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Black Hills, South Dakota: [specimens] 14954-14999. No. 83 1889

Hall, C. W.

[s.l.]: [s.n.], 1889

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U. S. GEOLOGICAL SURVEY

FIELD NOTE BOOK

No. 83.

August 3rd and 4, 1889.

Black Hills, S. Dakota

C. H. Hall,

14954-14999

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.

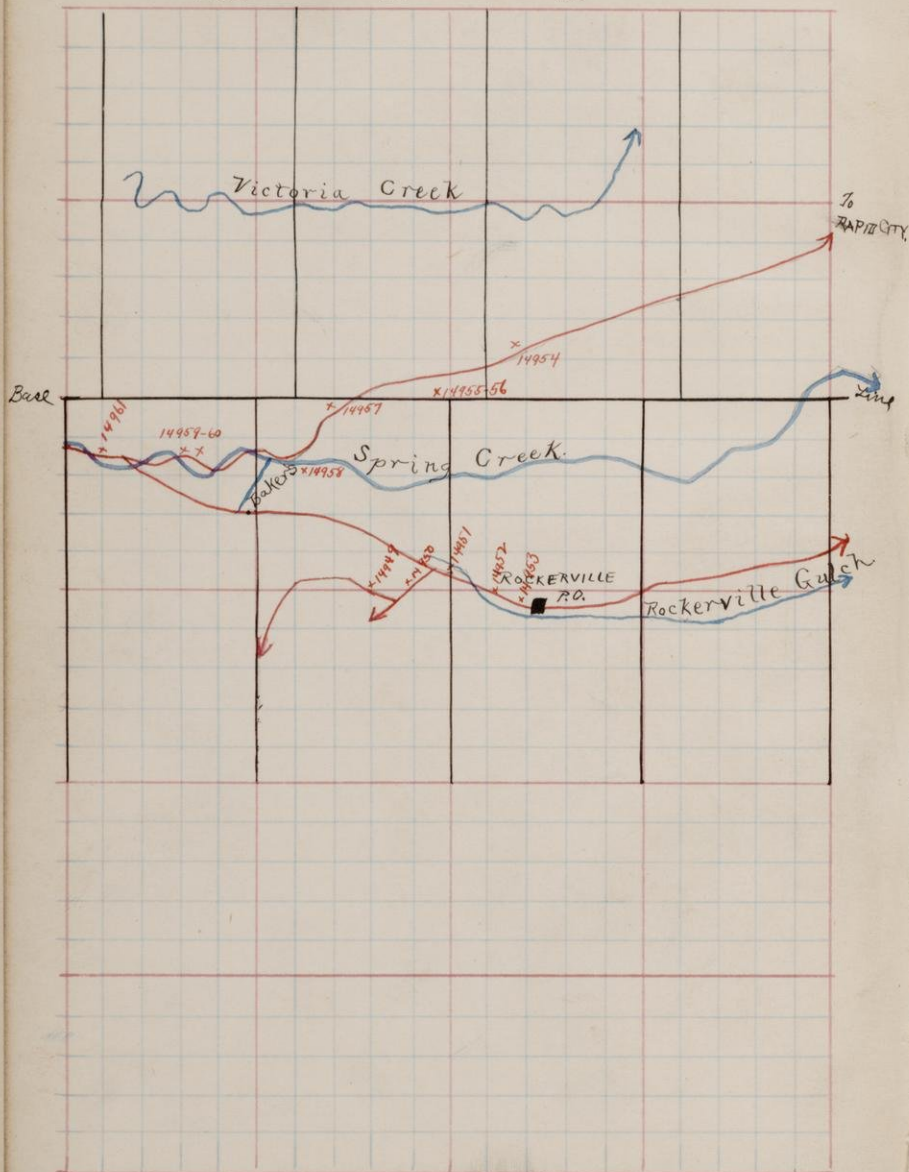
83

Notes on rock specimens
14954 — 14999 inclusive
gathered in the Black Hills
August 3^d + 4th 1889
by O. W. Hall.

Sec.

T.

R.



1
Rapid City S. Dakota
August 3rd 1889

I started this morning with a pair of horse and driver Lusk to collect specimens and take notes on two sections across the Black Hills Archean core from the easternmost exposures towards Rapid City, and Casselton which lies on the western border of the schists.

14954 The first indications of the slaty rocks appears on some hills which are grass covered rather than precipitous and at least 9 or 10 ^{was} miles west of south of Rapid City. The first indications were through the presence of numerous boulders & fragments of quartzite along the road. These were not sampled but the slates which stand in nearly vertical position were by this number

Measurement showed strike of schistose structure to be N. 25° W Dip 80° W. This spot was about 2 or 2 1/2 miles east of the bridge across Spring Creek. Contact of Archean & Potsdam was not seen

14955 These two numbers were taken
 14956 down the gulch 150 paces or so
 below the old mill site and dam
 of the Rider saw mill.
 The bluff on the north + east side
 of the creek is more than 100 ft.
 high.

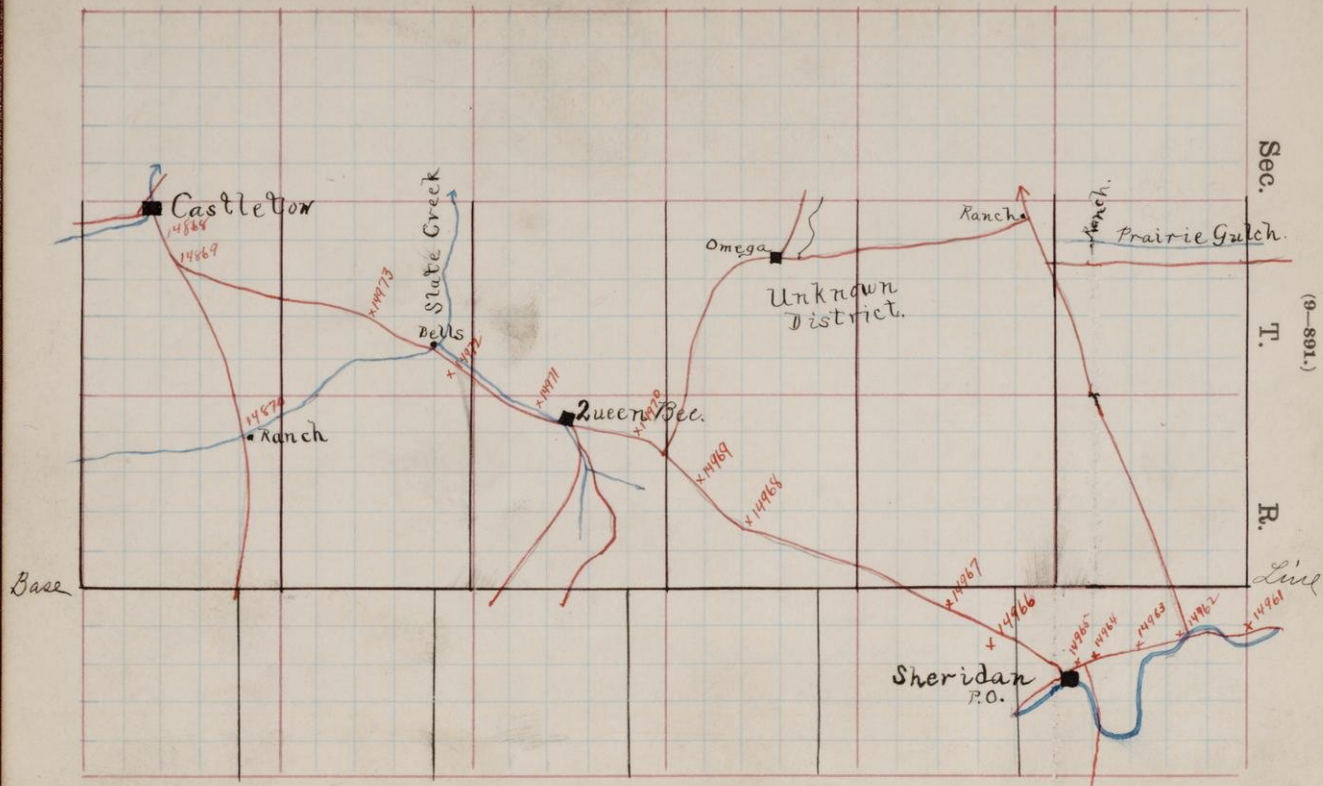
These two numbers represent
 the one a slaty + the other a quartz
 iferous phase of the interbedded
 rocks.

14957 On the side of the hill crossed
 just before descending into the
 gulch of Spring Creek the slaty
 and considerably rotted rock
 was sampled. A more schistose
 structure appears over the rock
 surface here than at the place
 where 14954 was taken.

Strike + dip of Schistose struc-
 ture have not changed mate-
 rially from the first point measured.

14958 A few paces below the bridge on which
 we crossed Spring Creek + on the south
 side of the stream this hard crystal-
 line sample was broken.

Strike of Schistose structure $N. 30^{\circ} W.$
 Dip $80^{\circ} N.$

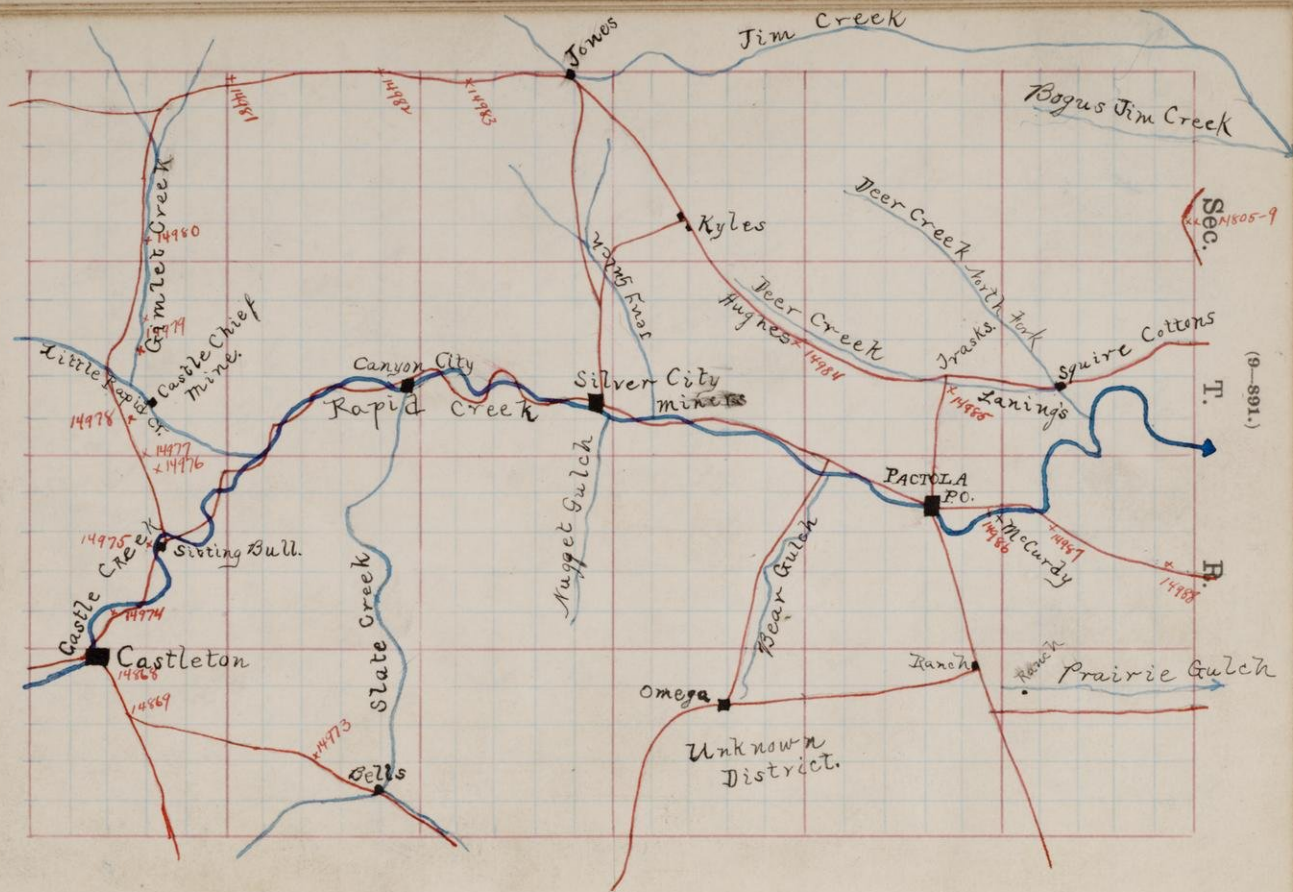


14959 This is apparently a very argillaceous rock; taken about a half mile above the bridge over which we crossed Spring Creek the first time and near which 14958 was taken.

Strike & dip of Schistose structure here appear to be unchanged.

14960 A few paces further on (west) the rock assumes a more compact condition than the preceding while at the same time there is more or less interlamination of the argillaceous & the compact. This now shows the compact rock - it seems to be badly shattered in the bluff from which this was broken.

14961 Just a few paces west of where the road to "Baker's ranch" & Rockville leaves the main road the rock becomes very black in color and very fissile. It is more slaty in fact than any rock before seen today. Along the road the rock is not high either at either side a half mile away the cliffs are precipitous.



14962 is an apparently massive though badly chattered rock.

At the spot sampled which is at the junction of our way with the Pactola road and on the west side of the latter, no trace seen of either strike or dip.

The rock is black brittle and finely granular.

14963. At 100 rods or so further up the stream the rock while keeping its black color and finely granular condition becomes quite fissile and its structure approaches the schistose.

14964 Just before reaching Shuidan P.O.
14965 and before reaching the road which bears northwest towards the Green Bee mine these two numbers were taken the one to show the normal rock of the locality (which in places is much finer than in others) and the other to show a peculiar decomposition of the rock. The extent of this alteration could not be seen on account of the grassed condition of the surface.

14966 Passing out on the Green Ber road a half mile or so from the cross-road where we left the Spring Creek, the rock samples taken seem to show a more slaty and ~~Schistose~~ condition than did those taken along the Spring Creek road and around Shuridan. One sample was taken to represent many rods of exposed rocks.

14967 But a half mile or so further on the rock again becomes more silicious and shows less fracturing than 14966. Some fractures have the appearance of a feld-spathic rock; still it seems granular or sub crystalline as a whole.

14968 No sample was taken for several miles; but at a point some 3 miles east of the Green Ber the rock is more slaty than the number last taken and it was difficult to secure a hand specimen. The color is the same light gray which prevails all through this section.

14969 At the top of the hill which appears to form the divide separating the waters flowing into Spring Cr. from those flowing northward, the rock again seems quite Silicious. It is more massive again — more so than any taken since we left the Shildan road.

Only a very little of the rock is exposed — thus grow to the very top of the hill on all sides.

14970 But at a point about one and a half miles above the Gum Bar the rock again becomes slaty and very soft and rotted — the color also becomes lighter.

This slateness continues past the Gum Bar with an occasional indication of quartz veins of considerable size in the pieces lying thickly over the ground on some knolls.

A great deal of placer mining has been done along this stream & much more would have been done had there been water sufficient for the washing.

14971 At the lower end of the almost deserted village around the closed Gunn Ber Stamping mills the slaty rock was again sampled. The rock differs from the preceding so far as can be detected by the unaided eye only in its darker color & finer texture.

The Schist Strike is $\pm 20^{\circ} W$
and Dip is $75^{\circ} E$

14972 Just before reaching the Slaty Creek crossing the rock has been cut away somewhat in building the road. A fine exhibition of cross bedding is here seen. The rock is so slaty that a sample could not be taken that would well show the combination of Schistose structure and bedding.

The Dip and Strike could not well be measured here; there is some uncertainty about the rock being in its normal position.

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14973 Coming up the draw from
Bells on Slate Creek towards Cas-
silton a good exposure of cross-
bedded Slate was seen. It
lies in the side of the hill north
of the road.

{	The Schist Strike was	N ^{20°} W
		Dip E 80°
	Bedding Strike	N 75° W
		Dip E 75°

The rock is considerably more
weathered than at the preced-
ing exposure - #14972.

In the immediate neighborhood
of Cassilton no samples were taken
as nos. 14868 + 14869 were
taken here on the southward trip
some days ago.

I find on comparing the
strike & dip of the true bedding
of 14973 with that of 14868 or 9
that there is a difference of 10° in the
strike dip of latter not known.

This variation may arise from
the imprecision of my measure-
ments:— I used a small magnetic
Compass and allowed 30° for the
magnetic variation.

14974 On our return from Casselton to Rapid City we started down the Rapid Creek towards Sitting Bull place, a short distance out we sampled the slate which all along is very fissile and becomes readily eroded by the stream.

The strike and dip seemed to be unchanged - Cross bedding was seen on many fallen pieces but in place it was not accessible.

14975 At Sitting Bull place we were obliged to leave the river on account of the terrible condition of the roads. At the junction when we started across the hill for Little Rapid Creek this sample of decomposed rock was taken. It is almost identical with that around Casselton.

14976 Both these numbers came from near the top of the ridge which runs down into the angle between Rapid Creek & Little Rapid Cr. This ridge is high and precipitous. Our sample the last is more silicious than the other.

14978 Approaching the Castle Chief
mines - now abandoned -
from the south the rocks are
very precipitous and the road
is extremely rough. From the
ledge this sample was broken.

Cross bedding and cleavage
seemed to coincide in places
while in others places both were
obscure. No little contortion
could be seen in spots and
this leads to the suggestion that
nets and lenses of quartz played
an important part in molding
the rock of this locality into its
present shape & condition at
the time the schistose structure
was taken on. There is much
quartz scattered through the rock
aside from that which in quite
considerable lenses and
veins can be followed for
long distances and which
has been worked quite thor-
oughly both in placer min-
ing and in rock crushing
processes for gold.

There is something of a hornblende
look to this rock in places but ~~the~~
actinolite like that just west of
Rochford was not seen.

14979 Passing up the Little Rapid Creek for 100 rods or so above the site of the Castle Chief mine a high black cliff rises on the north side of the stream. The rock composing this cliff is a black pyritous slate. The pyrite is so abundant in the central core of the mass that the slaty structure is greatly obscured. Alteration has proceeded so far that the stone cracks the hands badly in handling. The general direction of this rock is the same as that of all other localities sampled in this vicinity and this rock is undoubtedly the southeasterly extension of the black pyritiferous slate sampled just north of Shepherd's Hotel in Rockford #14852-3.

14980 Leaving the Little Rapid dam and passing up Ginlet Creek we find about half way to the stage road from Rockford to Rapid City a slate like this sample. It stands about $1\frac{1}{2}$ m. north of Little Rapid Creek.

- 14981 At the head of Grinlet Creek after turning East on the stage road and near an old cabin this rock stands in an exposure not more than 10 or 15 feet high. Both bedding and cleavage are clearly seen.
- Cleavage: Strike $N 20^{\circ} W$
Dip $80^{\circ} W$
- Bedding: Strike $N 60^{\circ} W$
Dip vertical
(30° allowed for magnetic variation)

- 14982 The rock was sampled at the top of the hill between Grinlet Creek and Jim Creek. Being so high the rock was badly altered and of a light brown color; it is also very fissile and very brittle.

- 14983 One half mile west of Jones' ranch the rock along the road is very black and very brittle. It shows a very beautiful concretion, also the crossbedding can be clearly seen. Direction apparently the same as at the preceding locality Over.

A mistake was made in naming the place at the junction of the stage road and that from Silver City and the Rapid Creek valley: Jones is a mile or two east of this place.

14984 A half mile or so east of the junction of the road above referred to and the old mill which stands in the angle between them, a sample of the slate was taken to show that as we rode along the character of the rock remained almost precisely the same for several miles.

14985 But at the place where the Pictola road leaves the stage road a high mass of rock stands in the southeast angle.

This is a massive, coarse-grained greenish rock apparently decomposed to a considerable extent.

This bears every evidence of being an igneous rock. Down the hill towards Pictola it seemed to become somewhat schistose.

14986 Passing down to Pactola we turned East and down an old poor road, very steep, to the river bottom. Just by the bridge over which we crossed to the South side I took this sample which seems to be precisely like that up by the Stage road two miles or so away.

14987 This is the rock in the great bend of the river not far from the flume and just when we began to climb the hill to leave the river on our crosscut to the Sawmill. Precisely like the last two numbers taken, - a greenish massive, tough rock.

14988 This is a slate again. Strike of Schistose structure N. 45° W.
Dip 85° E.

Being well on the top of the hill this slate is quite rotten and is very fissile and brittle. So near as I could judge this spot is halfway from 14987 to the Sawmill we are approaching.



(9-891.)

14989 In this sample, taken well down in the gulch and after we had passed the road from Prairie Gulch and the old Sawmill, we again see that green, tough, massive rock, which extends down from the crest of the hill above Pactola. How far north of that point this rock may extend cannot be conjectured from any data at hand.

14990 A half mile or more west
14991 of the Sawmill and at some little distance from #14989

These two rocks ^{samples} are a Slaty and the other a quartzitic represent a series of alternating bands which go to make up a large belt of rocks into which we now enter. The cliffs are becoming very steep and high.

14992 A high hill runs down between Rapid Creek and the small stream which the road from Pactola follows down and it seems to be composed ^{wholly} of a mass of quartzite. I should judge the hill to be 250 or 300 ft high and the rock consists of this lighter gray quartzite along its entire south side.

14993 Crossing to the north side of Rapid Creek we skirt along for a number of rods under a hill of quartzite. Not far to the east of where the two roads, the one we traveled and the one leading down to the sawmill yards, come together I climbed the bluff 100 feet or so to secure this sample. It is fine and very quartzitic slightly less so than the preceding number. It is also darker colored than that.

14994. One half mile or so below the sawmill the rock again begins to take on a decidedly slaty phase. As we ascend the hill we see before us the Potsdam and Carboniferous rocks and in the road the pieces of the underlying Archæan. Bearing no contact of the Archæan and the Potsdam would be seen along our road I took this sample from the slaty bank at the roadside. The piece is almost identical with 14990 the slaty modification of the west on the south side of the river.

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14995 The Potsdam sandstone is soon reached and the upper or upper middle layers can extend for quite a long distance. The color of a freshly fractured surface is nearly white; it is quite friable also. This sample was probably ^{not} taken well up towards the top of the formation.

14996 In the talus which has fallen down in front of the preceding, this type occurs in quite numerous blocks. At other and inaccessible places narrow belts which from a distance had this color & aspect can be interstratified in the uppermost part of the Potsdam just underneath the heavy beds of the supposed Carboniferous.

- 14997 As we came along to the Car-
boniferous I broke off and
14998 took along these two samples;
the first is a piece of the
white fresh rock broken from
the ledge itself from what I
took to be one of the middle
layers. It is fine and of me-
dium grain

The second piece was taken
from a block lying at the
foot of the ledge and apparent-
ly broken from one of the
uppermost layers of the fer-
mentation. Its pink-purple
color is not usual in the
beds, altho it was seen as
we passed northward the
first day out near the
place where we stopped to
eat our lunch.

14999 Passing down the hill toward Rapid City we slowly left the Carboniferous behind and in the neighborhood of the Chisholm Springs the "red beds" are reached. These specimens sample these beds. This is the last rock sampled in the trip. This is supposed to be Jura-Triassic.

Touching this series of specimens as a whole but little can be said other than this: they compare closely — indeed they are identical with ~~it~~ in their ~~aspects~~ general aspects — the series taken in ^{making the} the circuit of the hills.

Towards the east these rocks are slaty with interbedded quartzite and quartzitic schists; while at the west end of the line the Crystalline character is the more prominent.

True bedding cannot well be seen in any of the spots we stopped to examine on the

east side of the Hills which I think I can say it may always be found in the western exposures — at least all the exposures in the Slate Creek and Grindlet Creek valleys show this as a very prominent characteristic.

No Grindlet veins whatever were seen during this trip but along the northern side quartz was very abundant.

All the quartzite seen was along the east side running under the Potodams in the neighborhood of Rapid Creek.

Through the belt of country crossed nearly midway from east to west what appeared to be a very extensive ~~series~~ outcropping of massive rock was seen. This was the only division noted of the rocks crossed into a newer and an older series. But this could signify nothing of that character.

