Minnesota Valley: [specimens] 5331-5373. No. 33 1884

Hall C. S.

U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 33.
C. W. Hall.

Minn. Valley.
5331 to 5373.

Descriptions 5331 to 5373

Survey of the Pre-Cambrian Rocks of the N. W. States.

INSTRUCTIONS.

1. Devote at least two pages of this note book 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. 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 smaller spaces as 100 paces, each of the spaces between the red lines as 500 paces, and four of these large spaces as one mile, or 2,000 paces. Usually the southeast corner will be placed at the first red 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 down one space, 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, after which give in order 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 exposure as possible. Very often the notes for one section will cover more than one page in which case pass to the next right hand page, *repeating the map on each left hand page* as long as the notes, with regard to one section, continue.

3 Collect a specimen from each separate ledge of rock, or whenever 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 the note that it is of a rock identical with specimen so-and-so. Under the same conditions small sized samples will be allowed, but in all other cases *large sized trimmed specimens*, with chips for slicing, must be selected in accordance with § 3, chapter IV, p. 44, Regulations of the U. S. Geological Survey. All specimens are to have numbers painted on them, in white on a black background, in camp.

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, etc., etc.

5. Forward this note book, as soon as filled, as registered mail matter, to R. D. IRVING, U. S. Geologist, Madison, Wisconsin.

#33

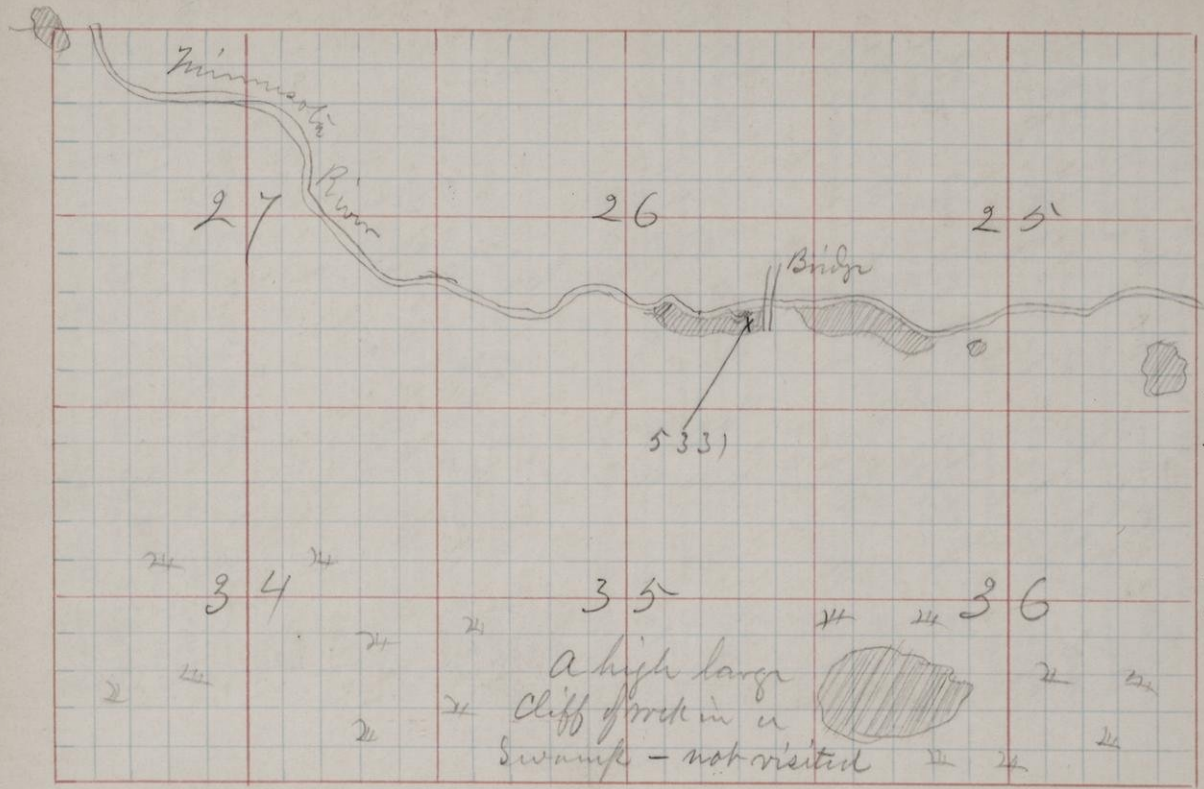
The northernmost Exposure in the Minnesota Valley seen during the present Academy work located in Sec. 16, 124-46 upon the west side of the present river channel

The position is about 200 S and 1400 W being a little further north than the Exposure upon the East side sampled with #5330.

The rock here is quite massive and then a Section shows a lamination pointing to its Gneissic nature.

The massive character of the rock seemed to obliterate all Strike and dip; these could be guessed at but not certainty could be felt in stating the guess.

In Sec 21 there is a small Exposure near the South line. It was not visited but seen from the East side of the river it did not appear large nor different from the Exposures upon that (E) Side.



(9–891.)

Sec. 26 T. 121 R. 46

5331

500 N; 300 W

For a half mile or so along the south bank of the river in Secs. 25 + 26 (for the river turns to the east between the outlet of Big-Stone Lake and this point) there lies an almost continuous ledge of rock, now + then the cliff rises to some height above the bed of the stream but usually the top of the exposure is not more than 12 to 15 feet.

The rock is a gniss with alternating colors and textures; in short it is identical with that on the north side of the river in all its essential characters. Now + then the rock varies somewhat as on the high bluff from which this number was taken. The color is dark, the banding is very distinct. Nodules of a different texture are seen some quite quartzose others micaceous now + then masses of hornblende or what appeared to be such were disclosed. The general character of the rock was that of a fine

(9—891.)

Sec. 26 T. 121 R. 46

5331

500 N. 300 W.

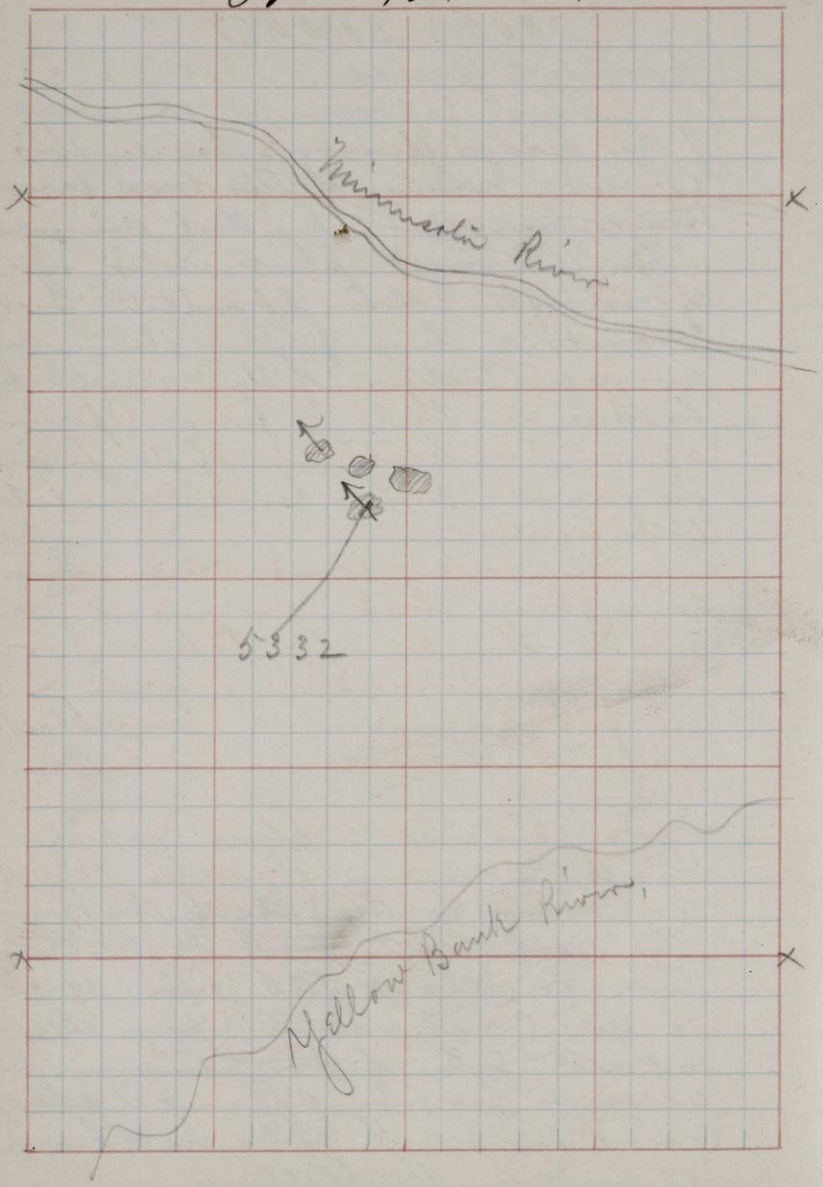
Granitoid Gneiss.

This exposure, to the west of the bridge across the river is not wholly of the modification represented by this number. For the most part it is of a reddish color sometimes coarser & then finer than the average texture of the neighborhood.

(Upon the South side of the river the ~~east~~ north and South section line is about 100 rods west of its continuation upon the north side of the stream. This accounts for any apparent displacement in part altho no change is made in the platting.

(9—891.)

Sec. 32 T. 121 R. 45



5332

1200 N; 1100 W

Sec 32

It was difficult to locate this Exposure owing the forlorn ignorance of the owner of the farm, a German only Six months out of the Fatherland. I did the best I could.

There are three or four Exposures around the buildings of the farm the one sampled was in a field to the South

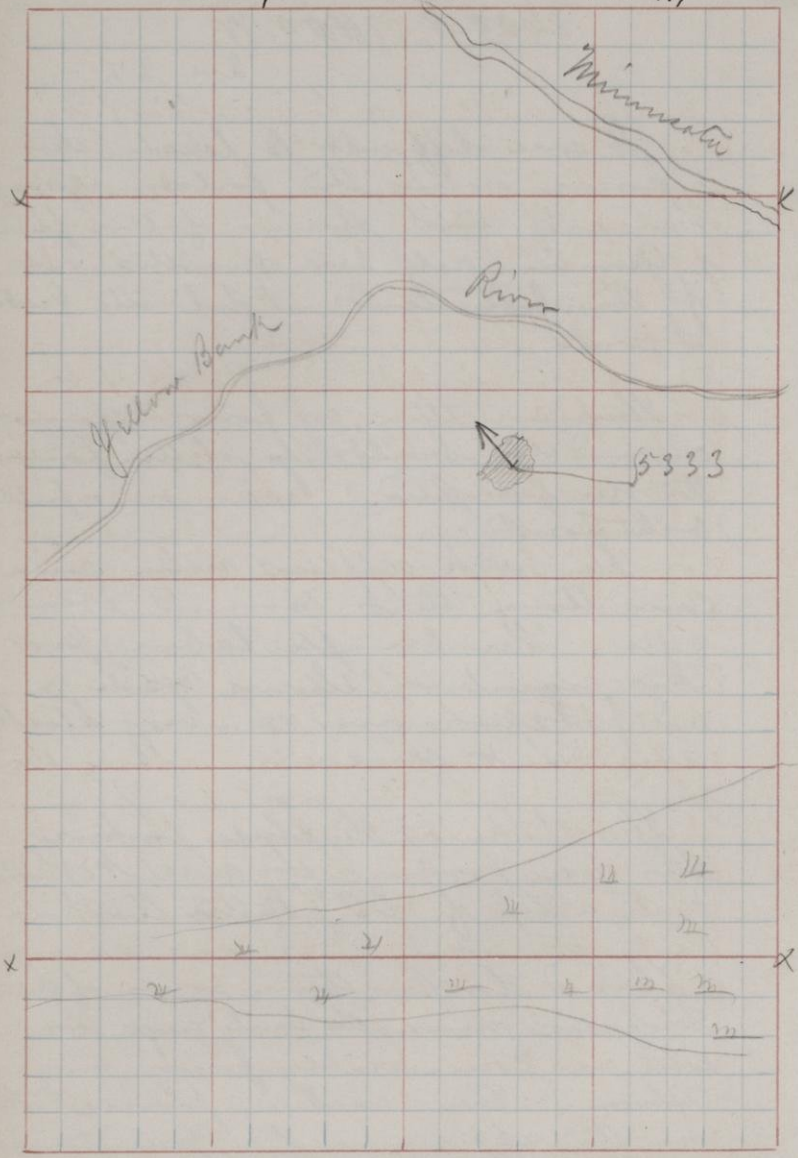
The rock appears more micaceous there that around Orlinville. The sample taken for this number shows quite a nod feldspar and a very black abundant mica

The Strike at the place where this was broken the was N E & S W. with a dip of 30° to the N W.

This is darker than some of the Surfaces near the buildings as well as considerably finer in texture. The rock in places takes on the appearance of a Granitoid Gneiss

(9—891.)

Sec. 4 T. 120 R. 45 W.



5332

1300 N; 700 W

In the middle of a large wheat field not very south of the Upflow Bank river this Exposure stands up 8 or 10 feet above the general level of the Swell on which it stands

There is more jointing into quite large blocks here than in any exposure visited in this upper part of the valley. The rock seems to be somewhat porphyritic in that the feldspar appears in crystals of considerable size compared with the other constituents of the rock

Considerable weathering had taken place affecting to some depth the whole exposure and especially noticeable along the joints which are so prominent on the highest part of the rock.

In one or two places an indistinct lamination was observed dipping S 8 W.

Jointing planes gave the appearance occasionally of a horizontal position of the layers.

(9—891.)

Sec. T. R.

Sur plat appr. 5-3-33

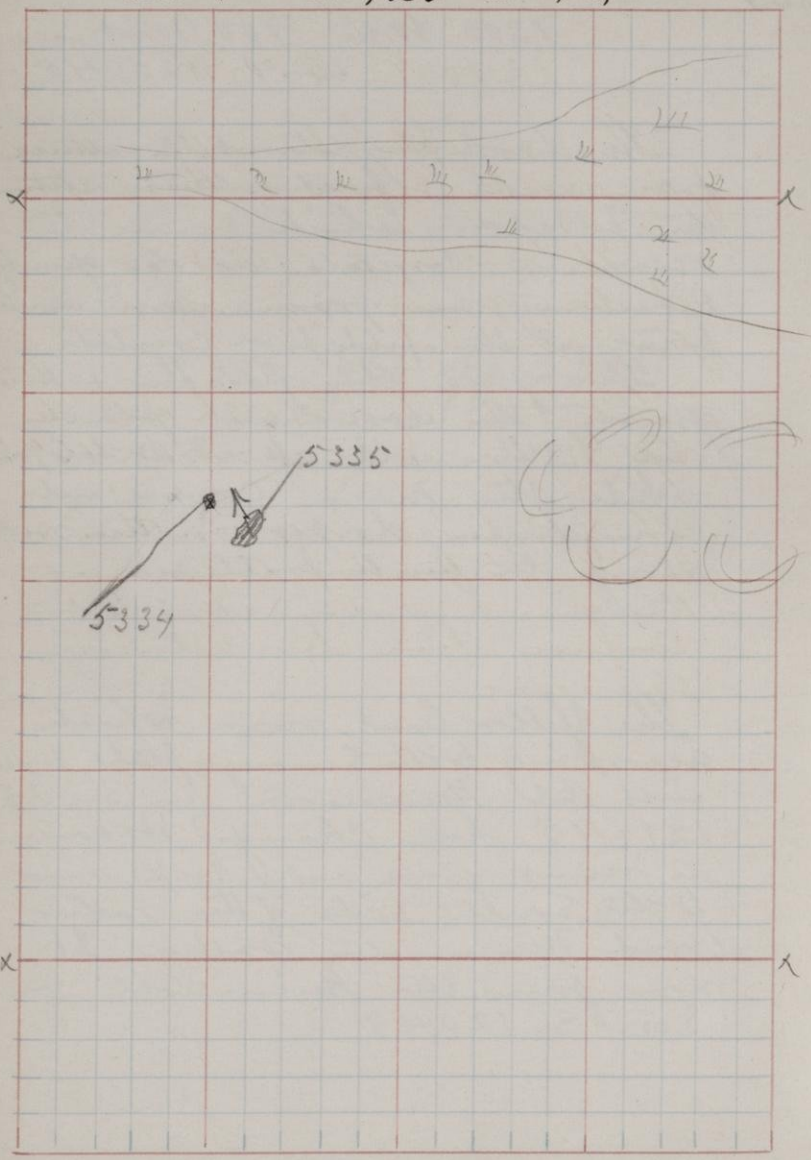
5333, Cont.

1300 North 700 West
Sec. 4, 120; 45

The dark ingredient weathers out much faster than either the feldspar which seems to occur in crystals or the quartz occurring in grains and masses between the feldspar crystals. This gives the feldspar + the quartz the dominant place in the make up at the surface while the mica comes into prominence deeper in the rock along the finer fractures.

The Yellow Bank river which according to the survey plats empties into the Minnesota in Sec 33 121; 45 has changed its course in recent years and keeps near to the south side of the rather broad Minnesota valley. It now joins the Minnesota in Sec 3, 120; 45

Sec. 9 T. 120 R. 45



5334

1200 N 1500 W

This sample shows the mass of the rock exposed on this section (9)

The rock is a schist or a schistose gneiss with mica in great abundance.

The strike is N 45° E and the dip to the NW at about 45°!

The feldspar weighs weathering much better than the mica; this gives a white aspect to the surfaces than the interior possesses.

Sec. 9 T. 120 R. 45

See preceding plat.

5-335

1150 N; 1400 W.

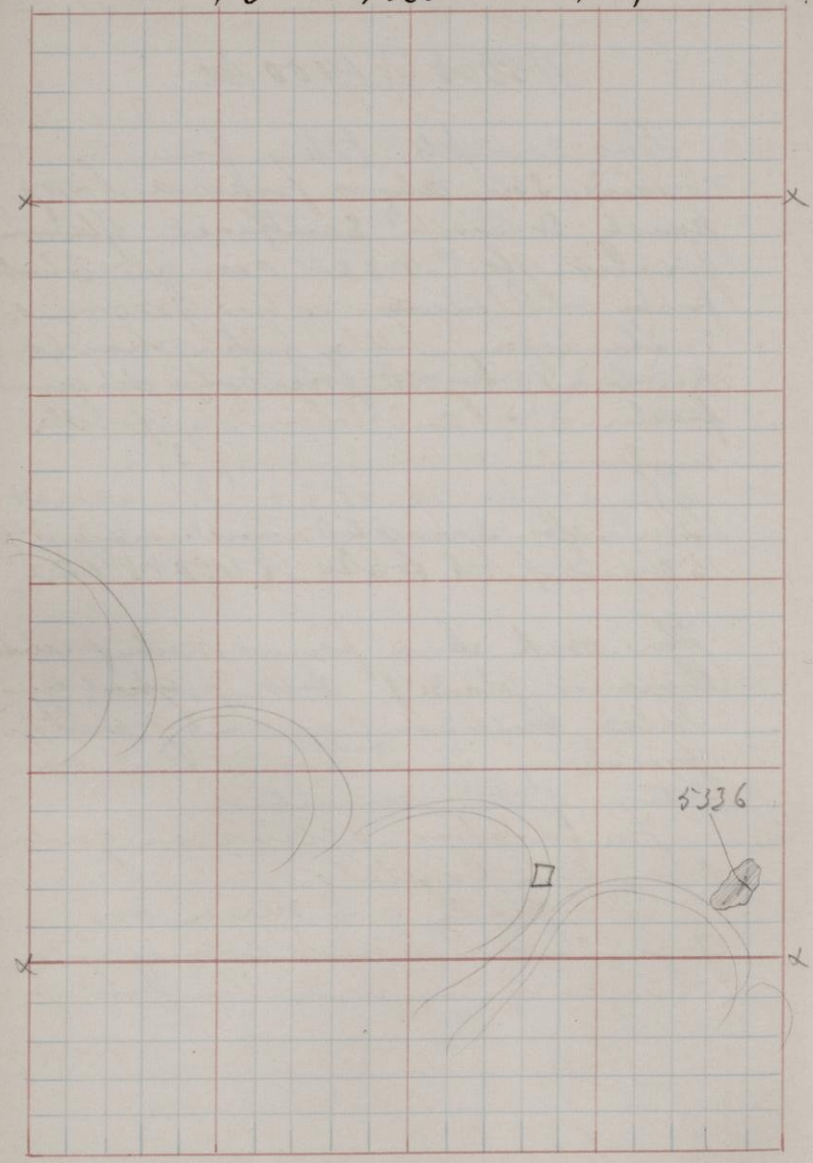
This sample taken from a considerable larger exposure 100 paces to the southeast of the location of # 5-334 is quite fresh and clear

The exposure is a high rounded knob 15 or 20 ft. above the ground level.

The strike is N 2° E S W as at the knob sampled with 5-334
The Dip is to the NW at 40°

The rock here is much fresher than in 5-334 but probably it is the same only the weathering is a superficial condition of this number.

Sec. 16 T. 120 R. 45



5336

200 N 100 W

Sec. 16

This sample is from a large, nearly smooth surface showing perfect glaciation over its whole area. Along one or two grooves & seams a little stone has been removed by the neighboring farmers, and tolerably fresh material was secured.

The exposure has a measurement of 150 feet N E & S W by 100 N. & S.

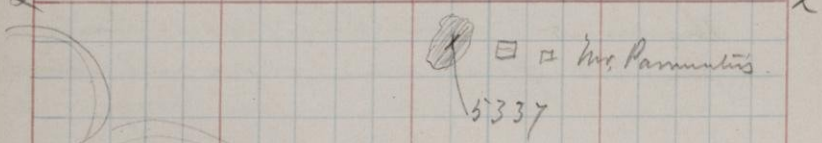
The rock is a fine rather medium (light or dark) colored gneiss and also rather coarse granitoid gneiss.

The feldspar occurs in quite complete crystals

The quartz and mica are granular and not coarse in comparison with the feldspar.

The glacial striae were S. 40 E.

Sec. 22 T. 120 R. 45



5337

1900 N; 900 W.

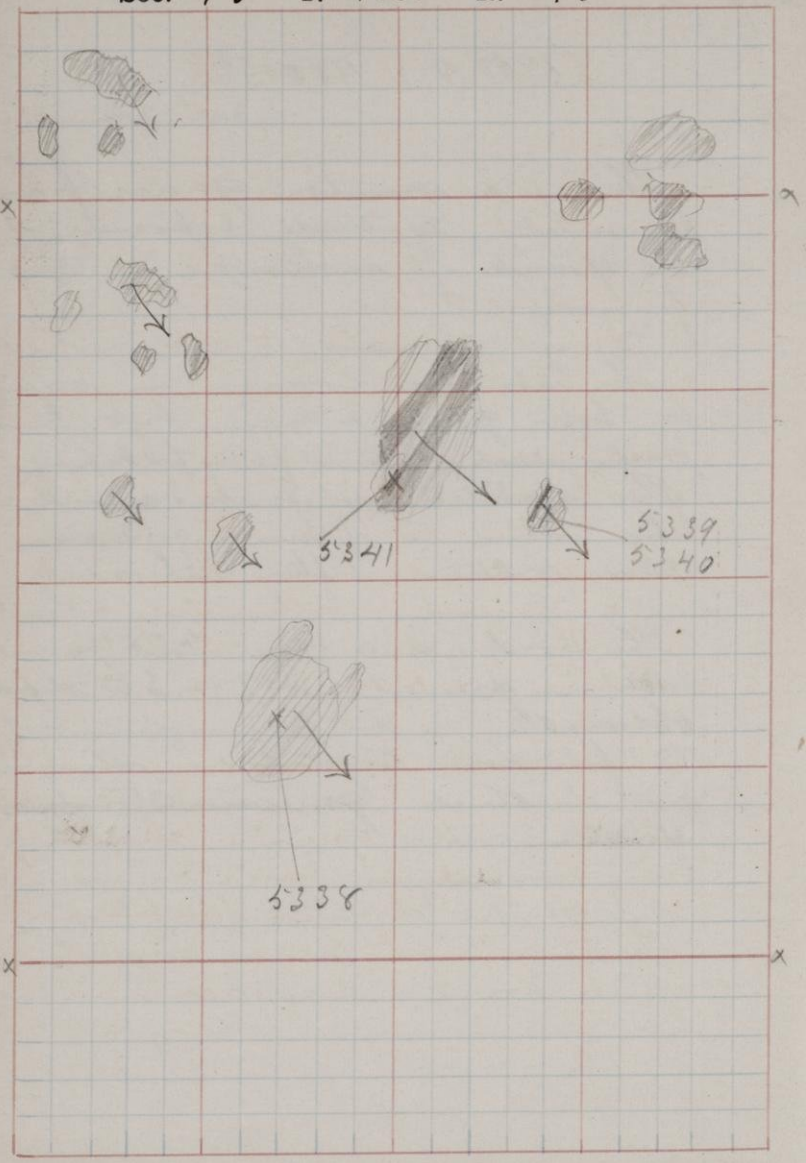
Sec. 22.

This is a granitoid gneiss from the most southerly exposure of the group of outcrops in this township

The texture is coarse in regard to both quartz & mica but more particularly so in the feldspar. The condition is fresh & unweathered the texture is firm and the color rather light & pleasing.

The rock is a granitoid gneiss with a ground N 2 ° E & S W direction observable in the arrangement of the feldspar crystals — otherwise no distinct gneissic structure is to be seen.

Sec. 15 T. 120 R. 43



5338

65°0 N ; 130° W.

Dec. 15.

This exposure is the largest, smoothest and most beautiful single, uninterrupted surface of rock yet seen

It is glaciated to a remarkably even surface.

Many coarser and finer bands of lighter & darker shades indicated by alternating quantity of mica present course thro the rock in a general northeasterly & southwesterly direction N 40°-45° E with a dip to the S E varying from 65° to 80°

The rock is granitoid in its jointing planes ~~and in its crystalline structure~~ the granitic character being seen only in large areas and in the general direction of the feldspar

The mineral some digits of which are 2 inches or more in length have the common characteristics of this mineral in the preceding number.

(9—891.)

Sec. 13 T. 120 R. 45

Surveying plat

5339

1200 N; 600 W.
Src

This rock appears to be a mingling of Gneiss and Schist. The Exposure is not large but it is highly broken. There are many other outcrops near and all seem to show the same general characters

The Gneiss often merges into a granitoid modification while the Schistose " or Schist is sometimes only a thin band disappearing either above or below or both above & below like an ordinary inclusion.

The dip is 70° ~~ESE~~ on one part of the Exposure making over a vertical position.

The Strike bends from N 30° E to North & South bringing its position between 5'337 and 5'338. to the Eastward of 5'337. - - -

(9—891.)

Sec. 15 T. 120 R. 48 W

See preceding plat.

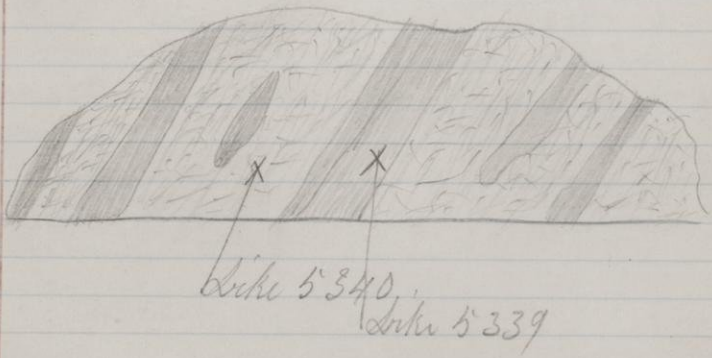
5340

1200 N; 600 W.

This is the gneissic modification of the bedding of 5339.
The position as to strike & dip agrees with that of 5339
The mica is not evenly distributed thro the mass but here & there are belts of feldspar & quartz with but little mica mingled with them

On either side of this exposure there were noted in which the rock is a granitoid gneiss like that at Mr Parmenter's house, our # 5337.

Below is a sketch of the face of the exposure from which 5339 & 5340 were broken:



(9—891.)

Sec. 15 T. 120 R. 45

See plat app 5338

5'341

1250 ft; 1000 W.

Sec 15

This sample was taken to show upon a small scale what the cliff shows in a very conspicuous manner viz the interbedding of the two types of rock prevailing in this particular portion of the valley.

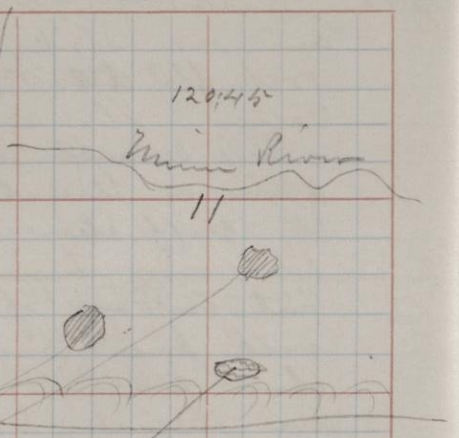
Does this locality not show the position of the Granitoid Gneiss — the "Granite" of Upham in his descriptions of the valley — in the formations of the Minnesota Valley?

When the schist is protected by the granitoid gneiss it stands up high above the prairie level but elsewhere it is weathered & shattered. It does not resist weathering [illegible] Equally well with the gneiss.

The belts of schist vary in width from 10 feet (in some cases even less) to more than 20 feet.

(9—891.)

Sec. T. R.



These Two Opossums were visited but not sampled. They were observed to be identical with the many other Opossums of the neighborhood.

A Granite boulder under the shade of which we lunched

Measures: 43 ft long
34 " wide
15 " high

With Edges somewhat rounded.

Section 15, 120; 45' has many and very striking exposures of the rock of this portion of the valley. The river once probably ran along the south side of the valley thro sections 6, 5, 9, 15, 14, etc to the south of the long ridge beginning in Sec 9 (See plat app. #5334 and extending into Sec 13. The rocks along the south side of this old valley are glaciated (Note Nos. 5336 & 5337) while those in the midst of it seem to show water worn tops & sides.

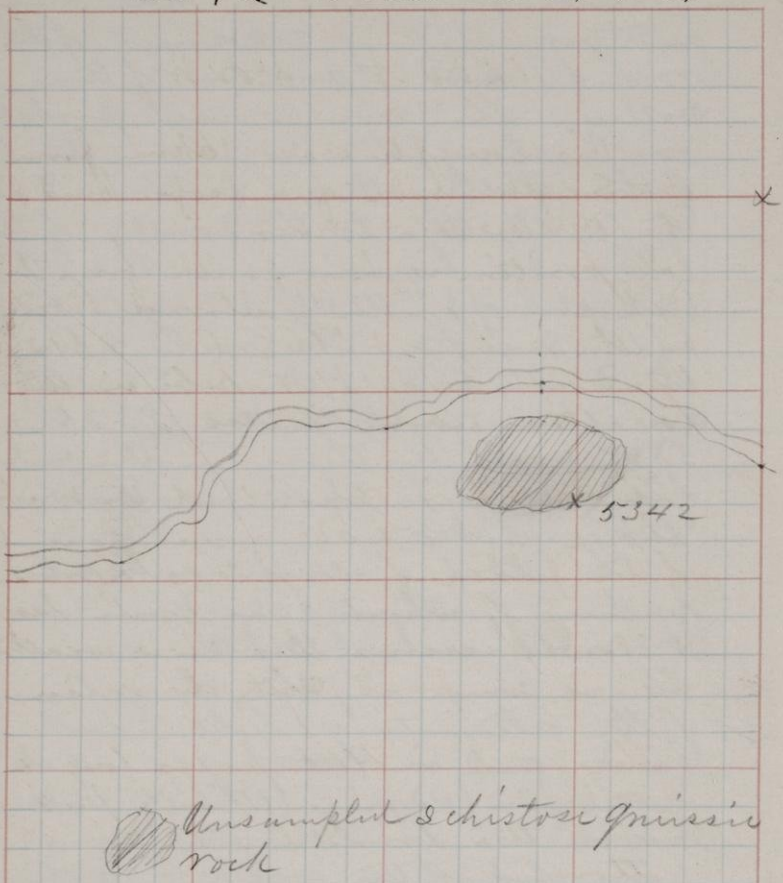
The strike of all the outcrops on these contiguous sections is N E & S W with but little variation This is seen in the directions of the alternating light & dark bands and in the general direction of the feldspars (already noted in one or two localities)

The dip of the rock is to the N W on the western edge of the group but elsewhere it is S E at a high angle varying from 45° to 75° or even higher than that.

One of the exposures is a high rock 40 feet or more from the ground level.

(9—891.)

Sec. 12 T. 120 R. ~~44~~ 45 W.



5342

1200 ft; S 60 W

This sample was taken from the South side of a large bend in the Minnesota river.

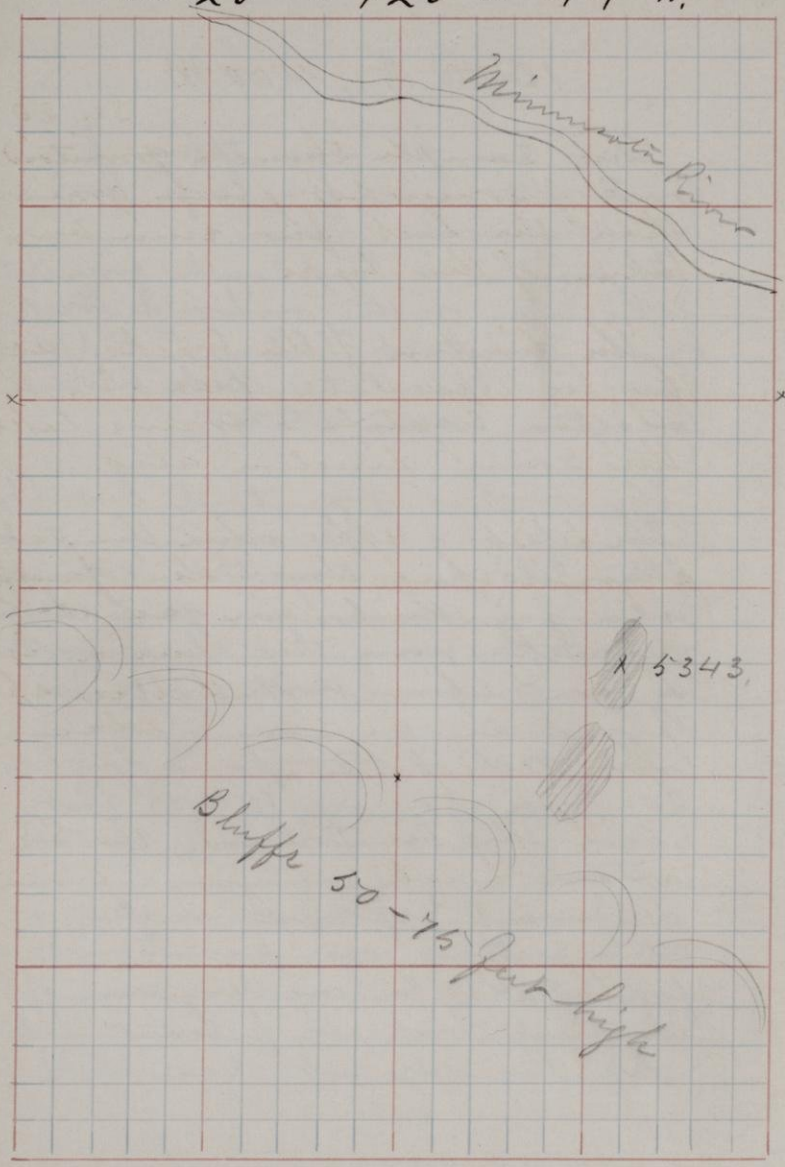
Its position is true South from the exposure on the railroad track by the Milepost #168 (# 5312 a) and is calculated to be in the location above stated.

The rock is granitoid but it shows a NE + SW arrangement of the feldspar crystals + grains many of which are quite large + conspicuous thus slow weathering as compared with the mica.

The rock is 400 paces long + 200 do wide + rises 10 to 15 feet above the broad level river bottom.

Several exposures in this + other sections were passed in coming from 5341 but as they were of identical rock + of similar strike + dip they were not sampled.

Sec. 20 T. 120 R. 44 W.



5343

1300 N.; 400 W.

Sec 20

This sample shows a granitoid rock of somewhat finer grain than the last few numbers taken of this type.

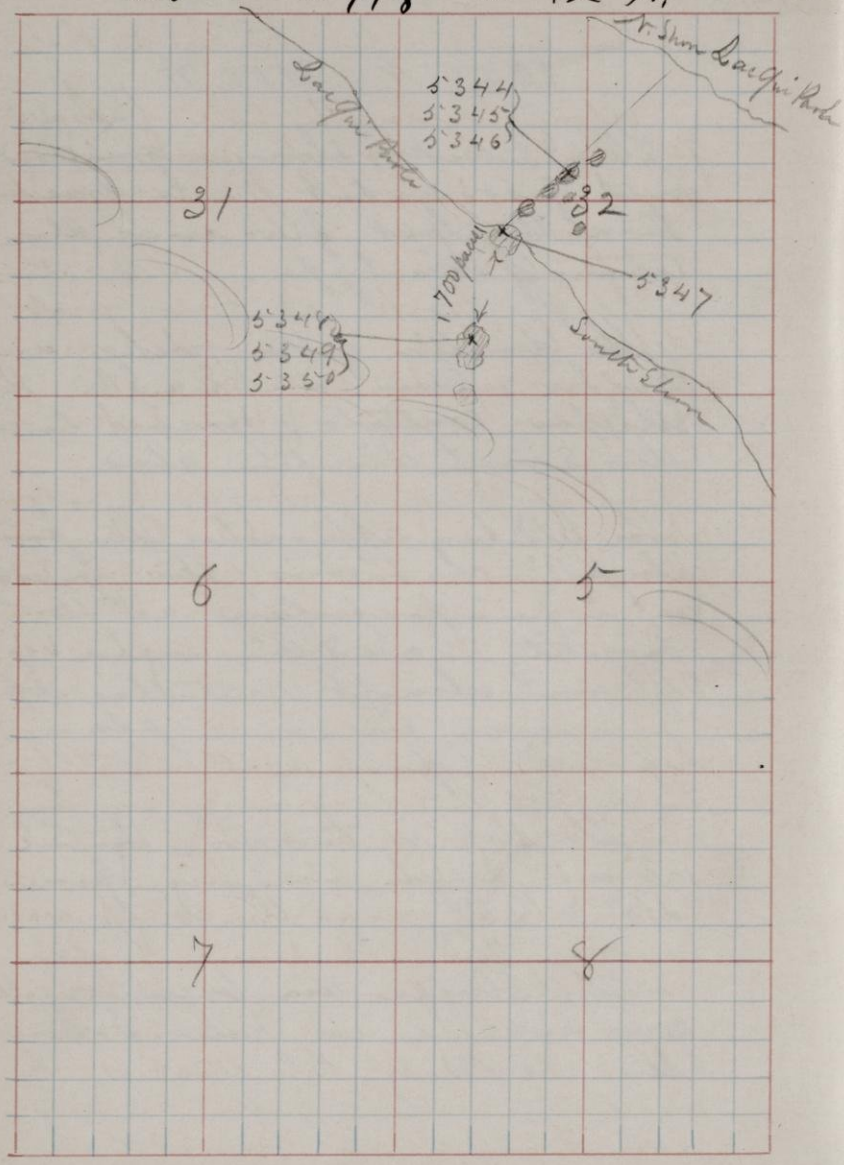
The direction of the rocks as they lie exposed is N E & S W. The feldspar crystals & grains take this same direction also.

The feldspar approaches the porphyritic character: the quartz is in fair proportion as to quantity; and the mica is of an almost metallic appearance in some places upon the exposure

The dip is towards the SE at an angle ranging from 40° to 45°

The bluffs are beginning to grow higher as we pass down the valley.

Secs T. 119 N 118 R. 42 W.



5344

1150 N; 1100 W. Est 17

Sec 32, 119:42 in Bear Gulch Park

Along the South side of Bear-Gulch Park no rock was seen until Sec 32, 119:42 was reached In many places however the surface gave every indication of bed rock at no great depth beneath it in the many boulders in the bottoms & the shallow water of the lakes

But in this Section rock is seen above the water in the lake and above the bottoms also in two or more exposures in the same ridge as the one sampled by this number

The rock is much weathered. All over the surface the decomposition has reached so deep that it is impossible to get fresh samples. Those were taken down near the high water mark. The rock seems fresher near the water line and beneath the water than upon the surface Is it hinted by this that rock weathers much faster in the air than when covered constantly with water?

Sec. 32 T. 119 R. 42

5344 Cont.

The banding of this rock is sharp and clear; in some places it is fine & in others; and the proportion of feldspar is far from uniform.

The mica has weathered in many places to a yellowish or even to a golden tint

The Strike of the laminae is N 50° W with a dip to the SW of from 70° to 80°

These figures are the results of measurements taken in several different places.

Sec. 32 T. 119 R. 42

See plat for 5344

5-345

Same as 5-3414 in Leadville Park

This is a medium coarse vein-rock cousing that 5-3414

Often it shows thickenings + bosses two or more feet across

Veins usually however the veins appear in bands ranging from 2 to 8 inches across.

Generally Feldspar + Mica appear to be the constituents and often they are of considerable size — the veins seem to be pegmatite

Feldspars are frequent of 3 or 4 inches in size.

Sec. 32 T. 119 R. 42

See plat for 5344

5346

Same as 5344+5 in Bear Gulch Park

The finer veins are also frequent. In places they are of considerable thickness also near the shore two or more feet in thickness were observed.

The general appearance is that of a true granitic vein of medium coarseness of rather reddish color and carrying the usual mineral constituents.

These veins seem to be like those found at Birch Cooley only these are quite weathered — still not so much as the granitic rock through which they course

There appears to be no regularity of direction nor of thickness

(9—891.)

Sec. 32 T. 119 R. 42

Surplat for 5344

5'347

800 N; 1400 W.

At the lake shore in a line with the row of islands stretching out into the middle of the lake is the point at which this sample was taken is S W of the point at which 5'344 was taken.

The rock is decidedly schistose in parts but the mass is that of a true gneiss. The surface is low — only two knobs in the area are high enough to escape inundation in the spring floods.

The banding of this rock is sharp + clear upon the upper surface the mica has weathered to a yellowish color.

The strike of the laminae is N 50° E with a dip to the N W of 70°-80° (these two figures are the results of two measurements taken.

Does this rock contain garnets? There is a pinkish color suggesting this mineral.

(9—891.)

Sec. 32 T. 118 R. 42

See plat for 5344

5348

300 N; 1600 W.

This is an exposure some 700 paces from the lake shore in a line S 35° W from the easternmost point of rock in the lake.

The laminae here seem to take the course N E + S W and stand nearly vertical. This strike would carry the continuation of this exposure towards the northeast to a point 100 or 150 paces towards the east of the exposures in the lake, nos. 5344, etc.

The bands here are firmer, more feldspathic less distinct than at the lake. The rock in short approaches the granitoid structure of the exposures up the river around Parmelia (5337) + below Ortonville + above Odessa

(9—891.)

Sec. 32 T. 118 R. 42

See preceding plat

5349

300 ft ; 1600 W.

This sample from the same locality as the preceding shows the modification which appears in bands through the preceding some broader & some narrower — from 3 inches to several feet — without any regularity of direction or dip.

The texture is coarse — some feldspars being an inch or more across

The constituents are quartz & mica in addition to that just named.

The quartz is in granules many of which are in the feldspars themselves as well as

Mica is not an abundant constituent — seems to occur in nests or segregations rather than to be somewhat uniformly distributed thro the rock mass.

The feldspar is red in color & many of the Cleavage surfaces are curved as if bent & broken from a ~~true~~ fractured plane cleavage surface.

(9—891.)

Sec. 32 T. 118 R. 42

Survey for 5 3 4 ⅝

5350

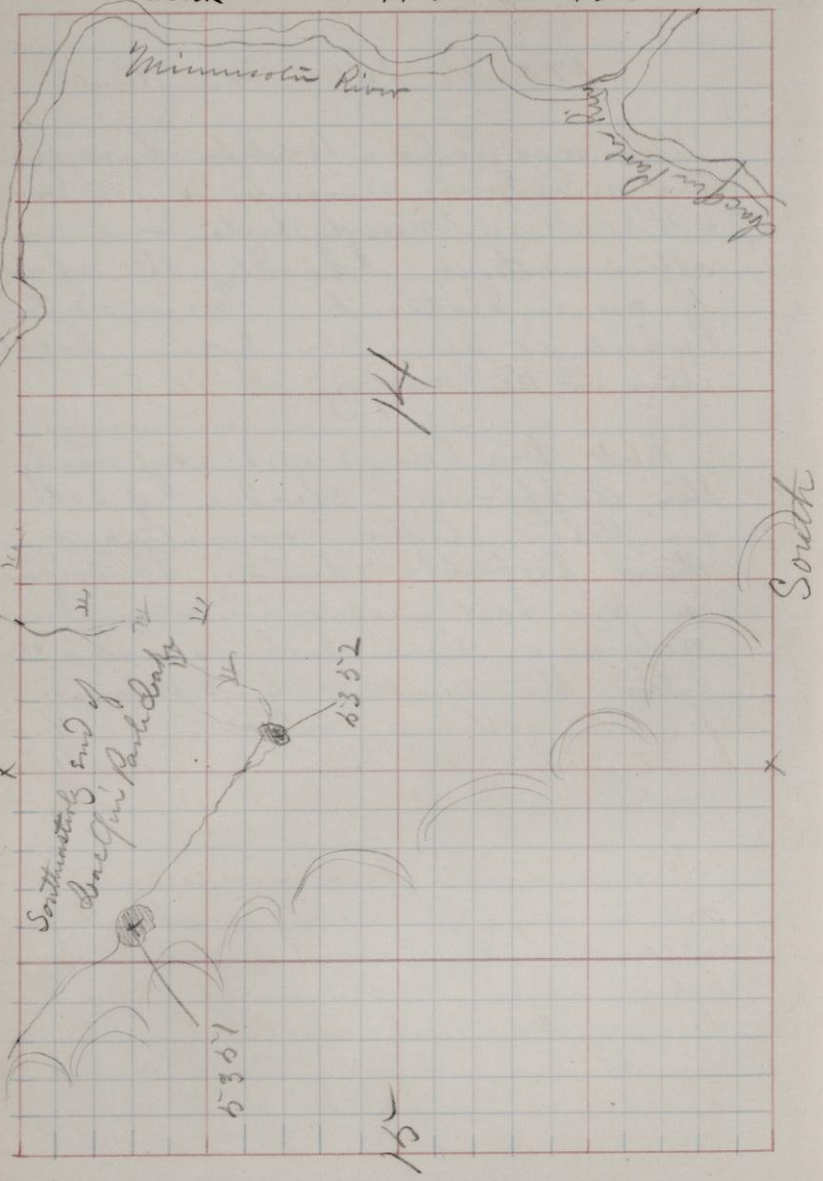
300 ft : 1600 W

This was taken to show how the two preceding numbers 5348 + 5349 merge into one another without hardly the apology of an indistinct vein contact which is seen in some localities in the valley.

But this brings out very nicely the differing shades of color in these two varieties & their probable identity in origin & results under metamorphic action — save perhaps under the latter the matter of tufts.

(9—891.)

Secs. 14 & 15 T. 118 R. 42



5'357

1700 N; 400 W Estimated
Sec. 15

This a gneissic rock suggesting 5'348 but believed to be a trifle finer in texture — as it is certainly different in degree of preservation

The strike here is N 50 E
Dip to the SE! at an angle of 60° from the horizontal.

Here is a slight projection into the lake at this point produced by this rock exposure

The peculiar watery streak from weathering which has been noted in so many localities is seen here

Veins and lenticular masses of quartz 3 or 4 inches in thickness occur here. No samples were taken as the mineral seemed to be identical with the same in other localities up and down the river valley.

Sec. 14 T. 118 R. 42 W.

See preceding plat

5352

1300 N; 1900 W

This is a finer rock than the preceding; still it has the same general characters mineralogical + structural.

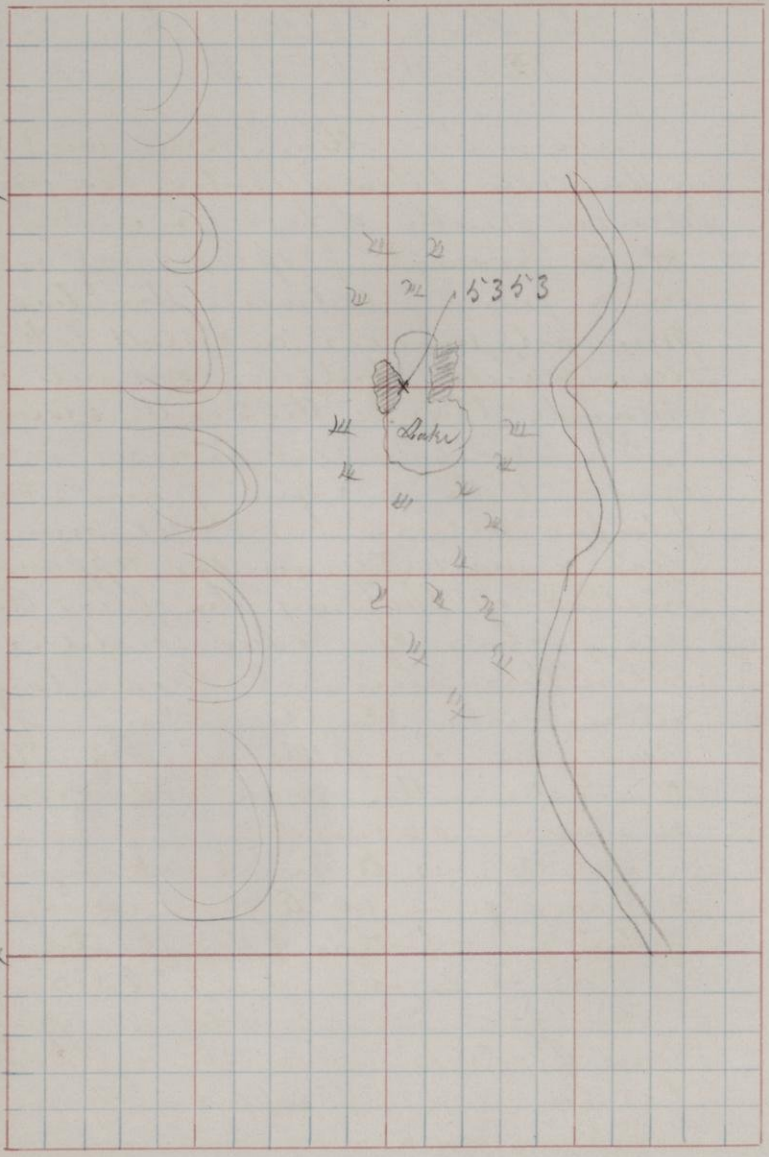
The color is a little darker owing to a redder feldspar and larger mica scales.

The gneissic structure seems to be disclosed thro the direction of the feldspar crystals and the of mineral constituents rather than in the sharp alternation of feldspathic + micaceous bands; still in some places this banding can be seen

The strike is near N 45° E
The dip was not measured but those places which gave opportunity to read this were narrow. Enough was seen to confirm the belief that the dip is very pronounced + very same near that at the preceding locality.

The physical features of the Lac qui Parle valley.

Sec. 30 T. 117 R. 40



5353

1500 N; 950 W.

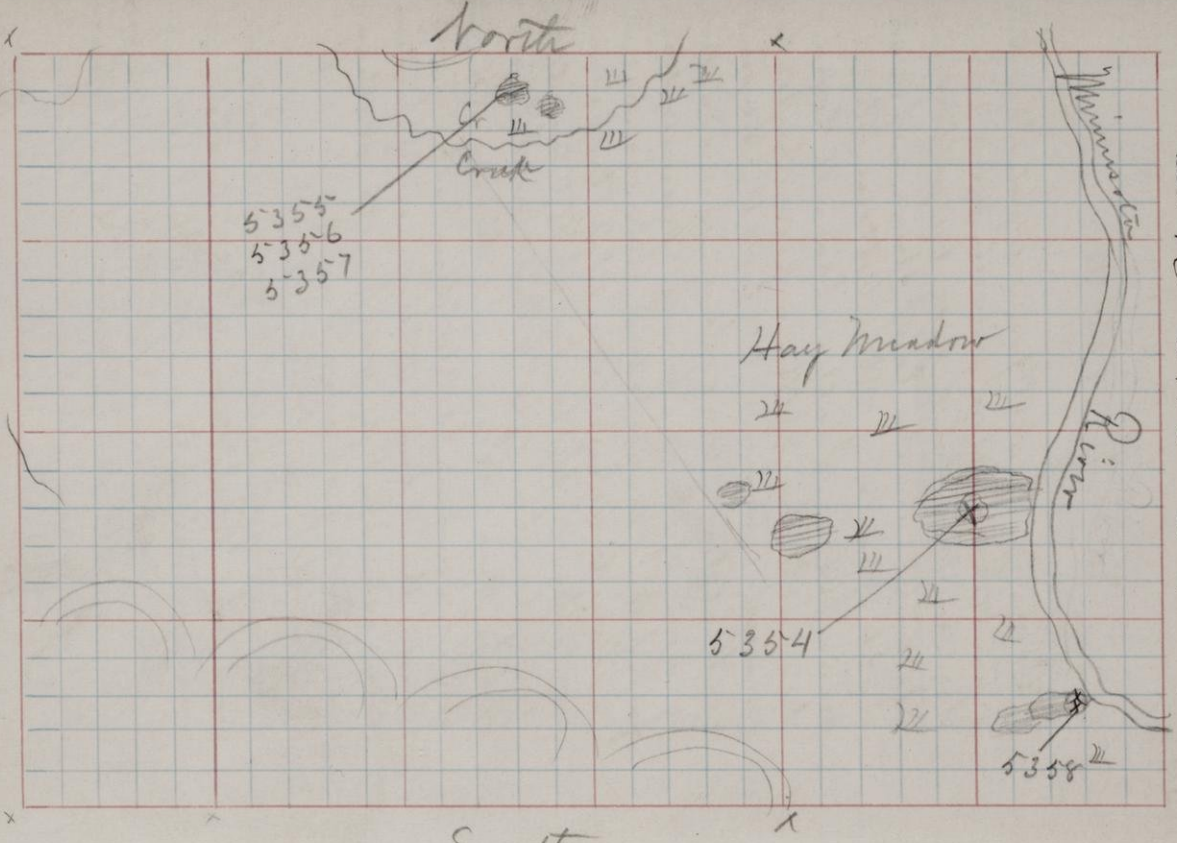
Down in the bottom on the west side of the river below Montevideo in a dense growth of forest & underbrush stand several exposures of rock in a group. Between the two principal masses a small lake lies which stretches out into a marsh towards the south west.

The color of the rock is a reddish brown with a fine "grain"; much feldspar occurs but this mineral has a marked granular appearance instead of showing the clear cleavage planes of other localities when this mineral shows larger individuals. An Abundance of quartz and but little mica further characterize the rock. No accessories were observed.

The dip is to the SE at angles varying from 60° to 80 — owing to some contortion of the strata.

The strike is N 55° E (mag.)

There are some beautiful aggregations of feldspar & quartz of coarse texture and lenticular shape; these are some inches in extent



Sec. 13 T. 116 R. 40 W.

5354

800 N; 1500 W.

Sec 13

Coming down from Montevideo to Granite Falls upon the west side the river could not be followed But we were told there were no rocks along the bottom until near the latter town. Coming down to the bottoms from the prairie in this township 116; 40 the first rock sighted was this exposure which is one of a row of hummocks from the bluff to the river bank.

The strike is N 70° E (true) and the dip is from 70° to vertical towards the NW., the variation being due to some waving of the laminæ, and the wavy outline of the laminæ are more noticeable in the nearly vertical strata in the more included portions of the exposure.

A vein of fine compact material was noticed towards the river. It was several feet in width.

The rock is a schist or a schistose gneiss and upon the surface it is considerably weathered & the feldspar is discolored.

Sec. 14 T. 116 R. 40, W.

See plat of 5-3-52

5355

1900 N; 700 W.

Sec. 14

Slide is a hornblendic rock. It is quite fine & firm in texture & shows many spots of a reddish or brownish tint clusters apparently of red feldspar granules

The rock in the mass is very much jointed and in places even shattered This jointing interferes somewhat with a clear reading of the bedding planes and dip.

The direction of the laminae when laminae are visible is from N. 70° E. to S 70° E — varying in direction to the extent of 40°

When the dip of the laminae could be observed it was recorded as from 50° – 75°

(9—891.)

Sec. 14 T. 116 R. 40 W

See plat of 5354

5356

1900 N; 1700 W.

This is a sample of a decidedly gneissic rock somewhat mottled in appearance. It occurs upon the SE side of the exposure and also through the middle of the highest point.

The samples show upon their light surface a weathering that has changed considerably the mica grains as well as the other the feldspathic constituent.

The darker colored part appears to weather more rapidly than the feldspathic; this causes a roughness of the surface through presence of cavities caused by removal of the darker portions

(9—891.)

Sec. 14 T. 116 R. 40 W.

See plat of 53524

5357

1900 N; 700 W.

This number is associated with the two preceding

It was seen in many veins of varying width from much leaved to two or three inches in thickness.

The direction was not definite

The sample reminds me of the narrow veins observed at the quarry of Mr Hiltimus of last year's series.
#5039A

(9—891.)

Sec. 13 T. 116 R. 40 W.

See plat of 5354

5358

300 N; 1200 W.

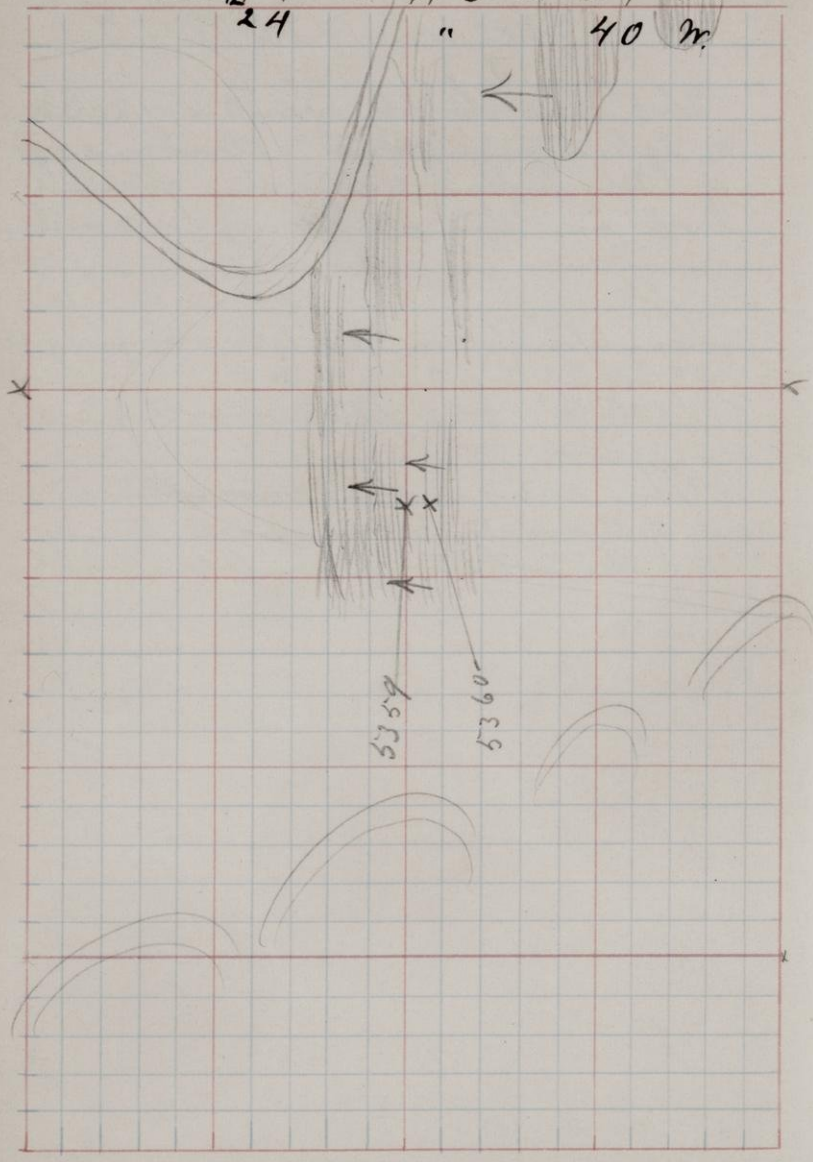
This is a highly weathered schist or schistose gneiss standing up a little higher than the ground level in the midst of a marshy meadow.

The strike is E & W varying to 5° S of E. (true)
Dip 75° to the north.

The mica has weathered to a yellowish brownish tint.
The whole crumbles badly.

(9—891.)

Sec. W½ 19 T. 116 R. 39 W.
24 " 40 W.



5359

1000 N; 300 W. 40
Sec. 24, 116: ~~37~~

This is the rock striking westward from a bend in the river in Sec 19 & Sec 24 where this was taken.

Along the north side of the Exposures the rock has a very uniform character which is fairly represented by this sample

The strike is about E & W
" Dip is N 75° 0

The rock here is not high above the level of the river

(9—891.)

Sec. 24 T. 116 R. 40

Superseding plat

5360

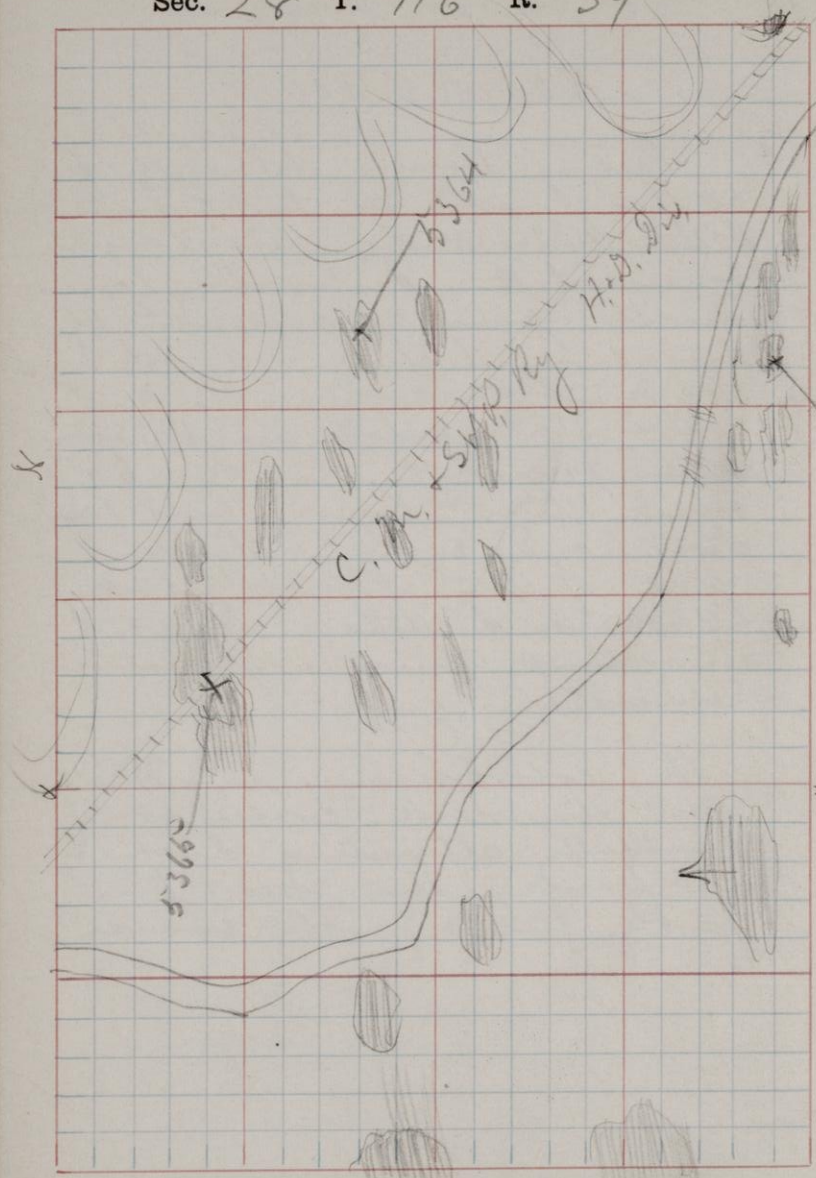
950 N; 300 W

Passing towards the South for 50 paces over the turf covered edges of the bedded rocks the layers consist of the distinctly laminated gneiss represented by this number.

The Strike & dip are the same as the preceding 5360, by which these layers pass underneath and every indication is given of the great extent & thickness of these beds of alternating gneiss & gneissic Schists.

The color here is a reddish and the rock consists of beautifully alternating dark & red bands the red being partly fine & partly coarse.

Sec. 28 T. 116 R. 39



5361

100 N; 900

See 28, 116; 39

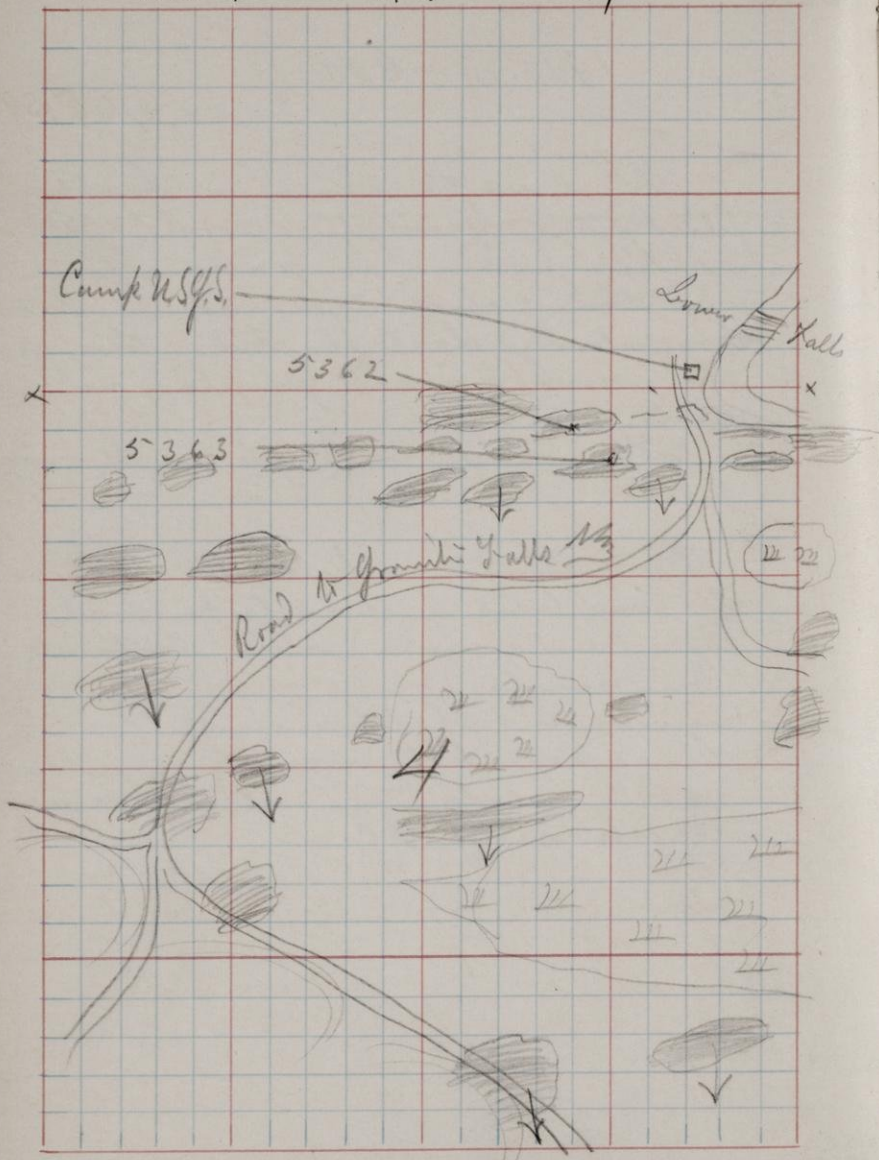
This sample shows a highly feldspathic quartzite rock

The texture is rather fine and the color red somewhat irregularly distributed through the mass. Some places are quite red.

The rock is fresh and very firm

At the point when this sample was broken the strike and dip could not with certainty be made out — these must be determined for this spot by measurements easily made in other and neighboring places.

Sec. 4 T. 115 R. 39



5362

1900 N; 600 W

Sec. 4, 11S; 3E

This number is a rather coarse grained quite feldspathic rock

When freshly broken it shows shiny surfaces of the fractured surfaces which appear to be feldspar with a greenish tint of color due apparently to the included slightly decomposed hornblende

The rock appears massive — one thinks as he passes over the ground that here is an immense dike crossing the country th

This locality is 200 or more paces from the river at the bend where the course makes to the East just below the lower falls in Granite Falls & Map SW from the Pittsburg & Elevator at the railway station.

Sec. T. R.

Sur plat for preceding lot.

5363

1800 N; 500 W

A little over 100 paces from 5362 in a SE direction ~~was taken~~ this Sample was taken

It was broken from the South side of a high abrupt mass of rock or ridge of rock making towards the river which it reaches at the bend mentioned in #5362 just South of the old river ~~bed~~ Channel.

The rock is so shattered & broken that its relation to the other masses eg 5362 could not be clearly made out.

This rock is coarser than the preceding & is different

The bleaches in weathering & the hornblende (?) becomes duller and rusty somewhat iron rusty

Mica seems to be present but what its relation to the duller dark constituent cannot be made out with the unaided eye.

Sec. T. R.

See plat opp. 5361

5364.

1200 N; 800 W

Dec. 28, 1163 9

Along the north side of the river above Granite Falls (i.e. the bridge across the stream between the East & West portions of the town) the Gneiss is beautifully Exposed. It lies on both sides of the railway track in the vicinity of the old Mills.

It shows long lines of lamination.

The strike is about East & West
The dip is from 70° to 75° North.
Both strike & dip are clearly pronounced!

The laminae are from 1/2 in. to 1 in. thick as a general thing but some thick enough & distinct enough to appear like bands or beds.

The weathering to which the rock has been subjected makes the lamination clear this' its effect upon the mica giving it a yellowish tint

Sec. 28 T. 116 R. 39,

See plat opp. p. 361

5365.

1600 N; 1700 W.

The strike and dip of this rock are the same as of No. 5364.

This is a beautiful, typical acidic gneiss of a rather light color & of a reddish tint

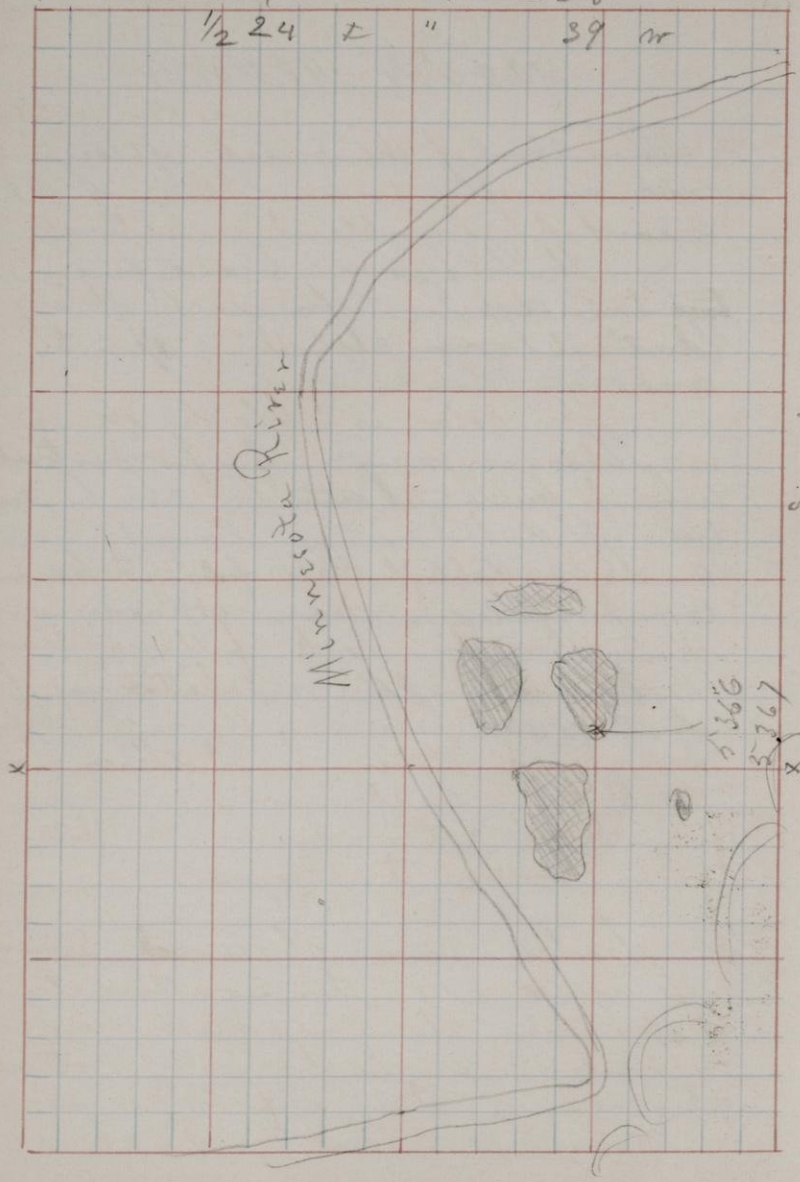
This is a gneissoid porphyritic of quartz and a concentration of the mica largely into bands which lie from 1/3 in to an inch or more apart.

This sample reminds one of # 5310

(9—891.)

Sec. 19 T. 115 R. 38 W

1/2 24 E 4 39 W



5366

500 N.; 1900 W.

Sec. 19, 11N; 3E

Here is one of the most interesting exposures yet seen. It is a marked hornblendic schist.

The exposures occur in two townships — the rock being identical over all the exposed area

The color is black or a very dark green of fine texture and highly shattered

Light colored ribbons whose composition was not examined run thro' the rock filling seams produced in the shattering of the rock. Some of these ribbons were very thin and others were thick & conspicuous — more from their color however than from their thickness

Dikes were observed Several in number on the Southeastern exposure. Their greatest measurement is in a nearly vertical direction. One three feet or more in length & a half foot across was noticed.

Contd These grades were not coated with clearly developed crystals tho perhaps at one time the surfaces were crystal covered

The strike of the exposures was concluded to be N 65° E (true) with a dip varying from 0 in vertical position to an inclination of 75° towards the Southeast.

The jointing dips its planes to the N E at from 25° to 30°

Another dipping or inclining of the Exposures evidently, one of jointing also is towards the Southwest

The outermost measurements of the area of these exposures or their distances apart were about 150 feet as the longest base surface

Whole distance from E to W of the Exposures 350 feet
North & South 250 "

Sec. T. R.

See plat of preceding No.

5367

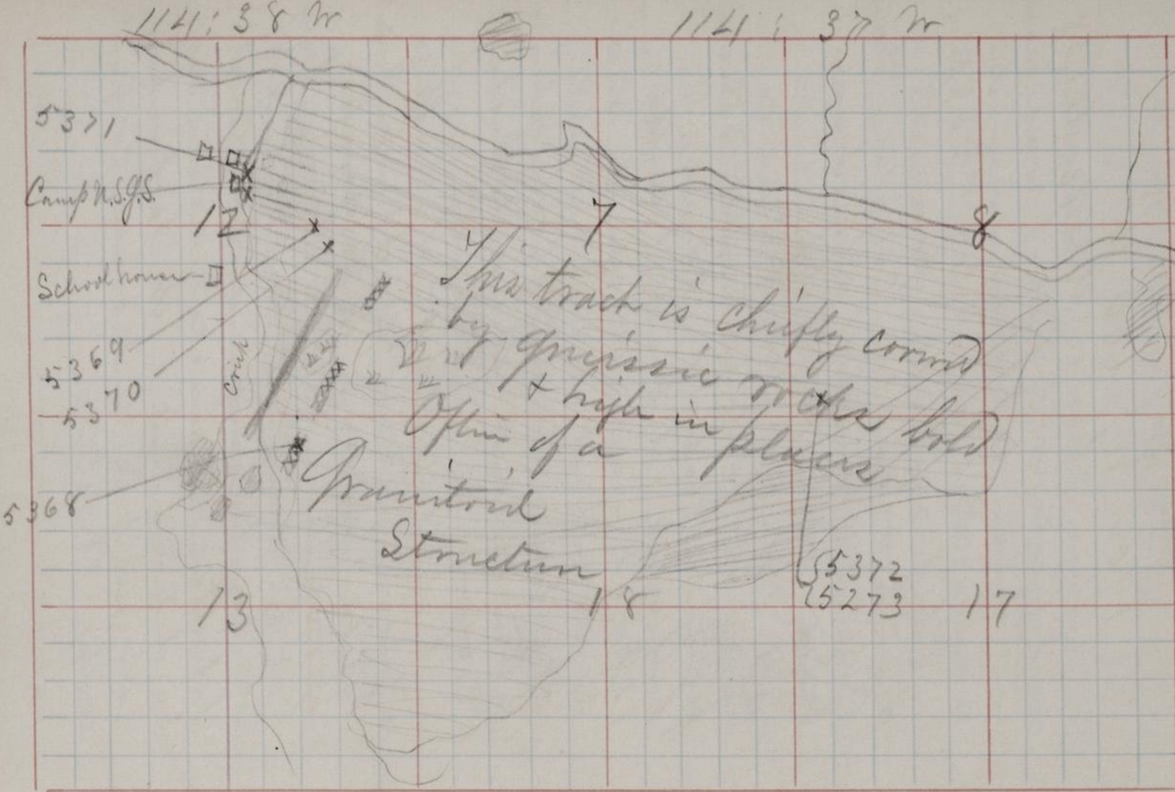
500 N; 1900 W.

This shows the geodic modification which was seen in many places over the area described in #5366

This material does not appear to occur in Crystals though Crystals might once have been present

The walls of these cavities are coated with silica form a leaf-like layer to a half inch deposit ~~with~~ spread without much regularity as to thickness as it conforms to the corrugations of the schist edges which it covers.

One cavity of great irregularity was observed on the N.E. exposure of the group It was three feet or more long but the material encasing it was so decomposed that its definite character could not be determined; it looked however as if it had been covered with Crystals.



114 : 38 W
114 : 37 W
5371
Camp U.S.G.S.
12
7
8
Schoolhouse
5369
5370
5368
Creek
This tract is chiefly covd
by gneissic rocks bold
& high in places
Often of a
granitoid
structure
5372
5273
13
18
17

Sec.
T.
R.

(9—891.)

5368

1900 N; 600 W.
Sec 13, 11N; 3E

This sample is from a belt of rock evidently a dike cropping out in two or three places in this Sec. 13. + also in 12.
Its width is 40 feet or more
Direction, N 30° E (true)

At the place where this sample was broken the rock is highly jointed, — the blocks being only 3 to 5 inches thick and the main joints run parallel with the direction of the dike
But several hundred paces to the northeast where the rock is higher the blocks are large + massive + piled up in quite regular walls, ~~of Columnar appearance~~

There is another dike parallel with this appearing in one or two places to the Eastward at 300 paces distance.

Three dikes are said to contain Fe S

(9—891.)

Sec. T. R.

Sin plat for 5368

5369

1000 N.; 500 W.

Sec. 12, 11N; 3E

Frequently veins of greater or less width from 1 to 6 inches were seen, as well as coarse segregations of quartz & feldspar.

When the rock is broken or worn parallel with these veins or segregations the surface is large.

This gives frequently a wrong impression as to the size of these masses which ~~point to~~ in reality are thin or insignificant in quantity as compared with the main mass of the rock.

This particular number was taken near one of these schistose inclusions named and bears the marks of its proximity in the mineral constituents present.

It shows quite wide bands of the mica in schistose position.

The lighter colored more feldspathic portion is red — some pieces show the color in spots of small size.

Secs 12 & 13 T. 114 R. 38 W.

See plat for 6-368

In this vicinity there are several square miles covered with high bald rocks to a great extent.

Towards the west and north they are massive — there are places where for several feet one can scarcely see a trace of lamination then the laminae are quite clear & straight marking off their direction towards the northeast & southwest.

Then perhaps soon a spot is reached where the contortions of the most varied figure are drawn in the mineral constituents of the rock.

Schistose inclusions are numerous in places & these are often drawn thro' & thro' by the lighter colored & more granitoid portions of the rock. The general direction of these contorted spots is the same as the other & more granitoid portions whose direction has been named.

This locality in some of its aspects shows a resemblance to that below Ortonville. The rock has nearly the same color, it has about the same texture, shows in its hard & rounded knobs nearly an equivalent hardness and has the same general direction of strike.

Sec. T. R.

See plat for 5368

5370

900 N; 400 W.

Sec. 13, 11N, 13E

At this point the rock seems both massive and gneissic. The dark bands come out prominently on weathering.

Their course is E 20° S (true) and are nearly perpendicular dipping not more than 10° or 12° towards the north.

On the South the rock at not more than 25 paces distant is broken + a vein-like coarseness of the rock is observed

Passing 25 more paces toward the north and the lamination is less distinct than here but yet it is not obliterated.

Sec. T. R.

See plat for 5368

5371

1300 N; 900 W.

Sec. 12, 11N; 3E

This is the massive modification of the vicinity i.e. it is as massive as could be found along the west side of the Oquirrh mountains.

To the right + left the banded structure shown by 5370 is clearly seen.

The banding seemed to run at this place somewhat north of east + varies a little 10° ± from the vertical towards the north in dip.

The rock is a reddish fine grained granitoid gneiss.
It appears to have much quartz in proportion.

Sec. 8, T. 114, R. 37.

See plat for 5368

6372

100 ft. 1850 ft.

On the land of Mr. J.C. Ellingson Sacred Heart P.O. S.W. 1/4, S.W. 1/4, Sec. 6, 114, 37 there is a bed of the rock bearing this number

The strike seems to be E 20° N (true) dipping apparently towards the north.

The rock seems to be a mixture of mica + hornblende with probably a little feldspar in

The rock is rather coarse — the mica occurs in nests which weather out more readily than the finer textured matrix. So the surface presents a pitted, + also mottled appearance

The color is dark: the mica everywhere seems fresh as compared with its associates.

Sec. 8 T. 114 R. 37,

Sur 5368 plat

5378.

100 N; 1850 W.

Sec. 8, 114:37

This specimen was taken to sample the feldspar which occurs at this exposure.

The veins in which it is found vary in width from 2 or 3 inches to 2 feet. In the narrower veins the crystals & pieces of crystals of the feldspar are smaller than in the broader veins.

In the latter are displayed crystal faces & cleavage planes, quite frequently 4 or 5 inches across.

But these cleavage planes rarely show much surface without inclusions of quartz or other mineral.