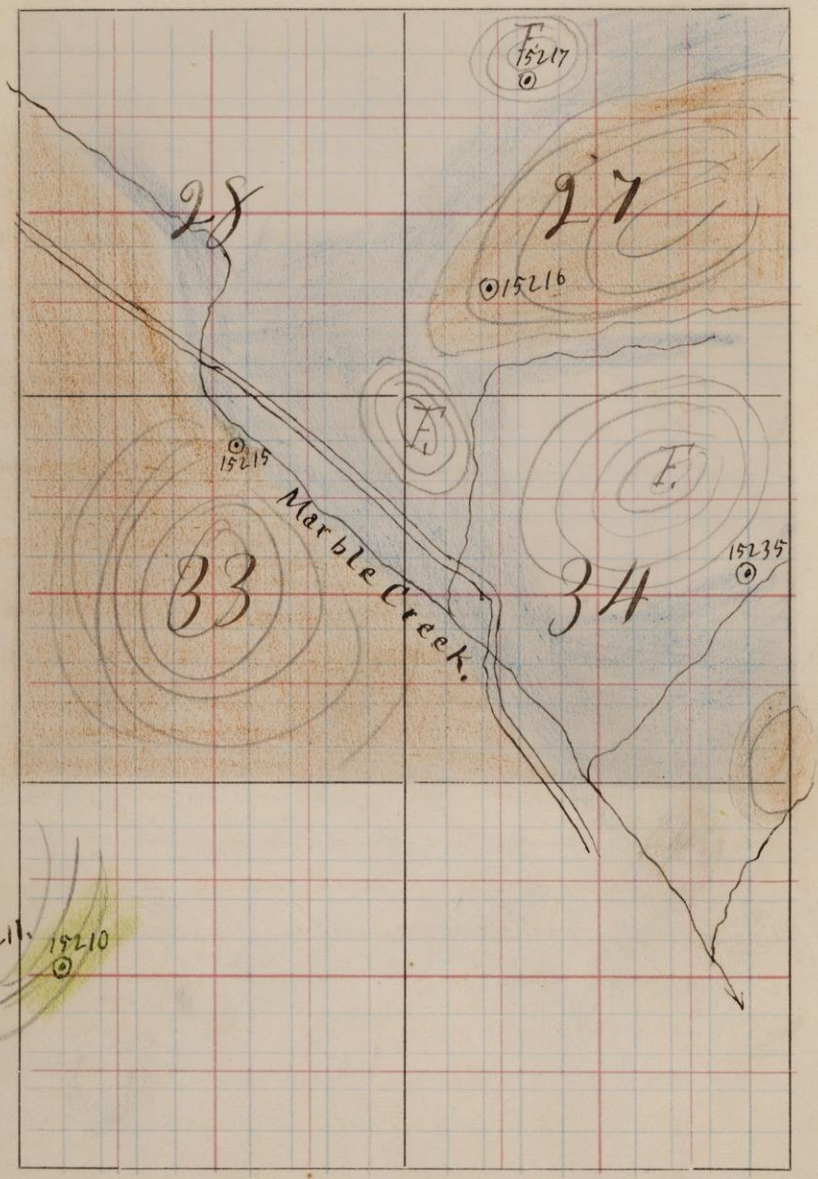
15233 Limestone from the creek bed. It has a great many large like porphyry gravels in it.

15236 Are limestone, taken from well strati-
15078 fied layers which have a gentle slope in

See P. 64

50 1/2

T. 33 N. R. 4. E. Sect. 27. 28. 33. & 34,



This map represents 4 sections. It is a map of porphyry, flint and limestone alternating

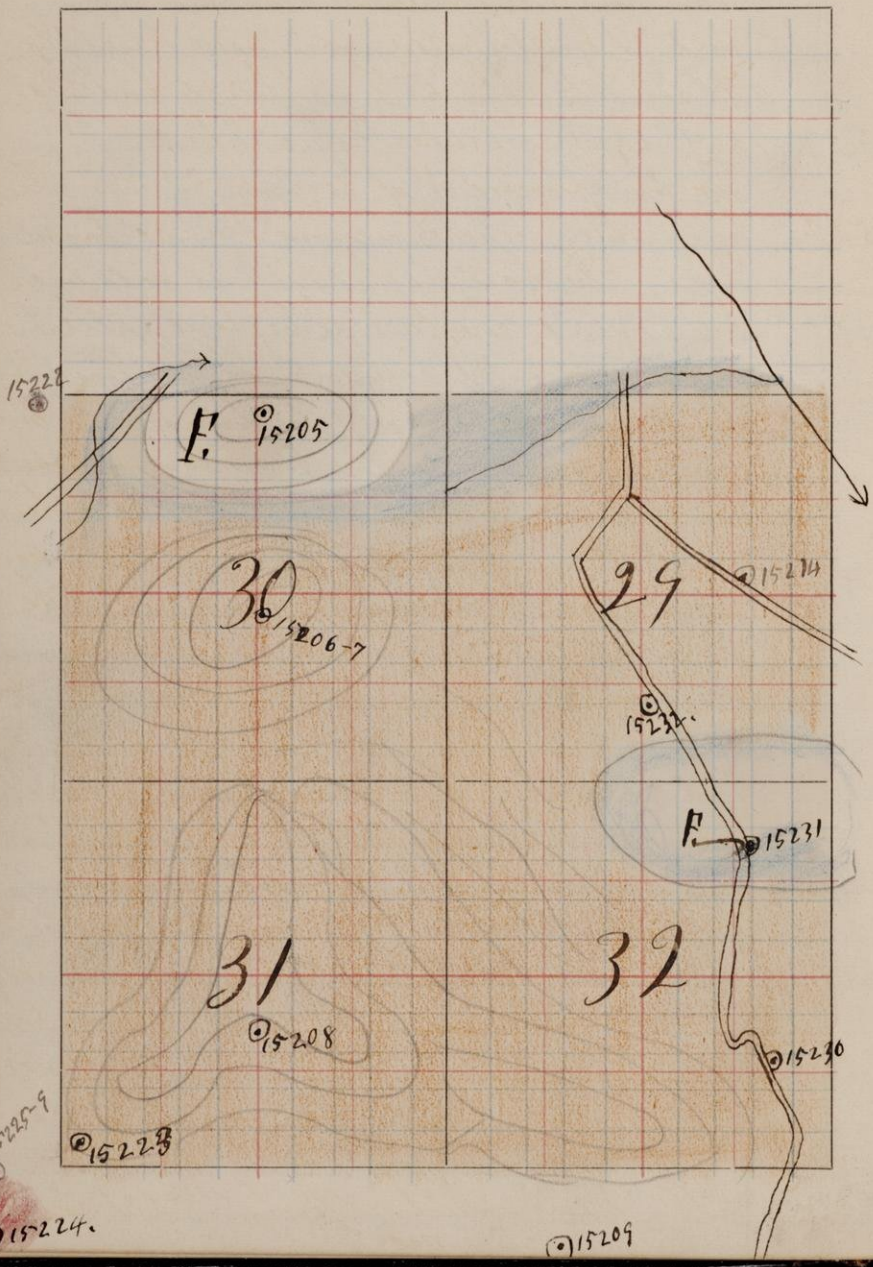
15235 There is nothing of special interest in the hand specimens or their mode of
15216 occurrence. The limestone is in the valley and is always well stratified and ap-
15217 proximately horizontal, but generally has a gentle slope in the direction of
15215 the hillsides. The map shows the location of the several specimens so that it is unnecessary to mention them in detail.

To the S.W. of this map, across the township line, two other specimens were taken.

15210 The former is a sandstone which
15211 came from layers along a branch. The latter is a dyke rock obtained from boulders on the surface, the dyke itself not having been found.

57 1/2

T. R.


15222
F.
15205
30
15206-7
29
15234
15233
F.
15231
31
15208
32
15230
15225-9
15223
15224.
15209

This map represents 4 sections and is principally occupied by the "Biser Mt." This hill is large and high and very irregular in shape.

On the extreme N. of Section 30 is a flint
15205 hill which reaches across the section line. The base of this hill is occupied by a very compact limestone, called marble by the citizens of the country. Passing immediately S. from this we cross a second hill which is composed entirely of porphyry. On the northern slope of this prospecting was done years ago in a vain search for iron ore. The rocks thrown out are of a dark red to black color, waxy lustre, and some of them seem to be a porphyry breccia. This rock will probably prove of great interest. Passing still farther off to the S. we ascend the northern spur of "Biser Mt." The porphyries of this hill have phorphyritic field spars which show much more plainly than the average. The northern part of section 32 and southern part of section 29 are occupied by a flint hill from which specimen 231 came.

See page 65.

Continued from P. 1.

The exposure consists of a narrow strip extending along a little branch, and covers but a few square rods. To the N.E. in a number of places small boulders and gravel of porphyry are scattered over the surface. I was first puzzled because I could not account for them, but it now seems probable they are the remnants of this same conglomerate rock, which may have at one time extended over these areas and which is now entirely disintegrated and largely removed. The rock where now exposed has a dip of fully 25° to the S.E. by S.E. giving it a strike N.N.W. by W.

15025 & 15029 These are from the contact line, the former granite, the latter porphyry, and are but 6 in. apart.

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Continued from P. 2.

15042 & 15043 '42 is from the highest point of this high bluff, which is called "Bunters Hill." '42 is from the bed of the creek immediately below '43. On the north side of the creek

15046 & 15047 & 15048 some distance above the contact line there is also a moderate hill but without steep bluffs. At the foot of this hill the rock is so coarsely crystalized that it will almost do to call it a granite. '48 was taken from this point. Near the summit of the hill the rock is not so well crystalized. '46 & '47 are from near the top of the hill.

On my last visit to the place I followed up the creek and gathered specimens from the creek bed all the way along, as is shown on the map. Some of these are quite coarse but in general the coarseness of texture decreases as the distance from the contact line increases so that a mile or so away crystalization is little if any more nearly perfect

than in the ordinary porphyries in other places. The individual specimens will show for themselves the way this change occurs much better than can be described in a field Note-Book.

15045 Quartz-diabase-porphyrite. This rock was found in boulders on the north side of the hill, as shown on the map. The dyke itself could not be found, on account of the heavy covering of soil on that part of the hill.

15044 & 15049 Sand stone. The northern part of this section is covered with sand stone. The portion shown on the map is the southern extremity of a large circular area nearly 3 mi. in diameter, almost all of which is probably covered with sand stone. Only a narrow strip on the south side of this valley lies within T. 33 N. and consequently a detailed examination of the remainder was not made. Nearly all of the valley is covered with soil, and is extensively cultivated. Along the branches and occasionally at other places outcroppings can be seen. Along the little branch in the extreme N.W. part of the map very heavy beds of sand stone are laid bare. At every place noticed the bedding seemed to be horizontal, and thus far there appears to be a total absence of any indications of orographic movements of any extent since the formation of the sand stone. '44 is from the surface at a little ravine; and '49 is from Esq. Bowmans' well but I could not determine

from what depth it came. The well was sunk about 25 ft. deep and did not pass through the sandstone.

Continued from P. 8.

15110. W. side of N.E. corner 2 ft. 8 in.
15111. E. of and adjoining 109.
15112. N.E. corner 3 ft. below surface.
15113. N.E. corner 4 ft. 6 in.
15114. N.E. " 5 ft. 6 in.
15115. W. side of N.E. corner 7 ft. 6 in.
15116. S. " " " " " 8 " .
15117. " " " " " " 11 " .
15118. W " " " " " 14 " .
15119. S " " N.W. " 15 " .
15120. Middle of W. side 14 ft.
15121. " " " " 15 " .
15122. N.W. corner 18 ft.
15123. S. side N.E. Corner 17 ft.
15124. W. " S.E " 17½ "
15125. Porphyry, surface rock S.W. corner of shaft.
15126. Coarsest rock seen on dump pile.
15127. Granite from surface at contact line 30 yds. N. of the shaft.
15128. Porphyry, surface rock 5 ft. S.W. of 127.

Continued from P. 14. 

porphyry, some granite, and others halfway between the two. The ledges of the rock are where exposed are granite. It could not be determined exactly from whence the boulders came, but it is evident they have not been moved far and it is quite probable they now exist on the same ground where they were formed.

15064- This is a coarse dyke rock from the spring near the house of Peter Weiss Jr. There is a large dyke here exposed over an area of 150 ft. by 75 ft. or more. The surface covering made it impossible to determine the direction of the trend of the dyke.

15065- This is a granite specimen taken from the hillside near the river, as shown on the map. The bluff is about 150 ft. high with granite ledges very abundant.

15061- This is a dyke rock at the foot of the high hill mentioned under No's. 6 & 7. The rock varies in color from dark to light. The latter being composed almost wholly of feld-spar.

15008- This is a dyke rock found by the road side leading from Peter Weiss's to young Peter Weiss's. The dyke itself could not be located, but there was a very large amount of boulders scattered over the hillside.

Continued from P. 26.

The two extremes were not more than 20 in. apart.

15253- A coarse grained porphyry from near the

contact line, as shown on map.

15254- This came from an old shaft and was called slate by the miners, but it looks very like hornblende which it probably is. This mineral is so scarce in this part of the country that it makes it quite interesting should it prove to be hornblende. The wall rock of the shaft is porphyry.

15255- This is a half way granite, which of course came from near the contact line.

15256. This is porphyry from just across the contact line.

In tracing this contact line great care was taken. The country is sometimes level and covered with a thin coating of soil, at other times hilly, with abundant exposures of rock. It is very noticable that the line is not sharply drawn. Often a coarsely crystalized area will be farther to the S.W. than some of the porphyry. Just N. of No. 250, for example the porphyry extends 20 to 30 ft. Such examples are often found.

Continued from P. 27.

The mining was principally done on the largest of these veins which carries argentiferous Galena. The vein is not vertical but dips to the S.E. about 45°, according to Mr. Wiley who at one time was Superintendent of the mines.

57- Slate rock from E side of vein from "Silver Mines"
58- The same as No. 230 in my Dissertation, which see.
58- Lepidolite from "Silver Mine."
59- The so-called "Elyperkine" from "Silver Mine."

Continued from p. 37.

water worn, and therefore must have rolled down the hillside while the sandstone was forming. This is positive evidence that the porphyry is older than the sandstone.

15138- This is limestone from along the same ravine and is so interbedded with the sandstone that there cannot be any material difference in the ages of the two rocks. Its location is shown on the map.

15131- This is porphyry from the summit of the hill above the Barton ravine, as shown on the map.

15132- These are all porphyries, the last two of which are
& from the bank of Strait's creek. The other is from a
15144 high point overlooking the creek.
&
15145-

15133+134- These are sandstones from the bank of the branch at Mrs. Henson's spring. The bluff here is 18 or more feet high. Well stratified sandstone overlies limestone beds and is conformable with them.

15135. This is limestone from immediately under the two sandstones just described.

The whole of these stratified rock dip gently to the N.W., and are good illustrations of what is so often seen in this township, namely stratified rock fringing the bases of hills and having gentle inclinations in the directions of the hillsides themselves.

It may here be said once for all that in no case thus far observed is there any evidence of the bedding of the stratified rock ever having been materially changed. Usually these rocks are gently

inclined, but almost invariably in the direction of the slope of the hillside. This is most likely due to the rocks having been deposited on a sloping bottom. We look in vain for any evidence of material orographic movements since the stratified rocks were deposited.

Continued from P. 36. [p. 40]

up the Dallas road perhaps all around the hill.

15152. Porphyry from same place as 151.

15176. This is limestone from the N. W. corner of the circular hill as shown on map.

15177. Porphyry from the summit of the hill.
This circular hill of porphyry is about 250 to 300 ft. high and presents a unique appearance rising as it does from a limestone valley. It is almost circular and a half mile diameter at base. There is no indication of its having been lifted up through the limestone and probably was formed long before the limestone was deposited.

Continued from P. 45.

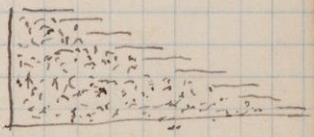
Tuffs's house. It was taken from only a few feet E of the limestone limit.

15170. Limestone from N. hillside, in bank of ravine. The hill is apparently composed of flint but the limestone at its base is almost horizontal and seems to pass in under the hill.

15155 Dyke rock. This is a most interesting occurrence of a dyke rock. It is surrounded by limestone, and on account of its resisting erosion more than the limestone has produced a narrow ridge throughout its entire length, a little more than 1/8 mi. The ground in most places is so covered with soil that I could not determine whether the dyke itself passed through the limestone, or whether it was formed before the deposition of the latter. It seems probable that the dyke is quite wide, 50 ft. or more, but this can not be stated definitely.

Continued from P. 48.

which have surface rocks that seem to be stratified. These overlie the massive rocks of the hill, and are at places apparently different from them, but we always find that on the hillside the pseudo stratified rock extend downward to about the same depth below the surface, no matter at what point on the hill the examination is made. At one place a trench about 2 rds. long has been dug into the hillside and this shows that any given layer merges into the massive rock of the hill, thus



A shaft sunk would show the layers down to a certain depth with the massive rocks below, but the cut on the hillside looks quite different.

Again, in the ravine N. of the hill at one

place the massive rocks by weathering are actually changing into shells and layers.

All these points make it seem probable that the apparent stratification is due, (a) to lava flows, and (b) to weathering.

This is an important question and is explained entirely differently by Pompelly in his Report above mentioned.

The manganese ores were probably deposited by water and fills nearly every little opening in the rocks.

15185. This seems to be a dyke rock, but it may not be, as some of the country rock looks very much like it.

15186 & 15187 & 16188 These three are from the same place, at one of the old mines and were taken to show that the rock mass certainly is a lava.

15189. This is a specimen of the manganese ore.

All the remainder on this map are taken to show the similarity of the rock in the different parts of the hill. The map shows their location much better than can be given in words.

Continued from P. 50.

the direction of the hillside.

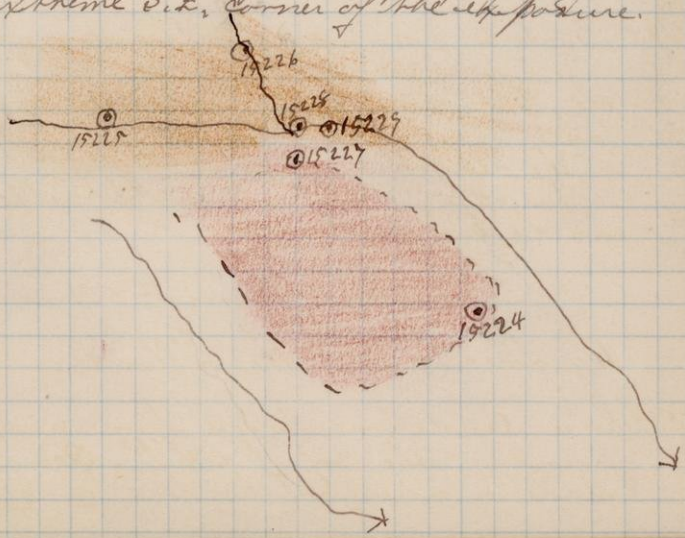
15074. Is a sandstone taken from a boulder found on the top of a hill. Search was made in vain for this rock in situ.

15075. This is flint taken from near 74. The hill from which the two came is flint throughout [with limestone at its base].

Continued from P. 52.

All of the specimens not named from these sections are simply porphyry and need not be described in detail.

To the S.W. of section 31, across the township line, is a little knoll of very coarse granite porphyry. Some of the porphyritic feld spar crystals are nearly 2 in. long. This little knoll, which is not exceeding 300 yds in diameter is almost entirely surrounded by ravines. To the N.W. a narrow neck reaches across on to the porphyry hills. This locality furnished an excellent opportunity for studying the crystallization question. Specimen 24 is the granite porphyry from the extreme S.E. corner of the exposure.



Specimen "25" is porphyry from 100 yds. up the ravine to the West of the northern exposure of the granite porphyry. No. "26" is up a little ravine 50 yds. to the north. No. "27" is the granite porphyry on the hillside about 50 ft. slant height from a point in the ravine at which No. "25" was taken. This latter is porphyry. No. "29" came from the same ravine about 50 ft. below "25".

So far as could be seen in the field there is a gradual transition from the coarse granite porphyry through No. "27" to which itself is comparatively fine grained, to the porphyries represented by the other numbers.

| No. | P. | No. | P. | No. | P. | No. | P. |
|---|---|---|---|---|---|---|---|
| 15001 | 30 | 15039 | 2 | 15077 | | 15115 | 8 |
| 2 | 13 | 40 | 2 | 78 | | 116 | 8 |
| 3 | 13 | 41 | 2 | 79 | | 117 | 8 |
| 4 | 12 | 42 | 2 | 80 | 18 | 118 | 8 |
| 5 | 14 | 43 | 2 | 81 | 18 | 119 | 8 |
| 6 | 14 | 44 | 2 | 82 | 18 | 120 | 8 |
| 7 | 14 | 45 | 2 | 83 | 20 | 121 | 8 |
| 8 | 14 | 46 | 2 | 84 | 18 | 122 | 8 |
| 9 | 29 | 47 | 2 | 85 | 20 | 123 | 8 |
| 10 | 29 | 48 | 2 | 86 | 17 | 124 | 8 |
| 11 | 29 | 49 | 2 | 87 | 17 | 125 | 8 |
| 12 | 29 | 50 | 4 | 88 | 16 | 126 | 8 |
| 13 | 29 | 51 | 4 | 89 | 16 | 127 | 8 |
| 14 | 29 | 52 | 6 | 90 | 15 | 128 | 8 |
| 15 | 24 | 53 | 3 | 91 | 16 | 129 | 1 |
| 16 | 12 | 54 | 3 | 92 | 16 | 130 | 38 |
| 17 | 18 | 55 | 3 | 93 | 21 | 131 | 37 |
| 18 | 18 | 56 | 3 | 94 | 21 | 132 | 37 |
| 19 | 12 | 57 | 27 | 95 | 21 | 133 | 37 |
| 20 | 11 | 58 | 27 | 96 | | 134 | 37 |
| 21 | 10 | 59 | 27 | 97 | | 135 | 37 |
| 22 | 9 | 60 | 12 | 98 | | 136 | 38 |
| 23 | 1 | 61 | 14 | 99 | 15 | 137 | 38 |
| 24 | 1 | 62 | 30 | 100 | 15 | 138 | 2 |
| 25 | 1 | 63 | 14 | 101 | | 139 | 2 |
| 26 | 1 | 64 | 14 | 102 | | 140 | 2 |
| 27 | 1 | 65 | 14 | 103 | | 141 | 2 |
| 28 | 1 | 66 | 7 | 104 | | 142 | 2 |
| 29 | 1 | 67 | 7 | 105 | 16 | 143 | 2 |
| 30 | 37 | 68 | 38 | 106 | 23 | 144 | 37 |
| 31 | 37 | 69 | 49 | 107 | 23 | 145 | 37 |
| 32 | 37 | 70 | 49 | 108 | 8 | 146 | 42 |
| 33 | 37 | 71 | 38 | 109 | 8 | 147 | 42 |
| 34 | 37 | 72 | 49 | 110 | 8 | 148 | 42 |
| 35 | 37 | 73 | 50 | 111 | 8 | 149 | 42 |
| 36 | 1 | 74 | 50 | 112 | 8 | 150 | 39 |
| 37 | 4 | 75 | 50 | 113 | 8 | 151 | 40 |
| 38 | 2 | 76 | 50 | 114 | 8 | 152 | 40 |

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72

| No. | P. | No. | P. | No. | P. |
|---|---|---|---|---|---|
| 15152a | 39 | | | | |
| 15153 | 39 | 15191 | 48 | 15229 | 52 |
| 154 | 39 | 192 | 48 | 230 | 52 |
| 155 | 45 | 193 | 48 | 231 | 52 |
| 156 | | 194 | 48 | 232 | 52 |
| 157 | 39 | 195 | 48 | 233 | 50 |
| 158 | 39 | 196 | 48 | 234 | 50 |
| 159 | 41 | 197 | 48 | 235 | 51 |
| 160 | 37 | 198 | 48 | 236 | 50 |
| 161 | 40 | 199 | 48 | 237 | 50 |
| 162 | 40 | 200 | 48 | 238 | 50 |
| 163 | 44 | 201 | 48 | 239 | 50 |
| 164 | 44 | 202 | 47 | 240 | 50 |
| 165 | 45 | 203 | 47 | 241 | 26 |
| 166 | 45 | 204 | 48 | 242 | 25 |
| 167 | 43 | 205 | 52 | 243 | 25 |
| 168 | 45 | 206 | 52 | 244 | 26 |
| 169 | 45 | 207 | 52 | 245 | 27 |
| 170 | 45 | 208 | 52 | 246 | 27 |
| 171 | 43 | 209 | 52 | 247 | 27 |
| 172 | 47 | 210 | 51 | 248 | 26 |
| 173 | 45 | 211 | 51 | 249 | 26 |
| 174 | 45 | 212 | 46 | 250 | 26 |
| 175 | 46 | 213 | 46 | 251 | 26 |
| 176 | 40 | 214 | 52 | 252 | 26 |
| 177 | 40 | 215 | 51 | 253 | 26 |
| 178 | 46 | 216 | 51 | 254 | 26 |
| 179 | 46 | 217 | 51 | 255 | 26 |
| 180 | 37 | 218 | 46 | 256 | 26 |
| 181 | 37 | 219 | 46 | 257 | 24 |
| 182 | 38 | 220 | 46 | 258 | 28 |
| 183 | 38 | 221 | 48 | 259 | |
| 184 | 47 | 222 | 52 | 260 | |
| 185 | 48 | 223 | 52 | | |
| 186 | 48 | 224 | 52 | | |
| 187 | 48 | 225 | 52 | | |
| 188 | 48 | 226 | 52 | | |
| 189 | 48 | 227 | 52 | | |
| 190 | 48 | 228 | 52 | | |