

3.26 to Hagerstown  
5.00-7.20 Selviden

Port Jervis to Patterson  
3.14-5.09  
4.30-6.25

To Othello 7.41-8.00

doc. 0109

Ch.

H. J. Herlein  
Market St.  
Seneca  
Walderstadt

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3328

April 8-14, 1914  
Pa + NY w/Barrett +  
students

7438

Sept 6-14, 1914  
NY + Pa cont. in  
doc. 110



April 8. Wed. Franklin House Scranton  
 " 9 Thur. American Hotel Allentown  
 " 10 Fri. Hotel near L. & B. Sta. Washington  
 " 11 Sat. Penn. Hall Pottsville  
 " 12 Sun " " "  
 " 13 Mon. Hotel near Scranton  
 " 14 Tues. Wells Hotel Allentown  
 " 15 Wed. " " "



Wednesday April 8-1914

Left New Haven at 8 A.M. for  
New York. Called on Poates and  
my sister-in-law to see about my plates  
or original drawings. They advised me  
to make them in ink drawings and  
then reproduce by the zinc line  
method. Poates (he could not reproduce  
the plates under \$10 each and that  
the color tinging will not come  
out in square inch size. So I  
will have them made for 100  
the ink drawings are much the better.  
The drawings should be done in  
ink on white paper and not  
on colored paper or different colors.

In regard to numbers all I need  
do is to indicate them in pencil  
and they will show on the printed  
size of printed matter.





Told Riley that I would have  
no car, the Ho state, but my fare  
was. They left the matter with me  
to decide what is wanted.

Left Lacey City over land of  
in 1916. Left 6.15 got to Easton  
at 8.30 P.M. Stopping at  
House.

---

Took the trip again with Sarah and  
Frank, Auntie, Smith and Affler on  
April 20 - 23 - 1916.

bee was recorded up to 16 and was  
in one case 20 inches. As a rule they  
range between 2 and 8 inches.

Thursday April - 1914.

Got up at 5:30 and took the Comm. train at 6:15 for Holland (N.J.) about 12 miles down the Delaware from Pottom. Then walked along the railway track to Milford where we got the train back again to Pottom, at 10:37 A.M.

We came south east to see the Triassic. At Holland we are in the quartzite conglomerates. In the conglomerates more than 9/10 of the material is a white coarse grained quartzite, the <sup>beds of which</sup> matrix will be in the Tuscarora or Medford. There are some reddish coarse grained sandstones - but none of the type of the red Medina. One sandstone is a limestone piece. The matrix of the same formation as the quartzite.

The sandstones are characterized by well rounded with many flat surfaces. The flat surfaces are about stream action with many of them dipping to the south which means they are up streams with their origin to the north or W. north. Some of the boulders

These conglomerates have been interpreted as due to glacial action but there is no evidence here of tillites. The material is clearly of tectonic stream action, streams that came from that distance from the Appalachians out to the coast.

In places the rocks are crushed into one direction or that some of the fault directions may be due to strike-slip during consolidation but more probably of the time of the Palisade deformation.

The primitive boulders are a magmatic structure. Some have fossils in sections but could make out none. Some possibility of early life.

are probably striated by ice. The striations are not well marked and usually are on concave faces. These markings are interpreted as not due to ice action but as the result of normal fracturing or due to differential settling during the glacial deformation. The deformed strata of the Appalachian region are about 2000 ft. thick. There must be a great fault where the Triassic strata are raised to the level of the Appalachian mountains.

As one descends in the Triassic zone and the limestone appears and the strata are usually smaller and smaller so that we see strata 1 and 3 inches. Still lower than you have before, all of the strata are finally all broken down into fragments of the same size. The Triassic strata are here, with and show show considerable sun. marking, rough wave marking, small ridges, and small troughs.

Great Fault

E. ← down stream

h.

Triassic 30°

Paleozoic 60°

To be seen N. of ...  
Trench 1000 2 miles,

sections of tunnels as if of worms. Ram  
sinks are not at all certain, make out.  
Some small pits were seen but there  
are thought like holes of escaping or  
gas.

Shales occur only here. Drill hole  
for about 13/4 miles and north of <sup>the</sup> the  
Employer's.

In the employer's we also saw some  
evidence of the shales, which are at hand.

Along the main road beside the rail-  
way track are great cliffs of the conglomerate  
and we here see first the decidedly shaly  
nature of the interbedded sand, shale  
and conglomerate. Shales are <sup>found</sup>  
to be almost all sand shale, which  
more and more sand occurs and then the  
fine, even into sands and shales with ex-  
ceedingly fine micaceous.

April 20-1966

The dark sand grains interbedded with the roof, li are of different sizes and are considerably rounded though not completely so. In one place was a fine exhibition of intraformational conglomerates in the dark sand and in several of the zones were sun-cracking, with the cracks filled with sand. There also were seen what appeared to be clam prints. I did not see them.

Barrett holds these deposits are laid down in shallow water, probably less than 50 feet and that they should not be classed as shore phenomena. The shore was not near. Between these deposits and the base must have been deeper water depositing the equivalent muds. The lime came in the main from the sea.

Some layers are diagenetically altered, others are oolitic, others are silty li, some are piffled, but a formation of rocks, zones of sand, all print in <sup>ways</sup> shallow water, warm climate and somewhat far or shore that lay just off of sea level.



the Lower Ordovician limestones along the  
Busk Hill to the contact with the ...  
The heavy bedded magnesian limestones have  
some sand and are interbedded with thin  
bedded ones or less of clay limestones but are  
more or less in the form of interstratified  
conglomerates. Such some also have thin bands  
of sand and shales and thin material  
may also fill in the same cracks. Toward  
the bottom one saw a few zones with Crinoid  
fossils in the form of  
in horizontal wavy layers of some lateral  
extent. Between the horizontal layers are  
of the same nature. All are more or  
less tilted diagonally. I would thought  
this the situation and composition did  
not have been a contact zone of  
water but rather under an alternate drying  
and wetting conditions. According to the con-  
ditions due to aerial exposures under  
normal conditions. The interstratified



conglomerates are seen as bedded mud layers  
broken up and rearranged by the next in  
series of the sea.

We proceeded down in the section  
and finally came upon the "Greenville"  
of the -Albionian system being an Car-  
brian. This is rather significant and  
should be looked into.

The "Greenville" contains one has com-  
pletely altered in section to with layers of  
actinolite, muscovite and other minerals.  
At the end of the ridge near the Summer  
Hotel we saw the intrusion granite and  
on the way back down to Easton we came  
across a [unclear] [unclear] [unclear].

June 25, 1908, Easton, Va. Height 9.  
Mountains 18 miles farther up the  
Delaware river.

This alteration of whitish Cystogone  
layers with the thicker dark ones may be due  
to alternations of growth bacteria and growth  
living bacteria. Such a type of alternation may  
occur in a climate change.

There must be some other reason why  
one kind of bacteria is better suited to  
than the other. The change may be several  
miles.

April 10. Friday Allentown - Stratford

leaving at 5.30. (Started in to see the ... section richer than that seen yesterday.

... of the old ...  
... 43 feet ...  
... (but not 18)

... finely ...  
... and unmineralized. The latter ...

... which are ...

... the ...

... the ...

... almost ...

... material that they use ... fossils.

The Martinsburg shale ...  
... It is 2 miles to the Blue ...

see page 10

Cyrtogon 12"

Plate 6"

Cyrtogon ledge 6" to 12" with beds.

Left about white 18"

Q. 1. del. ornamental clay li with thin zone of cyrt. 6"

Thin sand li 12"

Pl. li. 4"

Lower li. ferruginous 3" of cyrtogon 12"

Plate with congl. 8"

Thin sand li 16"

Plate li. 12"

Q. white, dolomitic and zone of Cyrtogon 12"

Cyrtogon ledge 18" Section of at top of latter part of zone.

Dark li. heavy bedded 18" Term. side of a ferruginous zone. 0-2"

irregular layer with cyrt. 10" long

Common white 6"

Plate as cyrt. 4"

Cyrtogon ledge 16" ornamental clay, with large amount of bed above 30"

Large white 10"

Cyrtogon ledge. Some clay, even bedded at top 12"

Dolomite, white, sandy bed 12"

Even bedded "Cyrtogon ledge 14"

Dolomite, ornamental zone 18 to 24"

Irregular laminated layer 8"

Common cyrtogon ledge 4" dolomitic

Cyrtogon ledge more or less thin top 16"

Heavy bedded li 16"

Plate layer with congl. 4"

Cyrtogon ledge, at top and may have red clay above <sup>strongly iron, even reddish above</sup> in 2 feet.

Thin <sup>white</sup> li. with cyrt. 4"

Heavy thin clay li. a white shell, slip of cyrt. with interbedded red and purple sand. 20' thick

ridge with the Silurian strata.

As we enter the slate belt in the  
slate quarries, a number of sections  
we saw the folding all more or less  
horizontal to the road. The cleavage is fully  
developed and is almost always at right  
angles to the folds. In the thick areas of  
uniform districts it seemed to me there was  
always a dip on the separation beds. Thus

and in some of the sections we saw  
a fine example of alternating bedding.

Black, carbonaceous shale with occasional  
small contacts.

4 1/2 to 6 3/4 ft

very fine grained, shaly, with  
thinly bedded, carbonaceous shale.

Dark gray, carbonaceous, well-bedded or slightly wavy

These layers of deposition <sup>reach</sup> 3 to 13 inches,  
they sometimes dip at an angle of 10 to 20 degrees  
as they dip down. The joint cycles are from 8 to 20 feet  
or more. There is usually a sandy bottom or a ferruginous zone and  
above the Hall-Castmaerum layer in which there may occur a more  
shaly of the regular shales. See page 2 beyond.

Total of section measured 43 feet 3 inches

Of these 18 are Cryptozoon zones = 14' 6" thick { Feet 2  
to 30"

Of these 14 are white zones = 13' 5" " { Feet 3  
to 36"

Of these 17 are limestone zones = 15' 4" { Feet 4  
to 38"

As the fine bands in the Cryptozoon ledges are =  $\frac{1}{100}$  inch  
it would take 17,400 years to deposit if each are  
annual layers. If the rest deposited twice as quick  
the whole time would = 34,600 years.

Top of section measured.

Cryptozoon 5"

in limestone 12"

Platy li. as before 6" or nothing

Cryptozoon 24 laminated

limestone with some fine white 30"

Platy li 6" Fossils & corals, diameter = 25 feet

Carboniferous 4" to 6"

Very white limestone, erosion above 12"

Platy li. laminated 3"

White 3"

limestone, dense li. 10"

Platy li 5" Fossils in cavities, diameter = 25 feet

Cryptozoon 2" banded

White 20"

Carboniferous 2" banded

White, m. li. 20"

Same series appears in the  
east of Salt Lake about  
16 miles or Reading,  
R. Q.

See page 618



why these cycles occur

Three explanations suggest themselves, 1. Climatic cycles, 2. annual fluctuations in the Tropic disturbances, 3. greater storms and hurricanes during a deep waters. Explanation (2) hardly seems probable for some minor changes while (3) does not seem to be the source of the wind pressure in the Tropics. Accordingly we have to have the mechanism for which the greater or less amount may be the actuality of disturbance it would seem to be the same. The cycles are hardly climatic in nature. In the same way the fluctuations of the latitude belt seen in the summer months are explained by the climatic cycles. It would seem that climatic cycles are a function of other cycles in the variability of the sun's radiative energy = sun-spot theory.

Let that be - we are stopping at Pittman House and about the Christ Station.

The 3rd day mostly down from the  
middle Tennesse to N. Fla. The Louisiana  
seems to be not farther west in the trough  
than the one in the mountains. In Feb. I  
doubt this inference.

At the very mountain  
the rain is not only more frequent but  
it is much more violent than in the  
mountains. The wind is a steady gale  
or bliz.

Section on Road 11-1214.

Lehigh Gap.

Station 11-1214

Lehigh River and High Succession.

Station 11-1214

eastern side of Lehigh River we have fine contact between the Lehigh and the ...  
quartz;

at 200' ...  
in Maryland

at 200' and ...  
1916 *Strophodonta* ...

(1 to 6 inches) ...  
large well rounded ...  
in a ...

the latter one of large ...  
hand ...

... [Some of these are certain black  
shred on shale inclusions]

The very quartz pebbles, are more common above and  
make up 70% of the sandstone.

I am not *Anthropogenic* on a trace  
of a fossil, I see no reason why the  
strata of this section is not  
California, - well known. I have found  
one site. [In 1915, I saw it in the same place]  
This is similar to the one in the  
... ..

There are some small black shales here  
only in the lower part of the section. (in recesses up to 6")

The sandstone is mostly clear sandstone  
rare. though it occurs in the lower part of  
the section a few inches thick.

The sandstone is restricted to the lower  
186 feet. From here come heavy bedded clean quartz  
sandstone with <sup>6 to 8 ft thick</sup> thin greenish shales. <sup>perfectly</sup> greenish shales  
with occasional bedding of <sup>at sections</sup> shales. The latter  
sandstone have a slight serpentine color. These  
shales are followed by heavier bedded silty sand-  
stone ~~with some shales~~ <sup>and some</sup> shales  
becoming a greenish sandy thin bedded <sup>sandstone</sup> sandstone.

Gradually the section <sup>the upper part of the</sup> passes into  
shales of a silty <sup>orally yellow</sup> limestone. Also some  
limestone shales. Originally the section is greenish  
but <sup>at the base of the</sup> there are interbedded sandstones and then  
at the top shales <sup>of the same</sup> are <sup>greenish</sup> greenish. All in

To the east, the -100 is in fact occurs  
after Crickany. It is mean that in fact  
occurs here.

Below the Crickany on one of the -100 is  
on the other side of the river occurs a heavy-  
bedded hard limestone. This is probably the  
Beecraft.

In the quarry we saw near Brown and  
they dug a well through the Crickany and came  
upon a black shale which is the Stipitella  
firmula. This means Marcellus and a  
rotational section. At the next exposure to the  
north the Crickany is again seen and is also  
rotational but here the shale is all the  
then comes the Marcellus with Stipitella firmula.  
After this the -100 is in fact can be said here.

all the total thickness must be over 1000 feet.

Above the latter then comes in a series of brick-red shales, 1. in blocks or finely rippled and sun-cracked, saw nothing in the way of fossils unless of the worm tracks, - *Paloria* series.

Nothing of the *Hel* debris was seen.

Of the *Oriskany* there is a basal block of flinty sandstone v. thin beds as at *Pine Island*. We saw a number of the *Lower Oriskany* fossils. Their run not less than 50 feet.

Over it then follows a considerable thickness of coarse *Oriskany* sandstone that in the higher beds goes over into a conglomerate. Part of the pebbles are of *Oriskany* origin. Of these *Strophomena*, *Perrinites*, *Oriskany* and *Corymbolites* was very numerous. This section is outcropped and faulted so that we did not work out the structure.

In this region there is a mineral spring well. In a residual pond near it. There also seems to be another spring from the *Oriskany* and the *Paloria*. Have a sample.

Beneath the *Oriskany* is the lowest

Page ② goes with April 10th page.

In the Hattington slate quarry we are again impressed with the cycles of deposition. There are zones 10 to 20 feet apart in which none of the black shale zones appear. Between these are other zones 10 to 20 feet across with the black shale zones. In one place the black shale zones may be regularly 4 to 6 inches apart with the black shale from 1 to 2 inches thick; in others they are from 12 to 18 inches or even further apart with the black shale bands 1 to 3 inches thick. In the argillite shale one sees no bedding but in the black shale there is a distinct series of thin banding.

Usually the black zones start or suddenly with a fine ferruginous sand layer from a  $\frac{1}{8}$  inch to  $\frac{1}{2}$  inch thick that gradually gives way to the black shale in which there may be one or more zones ( $\frac{1}{16}$  to  $\frac{1}{8}$ ) of argillite shale. Once in a while a sandy layer cuts into the shale due to wave action. In one case we saw an 18" layer of sand sharp on the shale that soon became rippled and cross bedded with the crests four inches apart. Most of the iron pyrite is in the black shale. What are these now indicating about cycles of black (red bottom) shale due to? Climate seems to be the explanation. If so the weather is not regular and yet there is a certain regularity about it. Can the black steps be representative of drier times, and debilitation and more carbonaceous and less oxygenated horizons?



In 1916 on the east side of river at an abandoned joint mine we saw many *Trepatorata*, *Ferostylidae*, *Chonetes* (left three) *Strophodonta* near *arata*, *Palmanella* and *Rhipidomella*. The horizon appears to be New Scotland shales. Also *Strophodonta striatella*.

*Oristony* or the Helderbergian is reduced to a residual clay matrix of a yellowish color though there is a small layer with more Scotland fossils. It is some red and even brown. [On the other side of river there,

In the glass sand quarry just before coming to Brownsville, they got in a well dipping the Marcellus black shale. This proved that the Oristony is not turned into the Marcellus.

The surface is of the vegetation character but is decidedly cleared, and is of considerable thickness. Then comes in more sandy green shales and finally sandstone. The latter is a *Lorraine*. These are not the same as the

the Catskill. The sandstone is thin <sup>in part</sup> *Lorraine*. Later I see that the *Lorraine* is not the same as I supposed, for the *Hiripia mesastriata* fauna is here that I find above the *Lorraine* etc. The great thickness of the *Lorraine* means *Chonetes* making in *Lorraine* at this time. The *Lorraine* agrees with the *Lorraine* in the same horizon.

This is the Spizella socialis aurora.

Sunday April 12-1914.

Pottsville, Pa.

Started out at 7:30 in the morning.  
Drove at Conowingo, 3 1/2 miles out from the  
city towards Achucilla Station.

At Conowingo <sup>station</sup> we began to see Ithaca but at  
what level could not be made out because the  
atmosphere was misty and soon dense. To ward's  
locality situated <sup>at</sup> Pottsville we got the first  
fossil in the morning. These fossils are <sup>primarily</sup> unimbricate.  
About 100 feet higher we got the small lot  
marked Middle Ithaca. Primarily another 200  
feet higher we came to the first and oldest  
zone. The fossils drop out in a strikingly  
manner and in this zone there are none at  
all. <sup>It is a zone of high pressure and low temperature.</sup>  
At this point there are more massive deposits and  
at about 5 feet above the level of the sea we saw  
things *Acucula* and *Tentaculites*. The latter  
are floaters while the *Acucula* sp. that was seen  
the sea was not yet normal, only that the water

Just before getting to the Cat Hill got a  
Estheria nam paracea

got in from the sea spray marine waters but did not succeed in getting a foothold.

Still <sup>though a logarithm</sup> a <sup>revolution</sup> marine fauna is at hand <sup>the fossils are seen common</sup> but before the <sup>the</sup> conditions is <sup>generally</sup> obtained we find <sup>the</sup> <sup>middle stage</sup> <sup>of</sup> a <sup>Grammysia</sup> <sup>in</sup> <sup>the</sup> <sup>same</sup> <sup>type</sup> <sup>of</sup> <sup>strata</sup>.

The fossils always disappear in approaching the red beds. In the red beds we always see sun-cracking, rain imprints, etc. and in one place we saw <sup>in</sup> <sup>the</sup> <sup>red</sup> <sup>beds</sup>. Also root markings are common in the red muds and even in the red muddy sandstones.

We have <sup>or</sup> <sup>in</sup> <sup>some</sup> <sup>places</sup> <sup>of</sup> <sup>green</sup> <sup>shales</sup> <sup>with</sup> <sup>many</sup> <sup>red</sup> <sup>beds</sup> <sup>all</sup> <sup>of</sup> <sup>them</sup> <sup>in</sup> <sup>one</sup> <sup>place</sup>. <sup>The</sup> <sup>red</sup> <sup>beds</sup> <sup>are</sup> <sup>not</sup> <sup>active</sup> <sup>seas</sup>. The sandstones often have imprints <sup>of</sup> <sup>atoms</sup> <sup>of</sup> <sup>1/4</sup> <sup>to</sup> <sup>2</sup> <sup>inches</sup> <sup>in</sup> <sup>diameter</sup>. <sup>Some</sup> <sup>of</sup> <sup>them</sup> <sup>are</sup> <sup>composites</sup> <sup>of</sup> <sup>green</sup> <sup>shales</sup> <sup>and</sup> <sup>pebbles</sup> <sup>more</sup> <sup>active</sup> <sup>taking</sup> <sup>up</sup> <sup>the</sup> <sup>pebbles</sup>.

The Province also has conglomerate beds that  
are 150. m. thick. In this region there is also  
a coal and iron local, up to one hundred  
meters thick.

and incorporating them into the river sands.

The more one ascends in the upper Alleghenia the more coarse the debris become. The marine fossils soon drop out and the great bulk of the formation is continental.

On the basis of plants the formation is easily separated from the Pocono. The former always has the *Archaeopteris* flora while the Pocono is richer in *Lycopods*. We have been hard to obtain 200 feet of rock there.

The Pocono is <sup>throughout</sup> a continental deposit <sup>of</sup> <sup>mostly</sup> <sup>a</sup> green shale horizon, none of which are red. Then too the Pocono has fine shaly partings with a *right* *conformable* shale one from 3 to 8 inches thick. The side partings <sup>are</sup> <sup>not</sup> <sup>more</sup> <sup>than</sup> <sup>10</sup> <sup>feet</sup> <sup>thick</sup>. Below it is not easily separated from the Alleghenia yet above is distinguished from the *Marcellus* *Shale*

The Grand Fork is a plate with con-  
crating with the mud cracks sometimes quite  
correct. Rain prints are also common. Pots  
may also be often seen in the shales.

In a series of red sandstones alternating  
with redder shales, the shales predominate.



ry the red character of the latter. The best  
Cocoon Lane is in the middle  
at the end of the railway cutting across  
the water works box.

The red color is due to the sand  
stone. The Pittsville type of sandstone  
appears at about 900 feet above the Pittsville  
and while some of these conglomerates resemble  
those in Pittsville they are not  
equivalent. At the top of the sandstone  
there is a thin bed of limestone and  
red shales and Pittsville is not

The sandstone is an important  
stratigraphic horizon. The fossils in the  
Coal Measures are the same <sup>conditions</sup> as in the  
sandstone. The conditions are  
Land conditions versus epicontinental seas  
and warmer moister climates.

Dr. J. S. ...

Market street

Was a very good track  
track even better than those of King's.  
will let me have a slot in two later  
on.

o o o o o o o o

Width about  $1/8$  inch. Width between legs  
about  $1\frac{3}{4}$  inches.

Winston has a slot of living ...  
trailing in the sand. He said the one ...  
made ... of tracks.

Spent the evening at Angus's house to see his (mailed) Chelon tracks. All appear to one type, the *Chelonotherium*, of a creek five feet. I don't think there were six feet but I could not see it that way. The size is about 1000 lbs. and the long fingers (but I saw some so much curved and turned, extremely. The remains of the toes that came, in some places, show plainly and seem to be that kind, rather than that they drift into the water. The tail often shows in the center of the track as a slender drag, sometimes to the side, the tail drags on the side, the concentric addition, as if the animal were, should into the mud.

There was a five kinds of tracks, large four-toed, small four-toed, including all the tracks made by legs.



Doc's H. J. Herstein has a  
very fine slab of Arthrolycus barlowi  
on Bald Eagle Mountain, near Ripono  
Station on P. R. R. on West Branch. The  
fossils are in tufts, about six in the slab  
less than 2 feet square.



Monday April 13 - 1914

Pottsville, Pa.

Conrad and I started to go to St. Paul  
to see the coal mines. Did not go with  
them but remained and packed up some  
of my things shipped via Adams.

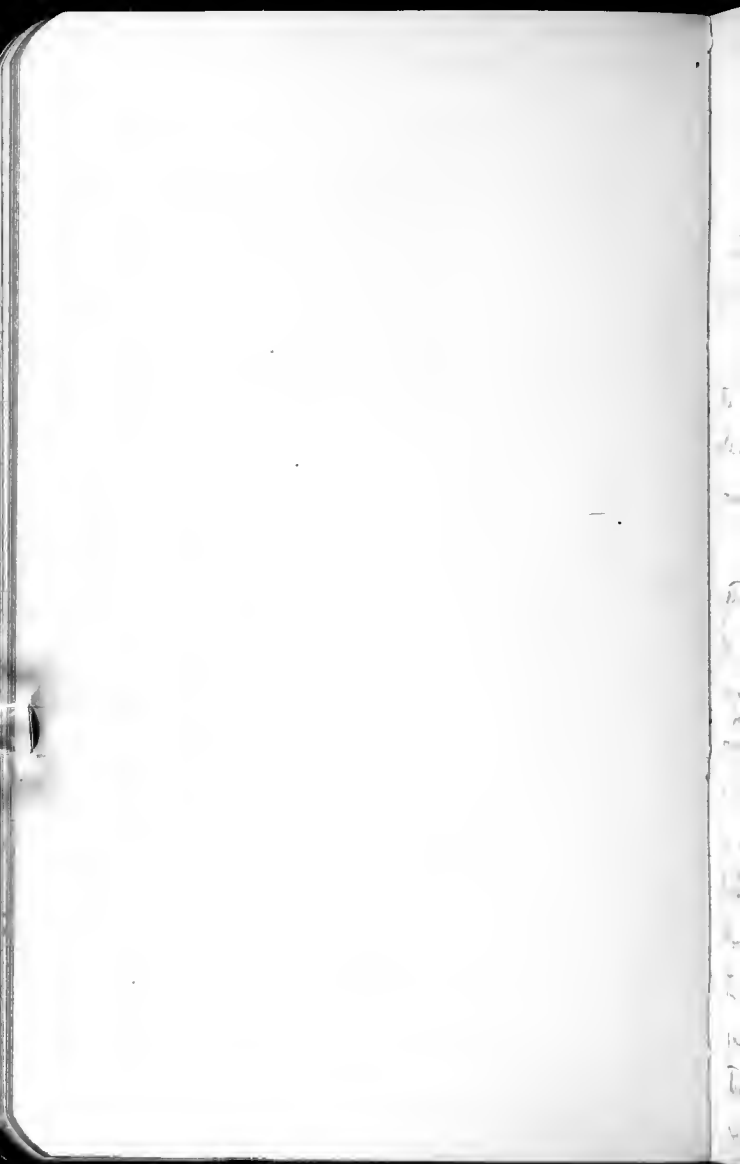
Called on Dr. H. J. Cooper to see  
his Grandfather's rocks. They are better  
than those that Cooper has.

Left Pottsville at 2:30 P.M.

to Hazelton, where we arrived at 3:30.

Left at 5:05 on trolley for Hazelton.  
Hazelton is the top of an old un-dissected  
sandplain. We have been coming over the  
top of the ridges at Hazelton. In fact above the  
sea. In all of the ridges small and large  
are small and large and white. This is  
what above the Pottsville conglomerate.

Left Hazelton at 6:20, changed  
cars in Desautels. At Desautels at 7:30.





Tuesday April 14-1914.

Ottisville, New York.

Left Branton at 7 A.M. and got to Ottisville at 11 A.M.

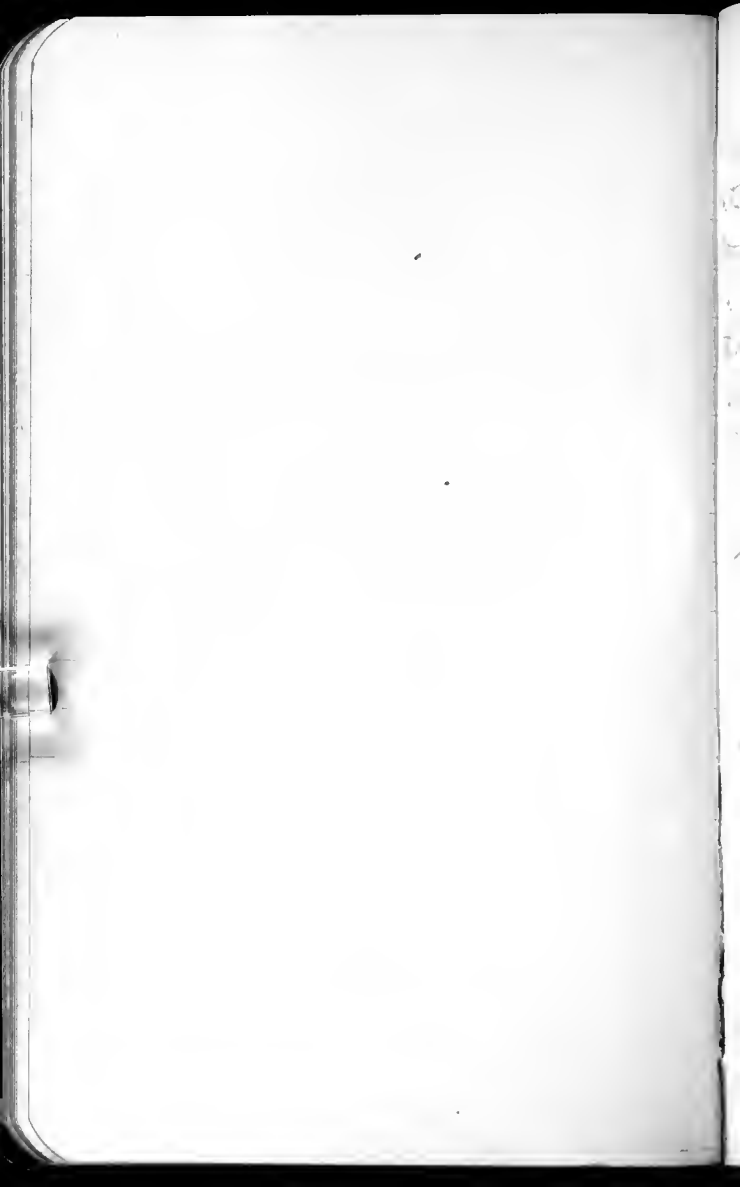
The contact between the Hudson River and the Shawangunk is an unmistakable unconformable one. The beds show the degree of the unconformity.

The Shawangunk begins with a coarse conglomerate with pebbles of various sizes, all of quartz. This goes on for 6 or 8 feet and then the pebbles become smaller but some pebbles of <sup>iron</sup> ore occur throughout the <sup>iron</sup> conglomerate. There is also here and there a Hudson shale pebble at the base. A coarse sandstone layer but higher up is in places very fine. The red color is very prominent throughout there is some iron ore nodules, also rarely a little of a <sup>iron</sup> ore. Towards the middle of the beds are separated by thin layers of black shale. There is also scattered throughout small nodules of iron carbonate that weather into iron rust spots.



The Eurypteri occur probably about the mid-  
thickness of the Haraway sand and to my great  
surprise we have come upon a great slab 20 x  
20 feet the under side of which was completely  
covered with Centronyx barani. It therefore  
shows that the Haraway sand is Medina and  
that Clarke and Ruedemann's Eurypteri are  
also of Medina age. These fossils are associated  
within 2 feet <sup>and not</sup> distance. Baird on a former  
trip measured the thickness for the Hudson  
slab of the Eurypteri zone.

It is only 300 feet above the top of the  
sand and only about the track of the  
sand, was the same level was Centronyx  
that appear to be 500 feet higher. In other  
words Centronyx can be found in sand  
500 feet. These upper beds have more sandy  
green clay, which is more than in the  
gray. Then too there is more iron (weathered  
and iron rust) in the beds at that the time  
was in the winter.



Joe Me: thickness is the same but  
as the Clinton here is practically like the Madison  
there is some greater thickness here. It seems to  
be the Schick's top section was again only  
that there is less conglomerate here, but one  
section and possibly some shale. Part of  
Pier's section is the Schick's top section.

Further along the railway towards the  
junction one sees considerable red beds of  
Tertiary age. These are much sur-cracked  
and weathered to a white wash-brown  
massive appearance. They indicate very  
likely a...

Got to New York at 6.30. Left for New  
Haven at 8.10. Home 10.30 P.M.

---

End of Barre trip.



Linton

Was here with Mr. of June 13-1913  
Ord. - Cobleskill contact in abandoned  
cement quarry on hill back of stone yard  
near Town.

7438

1914  
Sunday Feb. 6, 1914

Left New York at 9:41 and got  
to N. Y. at 11:45. Exp. at 2:00 p.m. for  
Rhinecliff and got to Linton at  
5 P.M.

Stopping at Eagle Hotel.

Transcript of G. B. S. 1902

Oriskany sandstone. - On the south side of Rondout creek at Rosendale station of Balkill Valley R. R. may be seen a <sup>upper</sup> part of the <sup>dipping south west.</sup> Oriskany. Here it is heavy bedded, <sup>and iron-bedded</sup> clearly washed, white, conglomeratic, quartzite with occasional very thin shale partings. The conglomerate zones are irregular in distribution, <sup>horizontally and vertically</sup> and of variable thickness; the pebbles, <sup>of thin quartz are</sup> well rounded and in size up to one inch in diameter though the average is between three-eighths and one-half inch. It is a <sup>marine</sup> shallow-water <sup>laid down</sup> deposit, not many miles from the shore.



Piscataway A. 77914

on the south side of Rock Creek

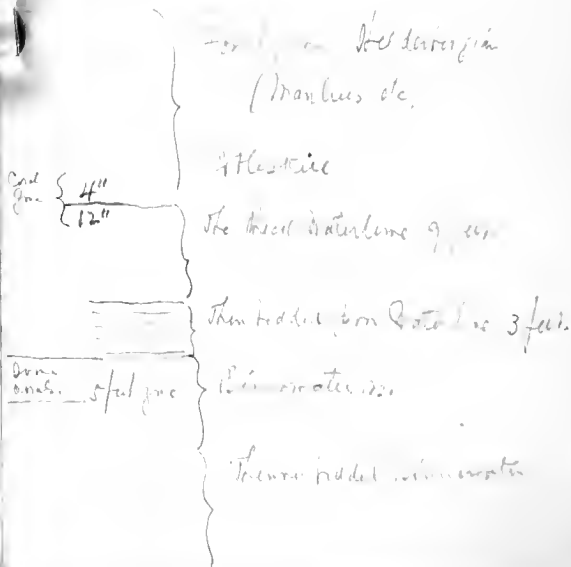
at Piscataway Station on Great Hill Valley R.R.

made seen the heavy bedded white quartzite sandstone dipping southwest. A vein quartz pebbles, the pieces of quartzite about 3/8 to 1/2 would be the average. The conglomerate grains are thin and thick and irregular lens shaped in texture. The sandstone is thin bedded. This is not any of the original but the clearly marked nature with a very thin and occasional coarse sandstone. The sandstone is at depth of 100-200 ft.

Then returned north as what I want to see is not in the south.

Piscataway sandstone

At Rosedale on the north side of the  
 Pondent is a great cliff from the river of 240  
 feet high. If 100 feet goes into Top Falls and  
 Binnewater we have 140 feet for the Helderbergian  
 on top. If there is Gristone on top it cannot be  
 more than 30 feet and I think that more is present.



Biene water Feb. 7 - 1914

Between Biene water and Pikesdale along the  
Hallsville R.R. can be seen the entire Stollertoyian.  
The exposures are along very steep cliffs or it would be  
hard to work it out, but all is shown in one  
uninterrupted exposure <sup>quite to a</sup> little disturbed by clearing.

North of Biene water in the <sup>new</sup> railway cut  
is seen the base of the Stollertoyian. It is here also  
that a large cement mill is located. The basal bed  
is <sup>beginning with a</sup> ~~Stollertoyian~~ <sup>zone with an abundance of</sup> ~~Stollertoyian~~  
Stollertoyian Stollertoyian Stollertoyian Stollertoyian  
Stollertoyian Stollertoyian Stollertoyian Stollertoyian  
These corals continue into <sup>the</sup> ~~the~~ <sup>zone</sup> ~~zone~~ for  
about 12 inches. The great abundance of Stollertoyian  
occurs in about 16 inches of rock and in the <sup>4 inches of the</sup> zone  
when the Stollertoyian changes into the Stollertoyian  
with Stollertoyian Stollertoyian Stollertoyian Stollertoyian  
with Stollertoyian Stollertoyian Stollertoyian Stollertoyian

The Stollertoyian red is a dense green but on  
of Stollertoyian and Stollertoyian <sup>with occasional</sup> ~~with occasional~~ <sup>abundant</sup> ~~abundant~~  
at the base there is Stollertoyian Stollertoyian Stollertoyian Stollertoyian  
the Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian  
Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian Stollertoyian

(For the present will lay the head here)  
Later I see them in Stollertoyian

Near the middle of the sun cracking on  
the cool side of the sandstone that filled into  
the parting of the rocks.

Upper High Falls shale grey, green and  
black shales. about 12 feet.

Middle Siliceous shales 25 feet down  
to the junction of the sandstone

Recreator sandstone comes in sharp, a coarse  
gray quartzite, clean rounded or bedded sands. Even  
it lies the Littlefield with the sandy transition zone  
described, but the one is being the other a clean quartz-  
ite. Some beds are much rippled, crest from 1 1/2 to 2  
inches across. <sup>These</sup> beds contain with green to almost  
black partings (1/4 to 3 or 4 inches), the sands in beds  
from 6 inch to 1 foot in one bed at the top. Some  
con bedding and cross-bedded sands at the top. The  
beds has a thickness of about 32 to 35 feet.

They are strongly mineralized and  
the near bottom.

Green shale - shales. On top a series of <sup>thin</sup> <sup>beds</sup> <sup>of</sup> <sup>green</sup> <sup>shale</sup> <sup>one</sup> <sup>or</sup> <sup>two</sup> <sup>feet</sup> <sup>thick</sup>, then some  
beds of <sup>very</sup> <sup>dark</sup> <sup>shale</sup>, with 2 green shale partings, then greenish  
sandy shales 2 feet or so, then black shales of about  
3 feet. Together about 12 feet.

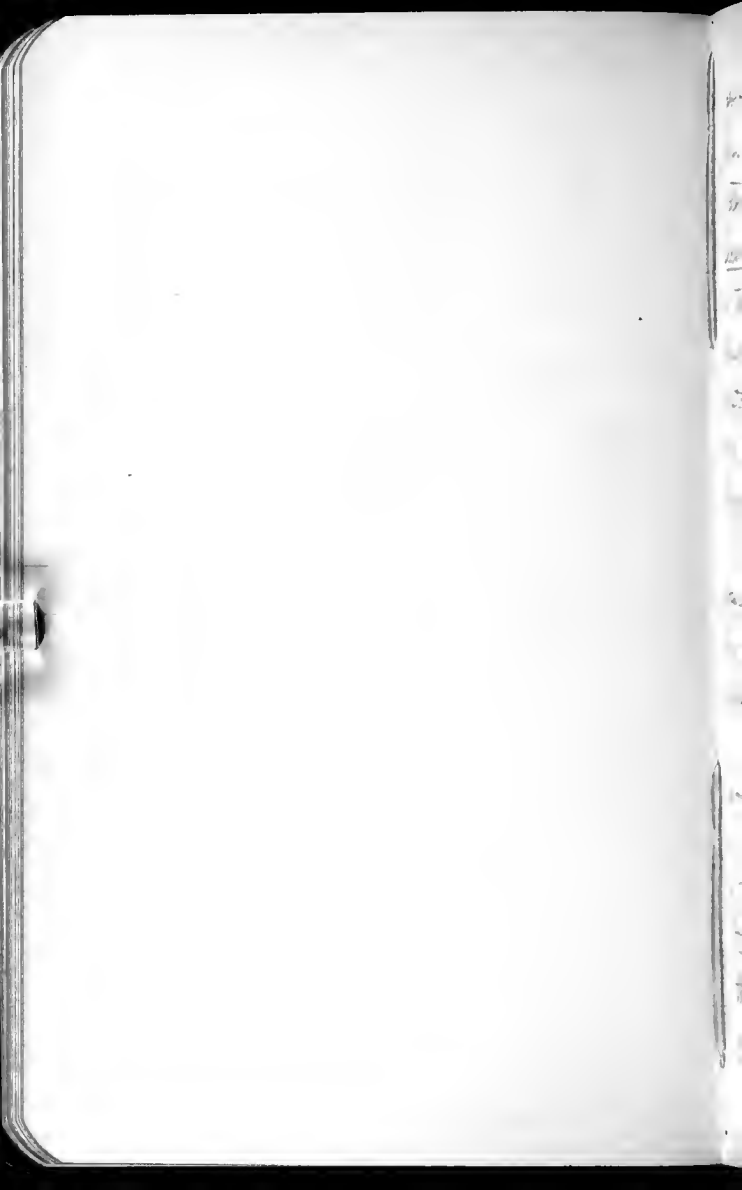
Then red sandy shales that are more or less  
cracked. Saw no quartzite here nor any

Disregarding the fact of the evening in the  
High Falls vale the noise is rarely <sup>1</sup> heard at all  
and may be more. Now he attempt to measure  
it.

quantity settles in the shale. It is the regular red  
sun-cracked sandy shales with a very slight tendency  
to being green. About 25 and certainly over 30  
feet to the slip fault. In all about 37 feet.

Shawangunk conglomerate heavily shalen-  
sided at the top showing that movement has been  
made over the top. It is a most decided conglomerate  
of fine quartz pebbles in clean sand, but the pebbles  
are not well rounded. <sup>the stones are not smooth.</sup> This seems to rest thick and  
then the gravel is covered <sup>to the north</sup> in more red  
shale. So it is <sup>thrust</sup> into the  
red shale. I am so interpreting it.

High Falls <sup>along the railway</sup> <sup>the road</sup> <sup>see</sup> <sup>such</sup>  
as of these shales and then the conglomerate  
followed by the crinoid beds. Then the coppe-  
olite beds with Strophomena varia sub. There  
are then hard limestones near the top of  
which are found and a crinoid stem,  
bed. Then a bed of about 10 feet





also full of thin sections.

When to my great surprise appear Halysites  
catenularia for the account being associated with  
Aceroularia. <sup>The specimen is a normal one, not distorted.</sup> I should judge these are still  
in the Coeymans, as I see no New Jersey  
land fossils. Still there is a dense but without  
white and very reddish limestone in which I  
did not see fossils, these are probably also in the  
Coeymans.

Binnewater sandstone. In the Coeymans  
passage farther north from the station at six mile fork  
from Livingston or at the north end of Red Bank  
sidings. Here also a slope <sup>on the</sup> in the middle of the creek.

At this place there is no sharp contact with the  
cemented <sup>above</sup> and then too the uppermost part of me  
is here with <sup>as a</sup> Binnewater sandstone with Binnewater  
of the <sup>cracked</sup> sandstone. Fossils from 2 to 3 feet above  
the top of Binnewater and Stromatopora or  
that one there is a doubt about the Binnewater  
only with the Stromatopora vari. above. See the  
few fossils gotten here.

Some water it about 10 feet but then a year  
to be much less thick.

Then walked south towards Rosendale but  
 this time took the major road south of Silverwater  
 to the west and down to Rounder Creek. It  
 is a very wet and I saw an occurrence  
 of *Staurium*. Still southward and 3 miles  
 beyond Rosendale got to High Falls and had  
 dinner at Provil's house, D. D. Durick Prof.

There at the first is a small *Staurium*  
 about 30 feet of *Staurium* and *Staurium*. <sup>that is an artificial.</sup> Apparently  
 the *Staurium* is *Staurium* and *Staurium*.  
 A fine specimen here.

At High Falls. Feb. 2 - 1914

The *Staurium* is *Staurium* and *Staurium*. <sup>the *Staurium* is *Staurium* in some places.</sup> <sup>below it</sup>  
*Staurium* is *Staurium* and *Staurium*. <sup>20 feet but I see *Staurium* about</sup>  
*Staurium* is *Staurium* and *Staurium*. <sup>16 - or 18 inches.</sup>

Below it is 6 feet of *Staurium* and *Staurium* stone  
 but out of the contact *Staurium*, is *Staurium* and *Staurium* distinct  
 with *Staurium*. The *Staurium* with *Staurium* contact on the

Benne water sandstone said by *Staurium* to  
 be 15 feet thick. <sup>but is also</sup> <sup>but is also</sup> <sup>but is also</sup> <sup>but is also</sup> <sup>but is also</sup>  
 It is nearer 25 feet thick. It also has



living grass and intraformational settles of cement  
like rock. A shallow sea bottom torn up by the  
waves reworking the living mud layers after being  
it down stream from the Falls opposite the abandoned  
mill race that it is thinner bedded and more  
This was <sup>due to the river and its retreating waters.</sup>  
When and before in a <sup>retreating</sup> <sup>of the</sup> <sup>river</sup>  
at the <sup>same</sup> <sup>time</sup> <sup>the</sup> <sup>river</sup> <sup>was</sup> <sup>cut</sup> <sup>into</sup>

But the sea <sup>is</sup> <sup>not</sup> <sup>without</sup> <sup>marked</sup> <sup>transitions</sup>  
one of <sup>the</sup> <sup>into</sup> <sup>the</sup> <sup>Red</sup> <sup>Hill</sup> <sup>shale</sup> <sup>is</sup> <sup>often</sup>  
10 feet may be called another <sup>bed</sup> <sup>and</sup> <sup>is</sup> <sup>not</sup>  
or sandy or dirty as the <sup>one</sup> <sup>then</sup> <sup>bedded</sup>. It was  
then yellow <sup>and</sup> <sup>inside</sup> <sup>a</sup> <sup>line</sup>. ~~It has~~

~~all the <sup>same</sup> <sup>features</sup> <sup>of</sup> <sup>the</sup> <sup>Red</sup> <sup>Hill</sup> <sup>shale</sup> <sup>is</sup> <sup>often</sup>~~  
~~to <sup>the</sup> <sup>Red</sup> <sup>Hill</sup> <sup>shale</sup> <sup>is</sup> <sup>often</sup>~~  
must <sup>be</sup> <sup>considered</sup> <sup>and</sup> <sup>is</sup> <sup>not</sup> <sup>the</sup>

Red Hill Falls shale, interbedded with an  
occasional blue shale. Thickness often 10 feet. These  
beds in the upper part have much intraformational  
beds, a whitish mud or green mud with red shale,  
square pebbles (shells and coral). Some of these  
forms are also common in the <sup>lower</sup> <sup>part</sup>

10 Wagon Jiji Falls

30 Child " "

10 " " " and water line

4 - 30 men " "

95 - 80 feet on Jiji Falls (estimate), may be  
more, but probably not 100 feet.

Platka between 80 and 90 feet

[At Drahim in about a 10:30 of G. S. Van Dyke told  
me to get *Cactinodactylus* near the top of the Shavangpau  
head. A little below Jiji Falls. It is on the  
hill side on road into village.]

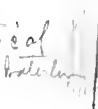
and the cavity was filled with calcite crystal.  
 These are in layers and also in lumps up to 6 inches  
 across. It is not calciche because there are no ver-  
 tical tubes.

Then comes a bed (just in part of electric  
 Power House) dense dark blue <sup>grey</sup> hard and sandy  
 rutiline-like stone. Thickness mostly 10 feet.

Then more red sandstone, <sup>the greatest and in fact the base</sup> getting by  
 red shales down to the Hawan gunk. <sup>is</sup> about  
 30 feet. Maybe 40 feet but <sup>is</sup> about 30.

Hawan gunk. A very soft red stone  
 here but the top of the stone is seen  
 seen back of the stone is seen and above the  
 stone ridge. It is very soft and is seen  
 the Hawan will then be the Crab.  
 Crab. It lies nearly horizontal, nearly at  
 an angle.

There are two at the base and above the Hawan (down  
 at the base and above the Hawan (down and up) and 2 at  
 the middle of it.

The Waterline - Jordan River contacts  
are more or less vertical  and

in the Taylor corner quarry at angle of about  
50°

~~Waterline~~ Jordan  
River see file of them upon Clark.



Winston - Pondover 2 1/2 miles

Walked about the area about 1/2 mile on  
Wightburg Hill to look over a route for a  
possible return here with student.

Was interested in the quarry on the  
corner of Delaware Ave to see the contact  
between the *Marlius* and *Cremans*.  
The *Marlius* is the residual yellow  
limestone part inside but weathering to a  
milky white outside. It is weathered  
on the top in a gapped way (see *Marlius*  
in *Geology* p. 1186), weathering surface  
not along joint surfaces.



The *Cremans* overlying is a mass of  
coarsely crystalline limestone made up of  
bricks, granular and dark blue in color.  
The fauna is a large one and quite un-  
like that of the *Marlius* in low. All



This can be worked out easily by using  
Van Ingen and Clark's fossil in the  
Hicksville Fr. Rocks in the vicinity of  
Rondout, N.Y.

Left Rondout at 4.30 for Port  
Jervis a railway with connection with the  
others at Rondout. Got to P. J. at 6.30  
Stopping at Bauers Hotel.

The contact between the hills and the  
Rondout <sup>at Rondout</sup> is striking and apparently un-  
conformable. The two layers are of very  
different materials, and although the hills  
in layers a sandstone yet there is no sand in  
the hills. The surface was clean  
when the sea came and had been under  
quite flat. See sketches on previous page.  
For contacts see my old photos.

Zone 7, Ottaville by rail

From Hamilton to the first great  
road to right. See Contour maps.

Then Salina to thin hollow.

The rest I saw and is excluded here.  
due.

Ottisville Sept. 9-1914.

Left Port Jervis at 10:30 for Ottisville to call  
on Mr. J. and to go at 3:26 P.M. to  
Ottisville.

The Jordan section here a fine steepled shale  
and not at all a soapstone as at Kingston. The  
angle of dip is also much steeper though the dip  
here is more about 50 or even 55 degrees.

The dip here is much steeper than at  
Kingston, 10 degrees or thereabouts  
at Kingston the plane was <sup>greater</sup> much  
more vertical - about 45 degrees.

There has been quartz replacement in the range of  
the shales between 1/4 and 1/2 inches, but the  
subrounded and the shales are very fine grained  
without any large grains. The shales are  
less large than any in the range  
near Kingston. There is also some red clay throughout  
the range. The beds range from 6 inches  
to about 2 feet thick. The average number is 8 to  
12 inches. The shales are less than 12 inches

120 feet

... ..

... .. from A layer.

67407  
402

750 feet of base.

The entire thickness of the ... .. will  
at the end of ... .. is not less than 750  
feet. Adding most ... .. along the ... ..  
... .. the ... .. the total thickness is  
900 feet or more a little more.

I estimate ... .. that there are  
... .. of ... .. of ... ..

[Barrett tells me he has also measured this  
section. Compare mine with his.]

Black slate, dense like, from 1/4 to even 6 inches,  
though the latter thickness is the exception. Looked  
for fossils but saw none. In one place saw  
sea-weeds reminding more of *Arthrophyces* but not  
enough to make certain. All of them seem in the  
first cut given by a thickness of about <sup>125 feet</sup>  $\frac{1}{2}$  Given bedding  
inclining in a large scale in sections also seen.

It is about 550 feet above the base where the  
first *Arthrophyces* and the great slab (20 x 50 feet) comes  
in. It is here also where the greatest amount of black  
slate occurs and the place where

*Eurypterus faura*. In fact *in faura* is in <sup>the</sup> slab with

At 700 feet I saw another small slab that is all  
probably also has <sup>some</sup> *Arthrophyces*.

The Shinarump quartzite conglomerate is the same  
throughout, thin bedded (4 to 18") with slight shale <sup>at top</sup>  
The pebbles are always the same and well arranged <sup>at top</sup>  
Everywhere the cross-bedded sandstones have signs of the  
green shale interbedded along but see masses of the  
base of the mud and interbedded of an intraformational  
deposits.





Going out again on the railway I found <sup>here</sup> another  
Arthurs layer in the second cut west of Hudson  
<sup>shales</sup>  
 River and here it is about 100' higher than the base of  
<sup>second</sup> the cut or 550' <sup>think from 550' at above base.</sup> and here as in  
 the quarry, and it probably is the same layer.  
 It is also in the second cut and then again at  
 about 700 feet above the base. All in the second cut  
 on railway.

When around the gorge in the <sup>mountain</sup> west side  
 stripping we see that the <sup>highly inclined</sup> Arthurs is introducing  
 some shale and some of the Arthurs is Arthurs.  
 Here too the conglomerates have dropped out but the sand-  
 stones are raised as before. I should find that from 50  
 to 100 feet higher I again saw Arthurs Arthurs.  
Arthurs. This is in the north of the Arthurs  
<sup>west</sup> Arthurs Arthurs Arthurs Arthurs Arthurs  
 City one sees yellowish and lighter reddish shales with  
 thick <sup>1-2-3 feet</sup> Arthurs. As one goes along the shales at much  
 for the Arthurs. All of these beds I take to be in  
 the transition Arthurs. At 77 mile post saw my first  
 small Arthurs and one Arthurs Arthurs.

Here the reds are low - the shale series  
while in the Schist beds are the schistose beds  
they are high ab. common in both cases the red  
beds are high in the section.

Possibly by working along the hill side  
one could find a contact - as in all prob-  
ability it would not be well defined.

With the dip of the rock is very steep, the  
I don't if there are more than 200-300  
it are not in. On it rests the Salina.  
There is no water on them it is now here.

Along the main road I saw Salina from the  
side of the road, a distance of 1/2 mile

At mile just 78 p.c. I saw more *Orthopyras*. The conglutins were under apart; may have been due to squeezing.

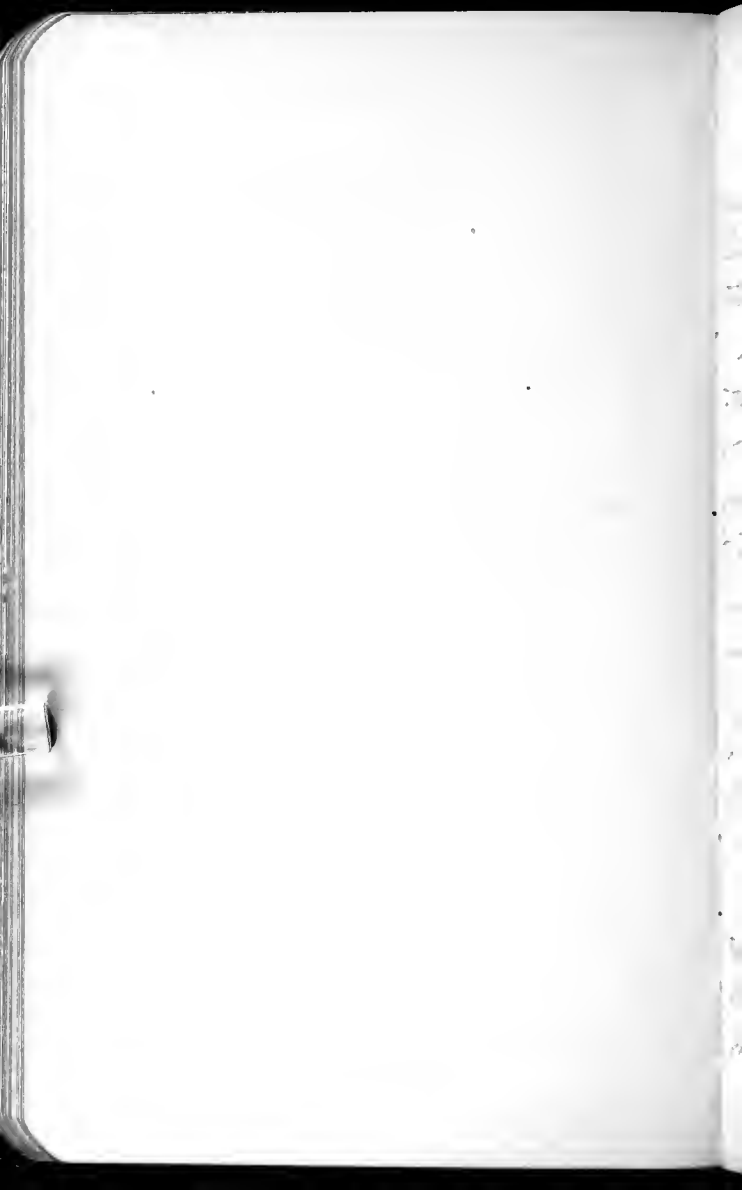
At 78.5 we are faced a <sup>typical</sup> *Pharos-*  
*gunk* conglutinate.

At 79.19 there are a number of *Orthopyras* in the *Oredina* shales, of the transition series. These shales are beneath the yellow ones that remind of *glacina*.

At 80.27 same rocks but here they are only  $3/4$  -  $1\frac{1}{2}$  inches thick. *Pharos* do not look like Red Salina at all. These are all *Oredina*.

At 81.20 appears the true Salina. It is a regulation red sun-washed rocks with thin water-lime beds most beautiful sun-washed and a few brachiopods. There are some small but very poor ostracods. This place is south of the water tank one square mile. Have taken 2 snap shot of it.

Salina *modicum* a just north of the water tank at Stein's house. Here I got on the way on road to make rather time to get to *paris*, and all of 5 miles got to make.



Left Port Huron on ~~the~~ <sup>the</sup> 3:26. Got to ~~Tristate~~  
court at 4:33. <sup>on the Lehigh station River St. Pa.</sup> Left court at 5:00 and got to  
Belvidere at 7:20. Paid for the small town  
the American House. There are at least 3 other hotels.

As only Hamilton strata are exposed from Tristate  
to the Great Bend <sup>to east</sup> in railway and as it then runs  
on the line of strike of the Dalina we get a distance  
of about  $\frac{1}{2}$  mile across the strike of the strata for  
the thickness of <sup>Silurian - Lower Devonian</sup> the strata. The dip will average 45°.  
This would give a thickness of about 1625  
feet for all Dalina and higher formations up  
to Hamilton. See Howell and Keller for  
actual thickness of strata south of Tristate  
and whether they have any effect on the  
thickness of the Dalina.

Along the main road can follow  
the Shaw Hollow bridge to about 3d house  
distance of a half mile or more. This may help  
further check up thickness of Dalina.



The following refers to the Hancock. See the later account.

At about 1 1/2 miles south of Delaware Hotel the red color stops, the shales dark but rather greenish and the whole series goes over into thin bedded <sup>dark green</sup> sandstones and conglomerates with the pebbles a size like those of the Hancock and from 1/2 to 3/4 inch in diameter. All of the congl. pieces (more than 1/2 thickness) have black shale pebble inclusions, some rounded but most of them are flat. An a rough material, coarse, buff colored, and much crumpled.

This series makes the upper Medina sandstones of 200 feet in thickness. Below it the section can be seen to be thin blue mudstone shales, below the thin sandstone is no great change to be the thin blue shales or after 300 to 400 feet, shales appear a new series. The dark green heavy bedded sandstone with thin shale inclusions.

The Hancock has a thin bedded but mostly blue-black shales with <sup>the sandstone</sup> some green bedded sandstone, the latter more than 1/2 inch in thickness. The sandstone plane lies about the same dip on both sides and other than well for color it is hard to distinguish them.

The *Peruviana* Final Report, p. 675  
gives the total Medina as 156.5 but divided  
into Casida and Medina, and the whole into  
4 groups of approximately and scattered on a line of  
2000.

In the next place there is absolutely no ground  
to separate the series into Casida and Medina.  
Further I saw no ground for assuming that these  
three groups separate the series into four separate  
sandstone. Further if we regard the several groups  
as whole, then the thickness does not agree with  
mine, all in all it is some copies of these ma-  
terial as far as the exposure goes.

The series begins with white coarse quartz  
for about 100 yds, then a lot of heavy sand  
with quartz pebbles, coarse and medium in the  
very beginning. The main feature here is that  
all the material is of the same thickness  
material is some 100 yds, but as a rule they  
are all a thickness of 10 to 15 inches. They are  
very common and striking, and are seen from



from the base to the top. The lower part of shale beds are deposited in the same manner as the upper part.

The same consists probably about 80% of coarse dark green quartzitic conglomerates in which the pebbles average from 1/8 to 1/2 inch in dia. The sandstone in which they are said to be then bedded and even more sand than appear than pieces of black quartzitic shales that range from 0 to 1/2 inch in dia. These shales are not of the color of the sandstone. The more of them the more the sandstone is of the color of the shales. The whole pebbles are of local shale, some being and some abundant.

The reason why the sandstone is so much more to be due to some of the beds being broken up into smaller pieces and so come to cover the ground. Comparing the two sides of the River through Littleton, the sandstone on the Colorado side are not the same as those on the New Jersey side shows no scales in the Colorado area.

If no estimate of thickness are correct  
and no stepping of a good red is correct then  
the thickness is not over 1400 feet against  
the 1665 feet said to have been measured by the  
same survey. However, the thickness may be  
even less than 1400 - at least up in the  
middle zone, several layers being the  
same dip. <sup>If the 168 feet of basal Salina is added as seen</sup>  
then the thickness is 1608 feet.

On the Penn. side the layers are  
unconformity for 2300 feet. Then a rounded zone  
of 600 feet more below it in some angle.  
There is a second rounded zone of 400  
feet, also in the same angle.  
This, I assume, to be the bed of the Greider-  
bed, 1460 feet.

There is also a possibility of a third zone  
of 600 feet more below it because there  
are signs of another zone.

There is also a thin zone of Clinton  
as seen by the Penn. Survey. The 1685 feet of Clinton  
is all of the Red Salina series.

Bottom 40 feet Hardly any congl. here  
 35 " From here all the way up  
 35 " always met black shales that  
 20 " fit included in the congl.  
 12 " Pebbles 1/2 to 3/8 inch. Rarely  
 10 " over this.  
 10 "  
 15 "  
 8 "

185  
 ↓  
 ← Wp.

43  
 5m. { 35 } 70 43 yards = 70 feet.  
 { 30 }  
 { 5 }

47 yards 76

covered zone

130 yards = 212 feet

sandstone as before

40 yards = 65.

covered

282 yards = 460

sandstone as before = 372

Id. Medina Fold in here the same thickness = 1600

Conglom 103 yards. 168 feet

40 yards up to first red shales  
 basal part together. No congl. here

all as first, then a little piece of, and  
 then more and more of red sh. all the way

as 1680 feet, but may in fact be  
 Clinton.

The Medina of the same general character.

all mes  
 sand-  
 clay  
 that  
 Tuesday  
 main  
 black  
 iron  
 in  
 the  
 gneiss  
 sandy

This strata is of Shaven quartz

210  
 1765

white congl.

Clinton here is 1680 feet

Salina series. In the ... a ... for 168 feet and ... of the ground then is shale or at least shaly sandstone where. It is ... that these beds should be added to the ... and that they represent the upper ... series, ... at Altoonville.

... and devoid of ... and black shale inclusions. ... and ... at 60 feet above the base of the red sandy shales. ... Salina ... of this days ...

The section ... into a ... of ... or that ... the thickness of ... (with) the ... Salina ... the thickness is ... as 1680 feet, but may in ... the Clinton.

El Dorado Water Co.

Friday, Feb. 11 - 194

Started on a trip to see the Godfrey trail to the bridge to see the water.

The water of the bridge between the Godfrey Mt. and Godfrey side almost or completely in the main by the Godfrey side. Saw none of it, all covered over by the valley. Driving along the ridge road and approaching near the top one found the soil very rich, with very thick columns of soil at the top. The soil is rich in humus, and very rich in organic matter. It is not very good for crops, but very good for the soil.

The top of the hill at the top is here a thick bed of a white, rather soft, marl (about 1/4" but some of it) in which are many Strophomena, and some Lucasites. Strophomena is very common in the lower part with S. trichotis. The thickness is not great but could not make it out.

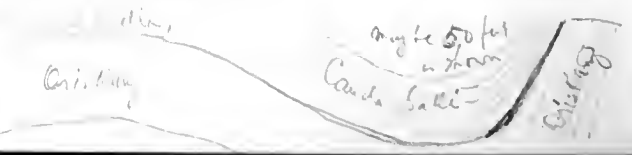
At the top of the Ridge occurs Esthus in the  
 a section cleared away. Goes all the way to the  
 top of the ridge in the distance. <sup>of the ridge</sup> <sup>bed of limestone in</sup>

At the station <sup>the</sup> <sup>(near S. & M. R. R.)</sup> <sup>the</sup> <sup>Esthus</sup> <sup>channel R.R.</sup>  
 may be seen the Chondrag, <sup>the</sup> <sup>many</sup> <sup>Esthus</sup> <sup>and</sup> <sup>them</sup>, Hesper  
dunderaria, Horata mucronata, C. <sup>from limestone, probably</sup> <sup>and small shells</sup>

On the top of the hill <sup>the</sup> <sup>Esthus</sup> <sup>is</sup> <sup>seen</sup> <sup>transitions</sup> <sup>of</sup> <sup>shells</sup>  
 to the lower <sup>the</sup> <sup>limestone</sup>, <sup>of</sup> <sup>the</sup> <sup>station</sup>

about a mile <sup>of</sup> <sup>the</sup> <sup>station</sup> seen Esthus with  
 an abundance of Conch. Galli, Lepta, Stad ready  
 in abundance, being seen in large

At the station on the east side of the electric railway  
 on same railway may be seen the very rich conglomeratic and  
massive limestone standing vert up, and is about 50 feet  
in thickness. It is very rich in Conch.  
Galli. At the base of the limestone may be seen an  
abundance of the limestone, and is very rich in  
the abundance of the limestone, and is very rich in



The Oriskany is here black shales interbedded with thin  
banks of conglomerate but toward the top the shales are nearly  
all a fine conglomerate, the pebbles with average  $\frac{1}{8}$  inch.  
At the very top <sup>some of</sup> the pebbles will go to  $\frac{3}{4}$  inch. There is an  
abundance of fossils but not easily made out as nearly all  
appear in sections. However there are many large brachiopods  
(on the south east corner of Sidley Ridge)

About  $\frac{1}{2}$  mile west of ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup> and  
south <sup>the</sup> ~~the~~ ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup> ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup>  
about 75 feet of ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup> ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup>  
is altavilla ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup> ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup>  
Knox, banded with thin shales (sometimes ~~the~~ <sup>the</sup> ~~same~~ <sup>same</sup> ~~place~~ <sup>place</sup>  
reddish white). In the quarry above the great blocks  
of Oriskany that have come down from the hill above  
as the hill is not over 230 feet high the shales are  
only an approximation of the thickness of the Oriskany.

As far as I can see the section is as follows.  
Onondaga limestone probably less than 20 feet.  
Esopus shale probably not over 100 feet.

Oriskany not over 50 feet.

Beecraft may be 20 feet more or less.

New Scotland. I saw none





out about 75 feet above base where the first black  
side zone appears.

The Medina - Hudson contact does not show  
here. On the Penn. side is far the better exposure  
due above the river road cuttings.

Opposite the uppermost and largest island  
(at Delaware Water Gap the top, the Medina  
is again well exposed. This is on the New Jersey  
side at the sharp junction. As the dip is  
towards Godfrey Ridge it is possible that some  
may appear in the Chem. Valley, but unless we  
come to the water level, seen this morning.

Then too the same sandstone is also  
exposed in the middle of the village of Delaware  
Water Gap.

# Slatington on the Lehigh.

Saturday, Feb. 12, 1914

See notes in Chris book under date April 11, 1914.  
Left Delaware Water Gap at 6.00 for Phillipsburg (off Easton). Changed here to Lehigh; got out at Slatington at 10.58. Stopping  
at various points.

The hematite red shales and fine grained sandstones seen in Lehigh Gap to the north of the Medina series show well in the R.R. cut about 1/2 mile beyond the <sup>main bridge</sup> Gap. About 150 feet of it stands on end and then flattens out on each side so that no further thickness can be made out. In the regular sandy talina, there are a few ripples but no sun cracking. Also saw a little caliche. Saw no fossils.

The Penn Survey gives the thickness as 1275' from south toward the Gap. One private survey about 500 feet of talina. Along the narrow road the base of the talina here is as it is at Delaware Gap a sandstone series. Penn Survey gives it as 85 feet. The talina is 75 feet thick. It is not  
nearly as well (therefore discovered) on the  
Medina series. The contact is as conformable as the  
Hudson River etc.

Just beyond

The contact is at the station Lehigh Gap on N.J. Central  
 The lower series is coarse bedded and without shale  
 while the Medina is thinner bedded with silty sandy  
 shales like those at Overville. The sandstone here is about 10  
 feet thick. Below this the thick bedded sandstone are  
 absent and the shale is a series of medium fine and  
 coarse bedded sandstone with many interbedded thin  
 shale layers with the silty <sup>med. fine shale of the Penn. Series 150' thick</sup> beds. This is undoubtedly the upper  
<sup>of the</sup> Medina series or rather a whole series  
 with the new <sup>thin</sup> shales <sup>as</sup> Agassiz's shale. At  
 the road corner <sup>here</sup> is long bedded shale and  
red sand shales like those at Overville.

Being on paper on the Mt. side there is a new railway  
 the Lehigh and Ridge R.R. and a new one sees <sup>the</sup> the  
Medina series. Repe one comes <sup>upon the contact</sup> at  
the see much red shales here and or that the above  
is in way. Further the line of shale beds, we are  
near the Lehigh Station of N. J. C. & P.  
The series are very much like the ones at the  
either gullies and red sandy shales interbedded with

beds 3' thick overlies (2'-7-7') in a thickness of 70' total.  
 Then follows below green shales, s. r. fine, with many thin  
 greenish greyish sandstones, but no red shales, for  
 about 150 feet. Another red shale zone 12 feet thick, thin  
 reddish sandstone 8 feet, yellowish grey sandstone, 20 feet. Then  
 a coarse, shaly sandstone 10 feet. Then green sandstone, some  
 thin sh., and an occasional thin red shale 40 feet.  
 Coarse area. Then thin and fine shaly sandstone 25 feet.

Coarse area with shale and thin bedded ss.  
 mostly yellow (grey) with a few black  
 and shales in 17' ss.

$\frac{00}{00} \frac{00}{00} \frac{00}{00} \frac{00}{00} \frac{00}{00}$

Then there is a coarse area 310 yards across but in  
 the lower trough of an opposite side of same one sees that the shales are mostly  
 thin <sup>thin ss. or sh.</sup> ~~thin ss. or sh.~~ <sup>thin ss. or sh.</sup> ~~thin ss. or sh.~~ <sup>thin ss. or sh.</sup> ~~thin ss. or sh.~~  
 ss. 710' or; the Penn. Linn. ss. 550'

then greenish-white cross bedded sandstone & sand-

stones, in 4' to 5' thick, or settles in a zone  
 to be more sand and a little more shaly charac-  
 ter. The whole pebble incline, in the <sup>6'</sup> 20' feet.

I will now begin at the bottom.

Hudson River shales only one little sandstone near  
 the bottom contact. Contact is very irregular but the  
 lithology is very different. See description of sand

Adirondack. The base is very rotten being a zone of  
 water circulation against the impervious <sup>18" thick</sup> Devonian shales.  
 First shales up to 6 inches, then a little bed with the stones  
 ranging from 1 to 4 inches, then 6 or 8 with large pebbles  
 and more a few stones. Then 80' of more with some  
 of these large pebbles and many black flint pebbles.  
 Then about 60 feet of lighter colored beds with some  
 more but without conglomerate of any kind. Then 40 feet  
 with small and large pebbles. No shale up to this  
 point, all being bedded in a more or less vertical  
 position. Now the series is then more bedded and is  
 very thin shale <sup>almost negligible in amount</sup> between the pebbles or thin shaly thick-  
 ness of the same. It is 20 feet. It is bedded in the same way.  
 This series is 540 feet and if anything my  
 estimate are under the mark. The Penn. Survey has 460'.

The Penn. Survey makes two series of Onondaga  
 Onondaga conglomerate 290 feet  
 Lower conglomerate 170

To me this is all one series. Local conglomerate  
 in Onondaga, but found none. It is, however,  
 unmistakable = Adirondack.



Reading - Port Clinton, Sep. 13-14/14

Left Reading by trolley for Allentown (1 hour) and  
then for Reading (3 hours). Got 3 P.M. in Phil. and Reading  
for Port Clinton at 4 P.M.

Went at the wagon bridge over the Little Schuylkill  
- the red later shales and interbedded sandstone and  
This is beside the Shangri in head of the P. and R. R.  
and said to be very 2600 feet thick with the top not seen.  
The base of the mass is the lower shales

and the cut of the Phil.-R. R. is about 1000 feet  
in the river valley  
Beside the large Schuylkill  
on the P. & R. R. we see the same series

and stratigraphic series of the Upper beds was  
justly at the top of the beds. There are 2 faults here.

On the Penn. R. R. above the city of Reading, the  
section shows even better a greater series of beds coming out  
from the same source

upper beds of the same series. For  
they have at their base green and red shales just  
I saw yesterday. However these red beds here are  
then just under the sandstone while elsewhere they  
first appeared 150 feet down down. As I did.

not see the top, the Medina evidently I did not see the upper Medina sandstone.

In any event it will be best to disregard the same (or no division) of the Penn. <sup>and to regard them</sup> Surry as one series of dominantly sandy shales with masses of sandstones and of the same character as those seen yesterday in Lehigh Gap. The two sandstone members within the Penn. Surry I do not think have any value. Their divisions are as follows. -

? Medina upper sandstones - - - 90 feet  
These I did not see and should have seen <sup>if present</sup> them -

Medina upper shales ? 480

These may be seen just west of station and it is

here where the red shale <sup>along the faulted zone</sup> occurs. It is

Medina lower sandstone 60

If I interpret these correctly they appear in an anticline just opposite the <sup>at</sup> station.

Medina lower shales 600

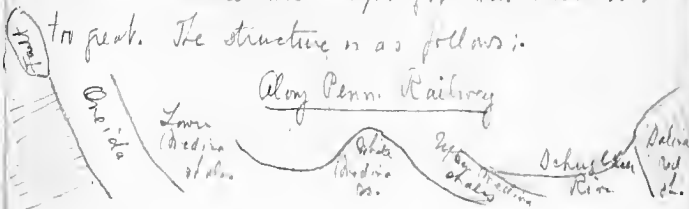
From the station eastward in a syncline

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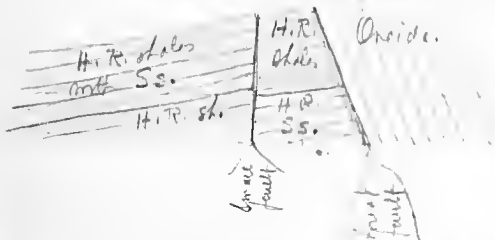
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I rather think the Penn. Survey did not make out the structure and therefore got their thicknesses too great. The structure is as follows:



The Onondaga - Hawangunk contact is as follows:



Onondaga - Hawangunk. A white to grey heavy bedded quartzite, even bedded and with all the congl. in the lower 4 to 8 feet, where the pebbles are of to 3/4 inch, higher if one sees them in the bedding planes. The Penn. Survey gives the thickness as 200 feet and this is correct as may be seen in the Penn. A.R. cuts.

Arthropods I saw 4 feet above base and  
a few at about 90 feet above base. Saw them twice  
again in loose blocks. They are here more abundant  
than usual.

Only estimates of thickness are as follows:-

Shawangunk at base - - - 200 feet.

A good deal may be faulted out so that the  
thickness may be here as great as in the  
Schiff Exp. = 520 feet.

Lower Medina Shales and oo. Estimated 600 feet

Middle Medina sandstones " 25 "

Upper Medina shales " 310 "

---

935 "

Saw no fossils other than bryozoa. However  
I rather think these shales go into Clinton  
time.

The Schick Kill Cap is the least signifi-  
cant one of these seen with the present rock ex-  
posure. Of the Hudsonian shales there are  
good exposures, and if fossils are present they  
should be found here.

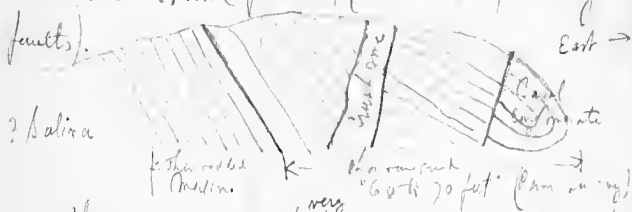


Hamilton, Ont. Canada Sep. 14 1914  
with reading but - and it is all along at 9  
A.M. - in a chert in the Rockville which seems to be  
the same as at Toronto.

To my great surprise on the northern side of the Blue  
Mt. about 3 miles north of the two well known Pines  
the quarry gave to me in Hamilton large banded blue  
sandstones. They stand a bit and in the middle of the  
quarry were quartzite, gneiss, schist and many  
other rocks of sandstones with an occasional  
shale one. These are <sup>than the quarry in the Hamilton</sup> quartzite, gneiss, schist  
granite, basalt, diabase, gabbro, and other igneous  
rocks (high area), quartzite, gneiss, schist, and other  
igneous (low area) and in abundance of granite inside,  
and the rest is quartzite and schist and other igneous  
rocks and other igneous rocks. The horizon  
is quartzite and schist and other igneous  
rocks.

at Hamilton or rather eastern side  
of Hamilton as Hamilton  
is quartzite and schist and other igneous  
rocks. Made it out later  
after going west where the red Upper Devonian is a real piece

at. walked east along the Penn. R.R. and there I saw the base of the Silurian. From the top of the hill I could also see that it made riffles in the Casquehanna river. The Hudson River cannot be made up here as the relief is not high and then too the Silurian is overturned, and faulted (small compensating faults).



Shannonville. At the base is a quantity little bed sand like Spalding. could not make it out. pebbles are well rounded and large averaging 2 to 3 inches; some go to 5 inches and many are smaller. I should say that with the red are pebbles.

Smaller pebbles  $\frac{1}{8}$  -  $\frac{3}{16}$  occur in the river 10 feet. The rest of the series is a coarse quartzite, <sup>devoid of pebbles</sup> the whole is said to be 60 to 70 feet thick. This thickness is correct as one sees it now but certainly some, or only a much, is faulted out. Seemingly it does not exceed 100 feet.

Medina-Clinton. Following gradually up the  
Oreosa in the Medina series of thin bedded <sup>chertish</sup> sandstones  
with interstratified shale. About 30 feet is to be seen  
and then the <sup>side</sup> <sup>hill-</sup> <sup>side</sup> <sup>with loose detritus.</sup> <sup>is</sup> broken down and covered.  
The Pennsylvanian <sup>is</sup> from 300 to 400 feet. In the central  
part <sup>Medina-Clinton</sup> <sup>is</sup> <sup>seen</sup> at <sup>the</sup> <sup>base</sup> <sup>of</sup> <sup>the</sup> <sup>hill</sup> <sup>along</sup> <sup>the</sup> <sup>ridge</sup>.

Higher up saw red shales, <sup>stone,</sup> <sup>so</sup> <sup>that</sup> <sup>the</sup>  
bedding is nearly close to here. If there is bed. in it.

From the topography it does not seem probable that  
beneath the Oreosa there can be a great quantity  
of sandstone. It is all out here. This is a significant  
fact for at 2 miles across the strike to the west  
is the greatest thickness. <sup>is</sup> <sup>a</sup> <sup>near</sup> <sup>Lewis-</sup>  
<sup>ton</sup>.

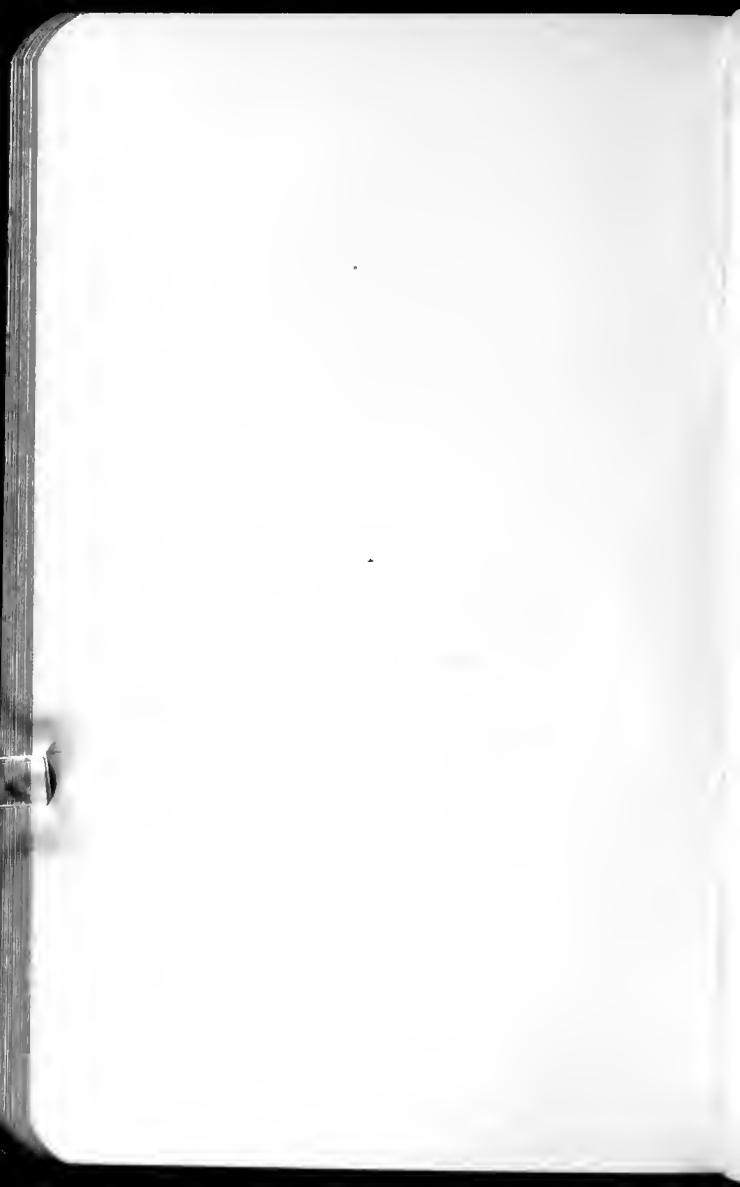
- 5/11 - leaving at 2.45 and got to Lewisston at

7438 / contin. in  
doc. 110















- 6 Near Allentown. Section 100  
 Elevation at 10 feet.
- 7 Same section above the base of Section,  
 at least 100 feet.
- 8 Same a little different view. Section 100  
 at least 100 feet.
- 8 Note quarry near Section. Distance of Section  
 alteration of Section changes.
- 9 Section the same as 10.
- 10-11, 12 High Falls at the north side Section  
 the distance Section.

A

1/2

1/2

1/2

1/2

1/2











Film 2

1-2 km crossing on base of Salina at 8:25 J. E. Ref. 9.

3-4 Base of Salina into Sub. East into Ref. 10. Pa. 1/15

at 1000 ft e. W.  
at 1000 ft e. W.

lyn  
ae



Sherringtonville Clinton -  
Medina Genuine  
Clinton Rochester Salina Tentaculite

Kingston, N.Y.

none

none

none

none

none

present

Rosendale, N.Y.

present

none

none

none

32-35  
37<sup>72</sup>

present

High Falls, N.Y.

250

250

none

none

none

25  
10  
30  
30 } 80

present

Ottisville, N.Y.

750

900

? 150

none

none

? 1000

present

Delaware Gap, Pa.

1600

1600

none

none

1500

present

Lehigh Gap, Pa.

540

1250

710

none

none

? 1275

present

Schuylkill Gap,

? 200

1135

935

none

none

2600

Jusquehannah Gap,

? 100

500

400

none

none

present

Lojans Gap.

613

2700

2100

2075

73

348

present.



doc. 0109



THE COLEMAN  
LEWISTOWN, PA.  
R. K. NOLAN, MGR.

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