Trip of 1907

doc.0093

New Jersey, Maryland, Virginia and Tennessee.

Massanutten Sale 11, 12
North Mountain " 14
Piney Rem " 15
Stanford " 16
Great Capapin " 17
D. B. B " 20.
Keezer " 24

doc. 0093

Note Book of
Charles Schuchert
Yale University
New Haven, Connecticut.

1907.

next page
2932
2933

If found by any one please return to above address.

Trips in Mesozoic of Atlantic border and Potomac - Lurray section, and Tenn. with Reids.

date rec'd	place shipped from & coll. dates ↓
2932	July 4 from Vincentown, NJ Jul 1 – Jul 3
2933	July 6 from [illegible] Jul 4 – Jul 5 Md
2938	Aug 7 from Cumberland, Md July 9 – 25
2939	Aug 3 from Louisville, Ky Jul 26 – Jul 31
2941	Aug. 22 from Cleveland, OH Aug. 12 – Aug. 13
2942	Aug. 22 from Niagara Falls, NY + Ontario Aug 15 – Aug 17
2944	Aug 26 from [illegible] Aug 12 – 13
2947	Sep. 3 from Perryville, TN Aug 8 – 9
2948	Sep. 9 from Nashville, TN Aug 1 – Aug. 3
2949	Sep. 11 from Camden, TN Aug 4 – 7

Phil Schuckert 1202 Linden Ave. Canton Ohio.
Miss S. Stutig 1055 Academy Ave.
A. F. Schuckert. 119 E. Seventh. Cin. O.
T. A. Bostwick.
R. S. Lull.
M. Corcoran, 59 Hall. New Haven, Con.
E. A. Callahan 472 Orange. " "
T. E. Savage, Urbana, Ill.
R. O. Baesler. C. A. Ulrich.
R. H. Gordon. Frank Hartley.
L. F. Mills 192 Seneca St. Auburn N. Y.

Mail to
July 1-2 Vincentown N. J.
Ship to July 8 Harpers Ferry, W. Va.
Ship to July 15 Martinsburg " "
Ship to July 22 Care of R. H. Gordon.
Ship to July 27 Nashville Tenn.
Ship to Aug 5 Camden Tenn.
Ship to Aug 7 Perryville, Tenn.
After this care C. H. Gould, Norman Okl.

Weller's Correlation Table. Ann. Rep. N. J. 1904.

Remarks.		Cook 1868.		Clark 1892-1894			Weller 1905
Green sand. Fossils.	25'	Upper Marl	Ash marl Green marl	Manas-quan	Manasquan marl	D	Manasquan
Glauconite with sand	45'	Yellow sand			Yellow sand		Long Branch
Laminated green sand. Shell layer T. harlani. Bryozoa beds above at Vincentown. Lower marls have bones	45'	Middle Marl	Yellow lime sand	Ran-cocas	Vincentown	C	Vincentown
			Shell layer Green marl Chocolate marl		Sewell		Sewell
Red due to oxydized glauconite. Some fossils but few.	100'	Red Sand	Indurated green earth Red sand	Mon-mouth	Red Bank sand	B	Tinton
			Dark micaceous clay				Red Bank
Green sand, and sand. Many fossils occur 300 species	30-50'	Lower Marl	Marl and clay Blue shell bed Bed marl		Navesink marl		Navesink Mt Laurel
Fossils rather rare. Not yet worked out.	275 to 400	Clay	Laminated sands	Mata-wan	Mt Laurel sand Wenonah		Wenonah
					Marshalltown clay marl	A	Marshalltown
					Columbus sand		Columbus
		Marls	Clayey green sand		Woodbury clay		Woodbury
					Merchantville clay-marl		Merchantville

Raritan a
Plastic clays. Basal Upper Cretaceous. 345'–400'

July first. Barrell, Reeds and Noble at Philadelphia. First train on Long Island road to Vincentown. Stay there 3 days. Have the following papers.

"Upper Cret. Form. of N. J., Delaware, & Md" by Clark.

"A Preliminary Rep. of the Cret. & Tert. Form. of N. J. By Clark.

The fossiliferous "Iron Marl" may I think be seen about Milton and also East of Crown Stolly. Ask about this at Vincentown. If so take this drive from Vincentown.

See my Cecil County Map
for roads and geology

[Look for unconformity. Said to occur
between these formations]

Perryville, Md.

Walk along P. R. R. track from Perryville to Charleston then across country to B. & O. R. R. and north to Perryville. Distance 1½ miles.

See paper "The Stratigraphy of the Potomac Group in Md." Clark - Biffins.

Section 1⅛ miles E. of Principio Creek (P. R. R.).

	Recent. Loam with gravel	5'
	Raritan. Fine white sand.	11'
	Brown loamy sand, bearing gravel and ochre towards base	12'
Potomac — Lower Cretaceous	Patapsco. White clay, somewhat variegated and ravigated; at times graduating over into micaceous sands; changing to sand, ochre, conglomerate toward base —	10 - 20'
	Dense ravigated clays,	10.
	Jurassic Patuxent under ground.	

Fogs Hill on B. & O. R. R.

Patapsco. Buff sands, water bearing at base	25'
Dense ravigated clays	10 - 30.

In places with considerable kettles.
The upper zone of clays with kettles.

See Spencers The Geol. of Masanutten Mt.

Baltimore Md.
Sate School House, Hill. Lee 1.482.
Federal Hill. Lee 1.484.

Harpers Ferry. One day to see the immediate region. Then to New Market across Massanutten Mt to Luray. Enquire here about driving across to Seven Fountains, Fork Clam Roads to Woodstock. Then to

Martinsburg.

North Mountain. Stop at Martinsburg.

Great Cacapon. Hotel here.
A long section from the Medina to Hamilton.
Enquire about cutting between here and Cumberland.

Dr Clarks Physical Features of Md.

and

Schuchert's Lower Devonic and Ontario formations of Maryland.

Hancock. Also on the road on the river front from the other side.

Cumberland. Look after Hartleys new localities. Then one day

Cash Valley across to Devils Back Bone.

Pinto section. One day

Twenty-first Bridge, Keyser quarries and Judge Aldines. One day.

Then to Nashville, Tenn.

Nashville Tenn.

Reservoir Hill and hill just N. E.
Here Orthorhynchula linneyi and large
Leperditias.
A little E. the R. and probably less than 20'
lower are other quarries with an abundance
of Tetradium and Columnaria.

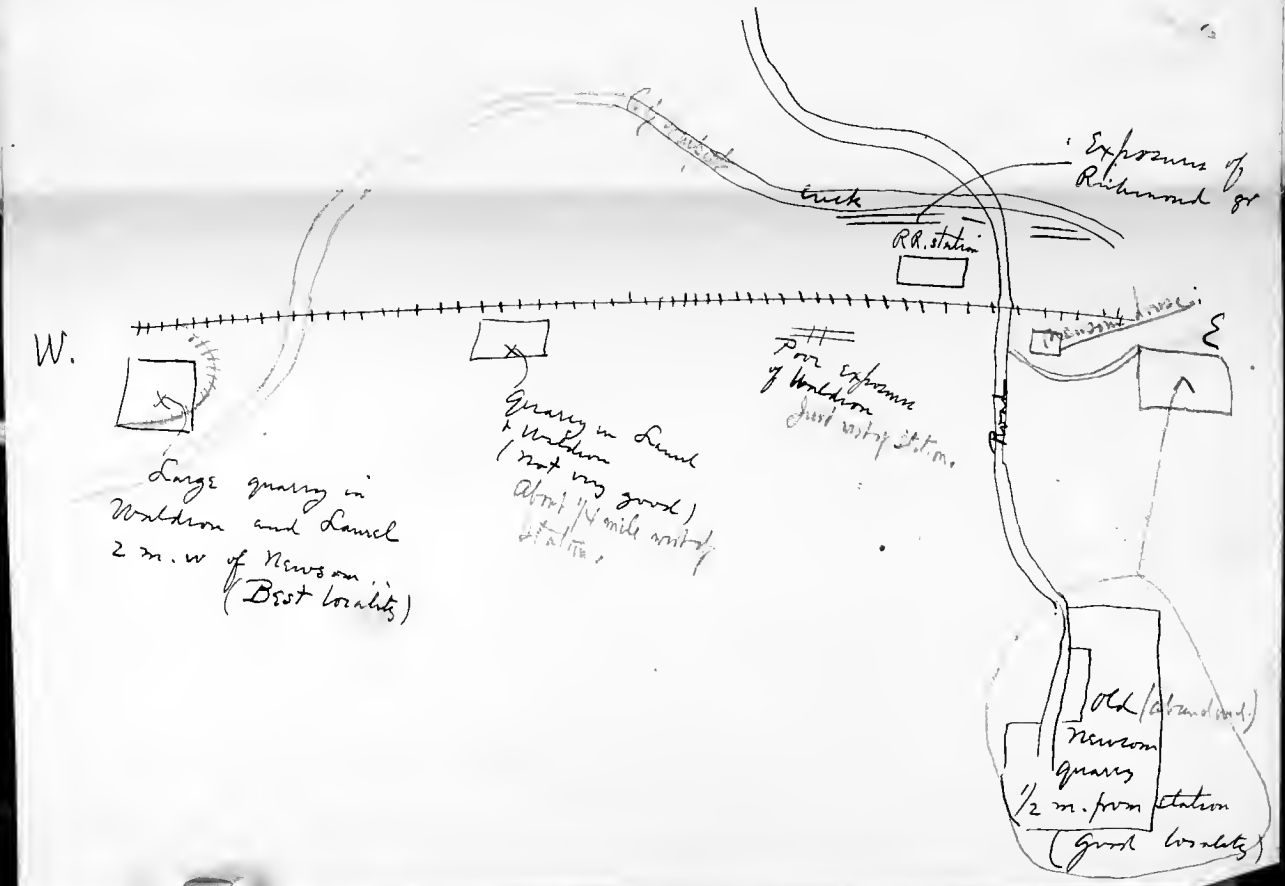
Naegli's Hill for an extensive section
in Orthorhynchula and Tetradium horizon.
The section is as follows:
Upper Bryozoa beds or Raphinesquina zone.
Then 20' lower
Orthorhynchula horizon.
Then 12' lower
Tetradium zone.
Then 15' lower
Soft shaly limestone.
Then 8' to road at South end.
These are the Capitol Hill limestone beds
of Safford, the transition beds between the
Trenton and the Cincinnati beds.

At Anderson may also be seen the Onondaga above the Silurian or Lego gone = to Louisville. Look here for Nucleocrinus verneuili, Strophodonta demissa, S. perplana Rhipidomella penelope, Nucleospira concinna.

See Foerste "Silurian and Devonian limestones of Western Tennessee."

Newsom localities.

There is but one house at Newsom and I was never able to get permission to stay over night there. You may have the same experience so I would advise staying at Nashville and going back and forth to Newsom by railroad. The fare is small and the trains arranged conveniently for putting in long days collecting. The sketch below gives the best localities



Camden. Tenn.

Best Oriskany locality just on the outskirts of the village. To the west of the village I secured nothing, or little.

The chert is from 12-15 feet thick, overlain by shale 6-7 feet thick. Is this the Black Shale? Over that is a 2 inch limonite band. Above this loose sand [= Harden? Oriskany acc. to Foerste. He gives the Camden here as 60']

Helderberg near Camden. South.

One locality is near Chaseville on Wolf Creek up Stream from the wagon road going from Chaseville to Hollidays. About six exposures in a quarter mile from the road. Thickness about 20-25'. Overlain by Camden chert, not exposed, only saw broken chert.

Between 4-5 miles N.-E. of Hollidays toward Camden along side the road are two fine localities of Helderbergian. 35' shown. Lowest beds have Michelinia and Favosites. Bryozoa higher up. Phacops from upper portion.

Foerste gives this locality as 5 miles north of Big Sandy Station on the Lower Camden road.

Big Sandy. North of Camden.

By wagon from Camden to Big Sandy and then 6 miles south to Tom Barnes is a fine Helderbergian exposure, about 10' thick, with Camden above. Above a recent blue mud deposit. See if one can drive direct to Tom Barnes and then to Big Sandy.

The Camden is well exposed in a small quarry to the west of Big Sandy Station. About 2-3' thick. Spirifer and Eatonia common. It is often seen along the road the most western road for six miles south of Big Sandy. Foerste says 5 miles S. of Big Sandy Station on the Dixon Camden road may be seen contact between the Helderbergian and Camden.

Pace, Henry County. Tenn.

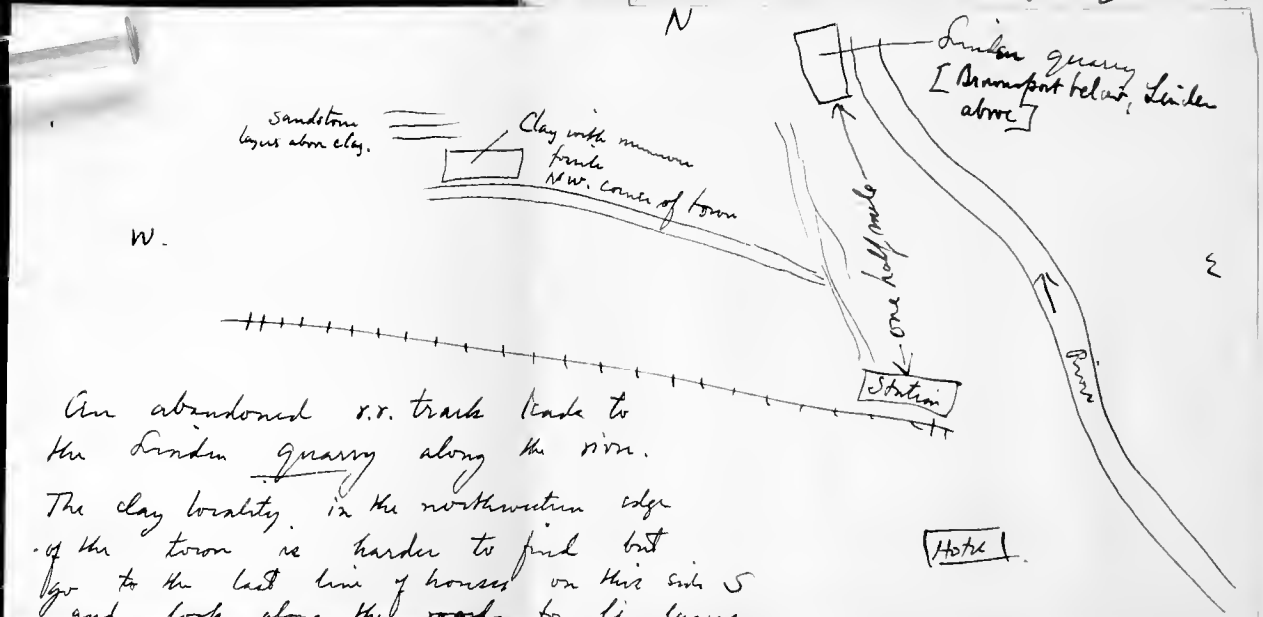
Fourteen miles north of Big Sandy Station (5 miles up from mouth of Big Sandy River) to Saffords Williams Mill. The exposure is on Benton county side, about 30' thick. Lowest layers Atrypa reticularis, higher Anastrophia followed by Orthis beds, with Orthostrophia (these are in the center of the Orthis beds). Phacops occur from and above the Anastrophia beds. Also Gypidula(?) Pate called this locality Swaynes Old Mill.

One locality is under bridge at public road near Lashleys store. See for the boy Robt Lashlee, Pace, who sold me fossils. at 50¢ per box cigar.

Another locality at old mill site about one mile above (? South).

Pate said get team at Big Sandy Station. See {At the Williams site Foerste says Camden Maybe {seen 50' thick and more.

Perryville. Helderbergian (Linden).
On railroad Camden - Lexington - Perryville. [See next page]



An abandoned S.R. tracks leads to the Linden quarry along the river.

The clay locality in the northwestern edge of the town is harder to find but go to the last line of houses on this side S and look along the road for li. lenses

Also see railroad cut between Perryville and Parsons for Haldeman fossils. It is 3 miles east of Parsons or 3½ miles west of Perryville, Tenn.

Fine Camden chert fossils around Decaturville which is southwest of Perryville.

Decaturville. or rather Alexian Spring

Roemers collection were made in a radius of 5 miles around Alexian Spring, located on the old Colonel Wallis Alexian farm, 3 miles south of Perryville. This is the "glade" hill country. The horizon is the Brownsport (above the Baldwin) = to the Louisville. Brownsport Landing is about 5 miles S-E. of Alexian Spring, and 3 miles N. of Vice Landing.

The Brownsport consists of whitish clays and soft limestones usually found in the open "mound glades". Can easily be seen in the spring fly. Alexian fossils below are red, from the sponges. One of these mounds a ¼ mile N. of home of Noah Butler, on road from Vice to Perryville 2½ miles N. of Vice. Another ½ mile farther west.

93' thick here. Others eastward on road from Dixon Spring to Tenn. River, many more S and S.-W. of the Spring within a radius of a mile.

Those between Dixon Spring and Perryville are mainly in the Glendick and Dixon zones.

The section here is as follows:-

Hardin sandstone
Camden chert } = Oriskany | Camden 60' at Camden

Linden li. {Upper or Pyburn / Lower or Ross li. with Camarotoechia

Brownsport 100' Upper part of tile li. with shales below. Astraeospongia above.

Dixon clay 30-45' Red clays with Fistulipora

Lego li 30-45' = Laurelville li.

Waldron.

Pyburn Landing at White Sulphur Springs. Here is a fine thick section of Helderbergian 100' thick. See Foerste p. 683. If time is at hand go here.

Perryville.

On the quarry ½ mile N.E. of the station is found the Brownsport below followed by the Leiden = New Scotland. Its as follows:-

Leiden base has Orthothetes woolworthanus, Rhipidomella Nata, Atrypa reticularis.

Lower third of Leiden 10½ feet. Solid crinoidal rock with few fossils.

Middle third 11½ feet. Richly fossiliferous. Soft rock, partly crinoidal with clay beds. At base Strophodonta beckii, Strophonella punctulifera, L. woolworthanus, Calmanites micrurus. Very rare Uncinulus schuchertii. Above this basal zone there is more clay with many small brachiopods.

Upper third, 15 feet. Fossil clay. Exposed in the northwestern corner of the town and is overlaid by thin layers of lt. buff bryozoans, in a bed 1½ feet thick. Only bed above which may be the Hardin sandstone. Common fossils about Perryville are loose and from the iron ore gravels.

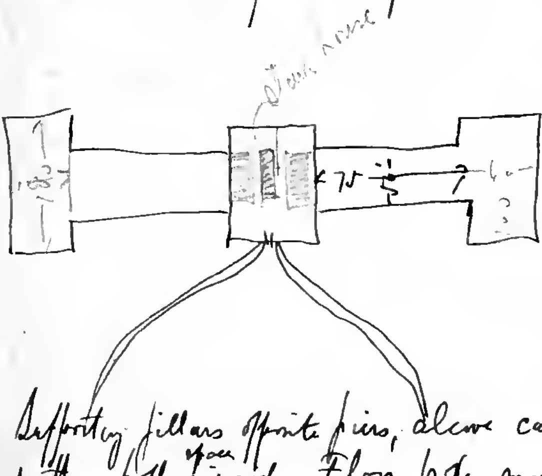
Tuesday June 25 - 1907

Bronx Botanical Garden.

Museum building.

A grey brick building with pillars of sandstone. Approach from each side around a central fountain to central doorway. In this like the museum at Prag. Effective. Three stories, 2 above general door way and one below. Basement fossil botany, First floor Economic Botany, second floor Systematic Botany.

Windows high above floor double with a transverse window or transome. Piers about one-half the width of the window. Floor plan as follows:-



Supporting pillars opposite piers, alcove case built round them, hollow space inside. Floor broken marble and 'ste. Inside color whiting. Cases oak.

In the systematic collection but one or two [illegible], each family is shown and these are for illustration in black & color. These are on a [illegible] [illegible] rock-ground framed in oak as follows. (deep [illegible] depth of case. Exhibits in part [illegible] as [illegible])

Special [illegible]
Ovoid [illegible] labels.

Zoological Garden.

[illegible]

[illegible] 12 miles. [illegible]

[illegible] Mathews - [illegible]

Alligators [illegible]

[illegible]

[illegible] along the [illegible]

on their belly. In the water which is very shallow they also use their legs in swimming but it is here chiefly the tail, which is flattened from side to side just as in snake [illegible]. From the use of the tail that I have seen these legs are powerful swimming organs. On the land they prefer to crawl if possible, rather than to walk lifted on their legs.

Princeton, June 26-30-1907

Arrived here about 4 P.M. on the 26th and next day visited [illegible] of the 24th field [illegible] Vance [illegible] at Lawrenceville [illegible]. [illegible] 34 men (18 finals and 16 preliminary). The work is uninteresting but the men and the candidates are the [illegible].

Chief at Lawrenceville Mr [illegible] [illegible], the young master [illegible] who called my attention to the horse bones

in the exam. room Saltonstall.
another son is taking prelim. exam
here for Yale.

Philadelphia June 30 – 1907.

[illegible]

[illegible]

2932

July [illegible]

[illegible] south [illegible]
[illegible] the [illegible] [illegible]

	1'	Soil about 12" thick
	3'	Loamy [illegible] colored [illegible]
Pleistocene		About 3 ft. [illegible] irregular surface
Marine but no fossils.	3'	Sandy conglomerate [illegible] [illegible] Limonite [illegible] 1/4 inch [illegible]
		Limonite. [illegible] 4"-6"
Cretaceous Manasquan.		Green sand [illegible] [illegible] Shark Teeth. [illegible] feet [illegible] Green Marl of "upper [illegible] Bed."

[illegible] man. [illegible]

To begin [illegible]
[illegible]

15 feet [illegible]
[illegible]

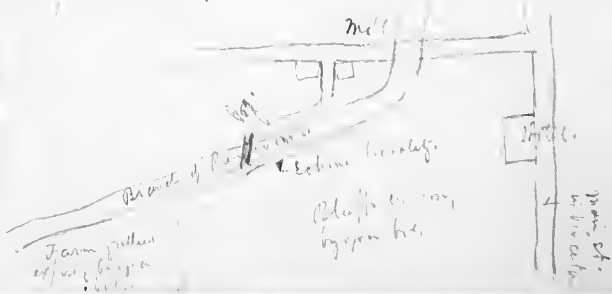
[illegible] John C. Brick

Vincentown [illegible]

Started out early down the stream to [illegible] other [illegible] I saw no other possible [illegible] places than the one of yesterday. [illegible] to [illegible] and then to [illegible] [illegible]

The country [illegible] Pleistocene mantle that it is rarely [illegible] [illegible] in the vicinity [illegible] stream [illegible] a little hilly [illegible] and [illegible]. A rich agricultural [illegible]

Late in [illegible] revisited the [illegible] [illegible] Found ten more [illegible] than locality [illegible] [illegible] about 150 feet of stream [illegible] stream is crossed. [illegible] thus:-



Vincentown July 3- 1907

doc. 93

This July 2 sketch map of Vincentown locs. is wrong. He has Mill & Main St. & Hotel all ok. with North toward top of page. But— everything else is wrong. - see 7533 + doc.----

C. MacClintock
1992

AGE:.....

.....

MAJOR AREA & MAP

ORGANISMS:

.....

COLL. OR LOC. DESCR.:

Vincentown July 3 - 1907

Packed material and shipped one small box via express.

In reading Clark's work on the [illegible] Cretaceous one is impressed with the abundance of green sand or glauconite. In fact all the formations may be said to be in the main of this sand. As one goes south the beds become more [illegible].

Barrell thinks the Cretaceous shore line may have extended to the Blue Ridge in which case it must have also existed in the Great Valley but not to the west of the Alleghanies. In Connecticut it extended to Hartford. His argument for this greater extension is due to the way the [illegible] cuts across the Crystalline structures. It could not have done this and then not be so the Cretaceous [illegible] which this river has cut its valley and as these were stripped away it became to [illegible] through the ancient rock. [illegible] its [illegible] course to the sea.

[illegible] 35 [illegible]

a [illegible] [illegible]

seeing the hotel car [illegible]

[illegible] where one [illegible]

hotel.

[2933]

[illegible]

[illegible] as [illegible] and [illegible] and [illegible] this [illegible] day [illegible].

[illegible] sand [illegible], [illegible] or in a sand pit on the [illegible] [illegible].

Surface

Jellwkcomposed [illegible] sand [illegible] clay [illegible]. 1-4 ft. [illegible] a [illegible] deposit.

Bluish-white gritty [illegible] sand [illegible] Same as above 1-4 inches.

Patuxent? [illegible] [illegible], clean [illegible] sand with a few [illegible] rounded, small pebbles. Irregular [illegible], Crossbedded. [illegible] sand.

7 feet seen.

The [illegible] between the [illegible] shale and [illegible], the [illegible] and [illegible] at Potomac ([illegible]) and looks most like a coarse beach sand [illegible] washed [illegible]. Then a sudden change [illegible] in the layered [illegible], followed almost immediately by another change, [illegible] the [illegible] [illegible] [illegible] the [illegible] in the [illegible] [illegible], [illegible] as they are on the shore. The white sand is [illegible] probably a beach sand.

See section on p. 51

2933 P.R.R.

In the cut 1 1/8 miles east of Principio Station the "dense variegated clays" present in railroad cut of fully at least 20 feet are very red almost vermilion. These are clays somewhat gritty and distinctly but irregularly variegated or rather mottled. Did not see here the white clay iron staining zone. Barrell has clay of the Patapsco [illegible] from about 20 feet above railroad track. Higher up comes in at once the brown loamy sands or pure white sands of the Raritan. This is the Raritan [illegible] we find the iron also.

Farther east lower down, the Patuxent comes in. These are more sandy beds, sometimes variegated, having an abundance of iron. These iron layers have at times considerable plant remains of a woody nature. One large piece with [illegible] remains [illegible] [illegible] [illegible]. Here some fragments of it [illegible] some of the sand. The iron ore [illegible] the idea of swamp iron [illegible] them. Here we also had evidence that the layers, drift iron had been, [illegible] mud deposits. Barrell has the evidence. This evidence that is more certain [illegible] established the nature of these deposits to be rather [illegible], marshes [illegible] the area. In other words the Patuxent [illegible] of blue sand may be [illegible] shallow sea, filling its margins with [illegible] deposits.

In general one gets the impression they [illegible] a [illegible] come in for a short time, depositing the white, coarse, sharp, angular sand with rounded pebbles up to pebbles, later followed by more or less [illegible] conditions impregnating depositing bog iron ore.

In some places the white sands of the Potomac [illegible] is full of rolled pebbles. These are where removed from their [illegible] distinguishable from the Pleistocene pebbles in being almost white [illegible] whereas the latter are stained [illegible].

At Charlestown we took the [illegible] road to the R.R. and came on the line B. & O. a little east of Frogs Hill station (see section infra) [illegible] north of the station one sees the variegated clays on one [illegible] deep road [illegible] narrow and [illegible] red [illegible] where the same clays are leached to white or bluish white color [illegible] several hundred [illegible] [illegible] the [illegible]

[illegible]

[illegible] [illegible] [illegible] [illegible]

[illegible] and the [illegible] [illegible] are [illegible] unevenly. In some places on the same horizon there will be a sandy [illegible] clay [illegible] [illegible] between [illegible] [illegible] more. In

other places it will be a mottled clay and in still another sandy. In still other places there are considerable quartz pebbles not much rolled but with all the corners rounded. In other words it is a fluviatile deposit of rivers coming off of a country of metamorphosed rocks.

In general the sequence seems to be as follows:- Towards the close or at the close of the [illegible] the eastern shore of North America was probably a low lying land with elevations not exceeding 100 feet and without long deep [illegible] river courses as the present Delaware, Susquehanna etc. [illegible] depressed some and a very shallow sea made its appearance depositing a basal zone of well washed angular sand, with well rounded pebbles. [illegible] this shallow sea was silted up [illegible] in places more beach sand was deposited in other areas, those of lagoons or rather deltas was deposited fluviatile deposits of red or varie[gated] [illegible]. This condition became general during the [illegible] [illegible] continental deposits occur. Now a second shallow sea invaded in places more persistent than in others but nowhere are there any true marine deposits laid down. This is the Raritan or Plastic clays of the Cretaceous. A third and decided [illegible]

mergence sets in bringing in an abundance of marine life (the first time). Thus in the Potomac [illegible] Green sands and this submergence continues into the Eocene with the sea insides.

Today I saw nothing [illegible] the unconformities described by Clarke between the Patuxent and the Patapsco and between the latter and the Raritan. In the Potomac deposits are [illegible] [illegible] origin it seems [illegible] that the unconformities may mean nothing [illegible] The mean [illegible] but only after it has been shown [illegible] variations [illegible] the [illegible], that [illegible] much erosion has taken place [illegible] the [illegible]. Consider the [illegible] and the [illegible] of [illegible].

[illegible] nothing [illegible] [illegible] seen so much along [illegible] it is [illegible] [illegible] [illegible] in some of [illegible] this [illegible] [illegible] the Patapsco [illegible] print out, like those [illegible] [illegible]. The [illegible] [illegible] it along the Patapsco in the cut [illegible] Jackson Station,

Arrived at the hotel at 7.30 and Darrell left for Philadelphia on the 8.05. He will pack his material and ship it by express tomorrow.

Havre de Grace July 5 — 1907
Friday

Packed box for Darrell and left on the 8.48 for Washington. P.R.R.

All the way saw almost no Potomac deposits until near Baltimore, South of Baltimore for ten miles are seen many fine exposures and most of these are near the city. Baltimore all forest for six miles or so would be another fine place to visit.

Arrived at Washington at 11 A.M. Then visited the U.S.G.S. Saw Rogers, [illegible] and Spencer. Then up the Washington Monument and to Mount Vernon. In the evening called on Miss [illegible].

Washington Saturday July 6-1907.
Visited the U.S.N.M. Saw Merrill and Rathbun and Stejneger. In the afternoon visited Great Falls.

The upper broader valley of Great Falls is very plain above the Falls. The narrow gorge is sharp and [illegible]. The river sand seen there is coarse, and unassorted, dirty and of very variable sizes. It is not at all like the Potomac sand seen on Thursday.

In the evening called at the Cosmos Club and met [illegible] Chen.

2938

July 7-1907. Sunday.

Left Washington at 9 A.M. and arrived at [illegible] a little before eleven. [illegible] climbed the [illegible] and [illegible] view of the [illegible]. The [illegible] directly [illegible] of [illegible] Eastern Branch of the [illegible] in and the Potomac [illegible] and out [illegible] angle

The Weverton sandstone makes the two mountain ranges while the valleys in between are of Algonkian rocks. These are a much metamorphosed diabase making the Catoctin schist and into this has been [illegible] a granite often very coarse grained. It is of these ancient rocks that the material of the Weverton is composed, a coarse grained and somewhat conglomeratic sandstone. This series and the Harpers shale are much altered.

As the basal layers of the Shenandoah limestone are said to have Lower Cambrian fossils, the same as in the Antietam sandstone, the question arises how [illegible] deposits [illegible] west. Are they [illegible] deposits upon [illegible]? [illegible] the [illegible] in them. Do the upper Shenandoah limestones [illegible] from the [illegible] and [illegible] upon the [illegible] [illegible] the sequence [illegible] of the [illegible] limestone? These are questions of importance in paleontology.

July 8 – Sunday Harpers Ferry.
Intended to take the 6.00 A.M. train for Washington Junction but by a curious mistake saw the train go with Keith but Noble and I were left. Later Keith showed me his material. Contact between the Cambrian and Triassic he did not see but a short distance south of the supposed contact he came on the Potomac conglomeratic marble.
This conglomerate is made up of irregular angled and well rounded limestone pebbles bound together by a ferric cement. The pebbles vary from the size of sand grains up to large blocks as large as a human head. This well cemented zone is followed by one of a sandy nature in which limestone pebbles are also found but here they are [illegible] and friable and weather out. Farther east occurs generally and but also [illegible] one of a sandy nature in which the [illegible] fairly but well rounded and well assorted. Farther [illegible] is found [illegible] Keith found [illegible] shale with vertical beds [illegible] of Triassic age and beds of [illegible].
The entire material he [illegible] at

hand, as the largest rocks in the conglomerate are nearest the Cambrian and become smaller toward the east.

The dip in the sandstone and red shale from the car windows look as if 20 degrees northward.

Noble and I walked along the C & O R.R. for about 2½ miles to see the contact between the Cambrian (Antietam sandstone) and the Shenandoah limestone. While we did not see the contact yet the fault line is well marked for on one side is the rugged relief of the Antietam sandstone with the higher ground back of it of the Waynesboro shale, while on the other side is seen the very red soil of the lower ground with its undulating surface. The latter is the ground of the Valley and of the Shenandoah limestone. Examined all the surfaces along the line of march but saw almost nothing of an organic nature. Nothing determinable!

Not far from the Antietam sandstone was seen something suggesting crinoid stems and the quarry near by has sections which may have been small Orthoceras. Still farther

and saw nothing to suggest anything.
In some of the stone culverts I saw on the white limestone two [illegible] stylolites and a small [illegible] and [illegible]. These certainly are of [illegible] of the [illegible] [illegible] [illegible]. The limestone is said to come from Hagerstown Md. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Martinsburg. Later. These limestones look decidedly like those of the quarries at Martinsburg.
With the Shenandoah limestone [illegible] [illegible] feet thick ending abruptly at the fault line beside the Cambrian sandstone the question is at once asked how far eastward did this limestone extend? Certainly across the [illegible] [illegible] [illegible] and the [illegible] [illegible] limestone [illegible] [illegible] [illegible] [illegible] [illegible] of Maryland. Has the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] plateau, the area of the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] this is the [illegible] that [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] limestone [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] Further [illegible] [illegible] [illegible] [illegible] seen the [illegible] [illegible] [illegible] [illegible] limestone

which now seem to me like nothing more than the Mississippian, Cambrian and Ordovician strata nearer the source, therefore different physically, and in the centre of elevation, now greatly metamorphosed. The local source [illegible] these Cambrian and Ordovician strata lies in the region of the eastern Piedmont for here are seen surface flows of lava — the meta-rhyolite.

Left at 5:38 P.M. [illegible] Luray, first over the B. & O. to Shenandoah Junction and then via the Norfolk and Western. Arrived [illegible] [illegible] at [illegible] [illegible] [illegible] [illegible].

As we cross the valley we are in the limestone [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] seen [illegible] [illegible] [illegible] [illegible] [illegible] Massanutten and then the north end [illegible] [illegible] [illegible] in the evening light [illegible] [illegible] blue. As we go on it is seen that the [illegible] [illegible] [illegible] [illegible] several ridges. [illegible] [illegible] [illegible] the case [illegible] [illegible] [illegible] of rocks — an outlier — in a limestone valley due to [illegible] [illegible] in the valley syncline and the final preservation of removal is due to the Massanutten sandstone.

After the rain in the afternoon walked south of Luray. We saw but little limestone in the Shenandoah, the lower beds with bands of chert weathering into a deep red clay. At about 1½ miles south we came into calcareous sandstones also with chert bands evidently the Potsdam sandstone. Here [illegible] complete from the Cambrian to the [illegible] both Lower Cambrian & Ordovician. Saw not a trace of a fossil.

July 10 Wednesday. Port Cross Roads.

Left Luray at 7.30 and went east down over the Eastern Branch Shenandoah river the surface with many [illegible] sides. A little further [illegible] by the [illegible] the river [illegible] an extensive [illegible] in the Shenandoah. Arriving at the river it is plain that the stream has cut down its entrenched valley [illegible] recently [illegible] after [illegible] Massanutten and [illegible] back and [illegible] on both sides of the stream is young.

Soon we encountered the [illegible] shales with the [illegible] surface [illegible] with rounded boulders of a quartzite = Massanutten. [illegible] also

seen on the eastern slope at levels nearly 200 [illegible] above the stream.

Down at the mountain and not very far from the (life) first evidence of the [illegible] I collected in the shale [illegible] [illegible]tus bodi, Trinucleus concentricus and [illegible]. This indicates the [illegible] and I [illegible] [illegible] less than 200 [illegible] Massanutten and probably [illegible] 100 feet.

Towards the crest of Massanutten Mt. we see the [illegible] bedded white quartzite. Here a cleanly washed, white, coarse grained quartzite with [illegible] pebbles [illegible] rounded. The evidence of a Terrace is clear and further [illegible] has not been [illegible] from a great distance.

[illegible] south [illegible] we encounter (125 feet) [illegible] Hamilton shales [illegible]. [illegible] [illegible], also [illegible] [illegible], [illegible]tes coronatus, Pleurotomaria [illegible] forms, [illegible] and [illegible].

Second quarters [illegible] the body running the stone.

At 2 P.M. started out on an exploration trip. Soon saw, on the Seven Fountains road, some Hamilton fossils but did not collect these at the present.

At Seven Fountains saw excellent exposures on two hillsides of the Lewistown limestones. This is the locality described by [illegible]. The soil over these limestones is [illegible] as usual for limestones in this county. In the soil over one [illegible] fine limestone [illegible] seen silicious fossils [illegible] brachiopods, [illegible] and 2 [illegible]. In other [illegible] made [illegible] fossils [illegible]. [illegible] gives the thickness of these limestones as 93 [illegible] [illegible] —

the same [illegible] where about [illegible] [illegible] with [illegible] plates.

Above these limestones [illegible] [illegible] In the [illegible] [illegible] and [illegible]. This may [illegible] Oriskany, [illegible] no [illegible] the true Oriskany. (See later notes)

(This gone in the [illegible] of [illegible]).

July 11 [illegible]

Fort Cross Road, Virginia

One [illegible] east [illegible] in presence of Hamilton, carrying Coronetes coniatus. C. [illegible] [illegible] C. mucronatus [illegible] common, S. medialis (one [illegible]) [illegible] with mucronatus, S. granulosus (rare), Tropidoleptus carinatus common). Michelinia [illegible] common). [illegible]

This locality [illegible] and takes one [illegible] of the [illegible] formations [illegible] Hamilton.

[illegible] walked over to [illegible] in [illegible] these [illegible] All of [illegible] seven [illegible] of 93 feet [illegible] into [illegible] seen [illegible] [illegible] and. See the fossils.

Above the [illegible] in a cherty [illegible] Cr[illegible]

[illegible] Crinting and [illegible] in the(? [illegible]

[illegible] from 1000 [illegible]

[illegible] Talus

[illegible]

[illegible] some

(at first thought the dip [illegible] and made out the thickness as from 100 to 200 feet, but the dip is probably not great)

distance above the base [illegible] found [illegible] Leptaena Stropheodonta, [illegible] and crinoid [illegible] (have [illegible] those pieces). Then at [illegible] saw Ambocoelia umbonata. [illegible] than the Leptaena [illegible] Schuchertella [illegible] and [illegible]. All of this indicates (Onondaga) but nowhere did a single [illegible] any [illegible] turn up.

While at work about Mott [illegible] and Cherry [illegible] I changed this correlation to Kingston. The trouble is that this eastern thickness is near or more than 1400 feet.

Following [illegible] came in thin black smooth [illegible] with [illegible] Lingula and Orbiculoidea [illegible] of the Marcellus. These beds may be 100 to 200 feet thick before the higher Hamilton [illegible] comes in. [illegible] but saw only Cyrtina hamiltonensis. In any event [illegible] along the [illegible] the locality [illegible] on the [illegible] side [illegible] the [illegible].

The contact between the (Onondaga) shales and the Marcellus may indicate an [illegible] more [illegible] worked out [illegible] the [illegible] and in 1900 feet [illegible] that it came [illegible] limestone that [illegible] the [illegible] limestone [illegible] 20 feet [illegible] the [illegible] the true [illegible] Finally [illegible]

[illegible] attached pebbles like those of the Oriskany conglomerate layer. It had in it a [illegible] much like [illegible] and [illegible] of [illegible] or Pennsylvania [illegible]. Can they have been [illegible] in place [illegible]

[illegible] Later - this certainly was a piece of Becraft li. indicating that there were eroded out here. The pebbles attached to it were like those at Cherry Run.

[illegible] the upper Massanutten [illegible] Tentaculites [illegible]

(Faulted down Upper Massanutten sandstone)

[illegible]

This is the Upper Massanutten [illegible] faulted down. The sandy shales beneath must be Lower Massanutten, the fossils of which indicate [illegible]

[illegible]

Lower [illegible]

[illegible]

Cuningi (some very large ones [illegible] Platystrophia but have too many plications on side and sinus, 6 or 7), Orthis testudinaria, the are very flat, rare, [illegible] emacerata and Rafinesquina alternata.

These rocks [illegible] beneath the lower downfaulted [illegible] sandstone. The latter comes in sharp, a white sandstone [illegible] base with pebbles of [illegible].

Just above this [illegible] downfaulted [illegible] sandstone [illegible] collecting [illegible], Calymene callicephala, [illegible] many Orthis testudinaria (looks like meeki not the [illegible] running out on the range line). The [illegible] must be in the upper lower [illegible] while the [illegible] beneath the lower downfaulted [illegible] is certainly Lorraine.

[illegible] (a Triplecia) [illegible] Taonurus markings are [illegible] the road [illegible] just east of the stream.

[illegible]

[illegible] (smaller corallites) up to 8-10 inches in diameter.

[D1492]

[illegible]ites continues down the [illegible] further.
At 1950 feet altitude [illegible] pick up [illegible] of [illegible] in the [illegible] brecci.
At 2250 feet altitude [illegible]
of [illegible] and [illegible] [illegible]
[illegible] [illegible] specimens, [illegible] locality in [illegible] of
the mountain [illegible] road [illegible]
has a fine view of [illegible] over the Shenan-
doah. [illegible] at the bridge,
(Later. The same fossils were found in Martinsburg at [illegible] the Martinsburg shales)
There is no [illegible] continuous section
of the Martinsburg [illegible] than the one on the
road from [illegible] to Massanutten [illegible]
one [illegible] (see later)
to the [illegible] sandstone [illegible]
[illegible] in the upper Massanutten [illegible] and [illegible]
in the [illegible]
the highest [illegible]
sandy [illegible] into yellowish red, white
or mottled [illegible] shale. [illegible]
[illegible] and [illegible] more sandy [illegible] Massanutten.
[illegible]
one [illegible] black, to
the [illegible] the [illegible] from
the bridge, [illegible] the [illegible]

(This in large part derived [illegible] deviation quartzite at maximum of elevation

the coarse oolite and into this shallow sea was depositing the beach sand making the upper [illegible] mountain

The new cycle is now begun and [illegible] sea while not constantly advancing upon the [illegible] edge, was at first filled [illegible] [illegible] place and [illegible] the [illegible] [illegible] give evidence [illegible] [illegible] sea [illegible] were deposited [illegible] deposits [illegible] at times were exposed [illegible] sun-cracked. [illegible] dance [illegible] [illegible] the Cambrian [illegible] a normal sea still [illegible] of life. All [illegible] along the [illegible] the sea [illegible] not were [illegible] to [illegible].

While this elevation was going on, [illegible] the [illegible] and [illegible] the sea [illegible] the region towards [illegible] of the [illegible], the sea still existed [illegible]. Here [illegible] elevation the sea [illegible] shallower than [illegible] and the [illegible] of the [illegible] sand [illegible] was being carried out [illegible] constantly elongating rivers [illegible] and [illegible] known as the Chedima- [illegible] [illegible] [illegible] [illegible] [illegible] rivers [illegible] shallowing sea [illegible] are therefore [illegible]

June 13 – [illegible]

Woodstock to [illegible]

over the [illegible]

Left Woodstock at [illegible] 16 P.M. [illegible] of

Mottenstoney [illegible] We go [illegible]

here to the Valley [illegible] Rapids

Ferry, and then [illegible]

[illegible]

[illegible]

Not more than [illegible] (= Chautauqua)

noticed between [illegible]

[illegible]

[illegible] See later

[illegible]

or some additional [illegible]

[illegible] up 30°E. [illegible]

[illegible]

stay on the top.

[illegible]

[illegible]

the [illegible] pressure [illegible]

[illegible]

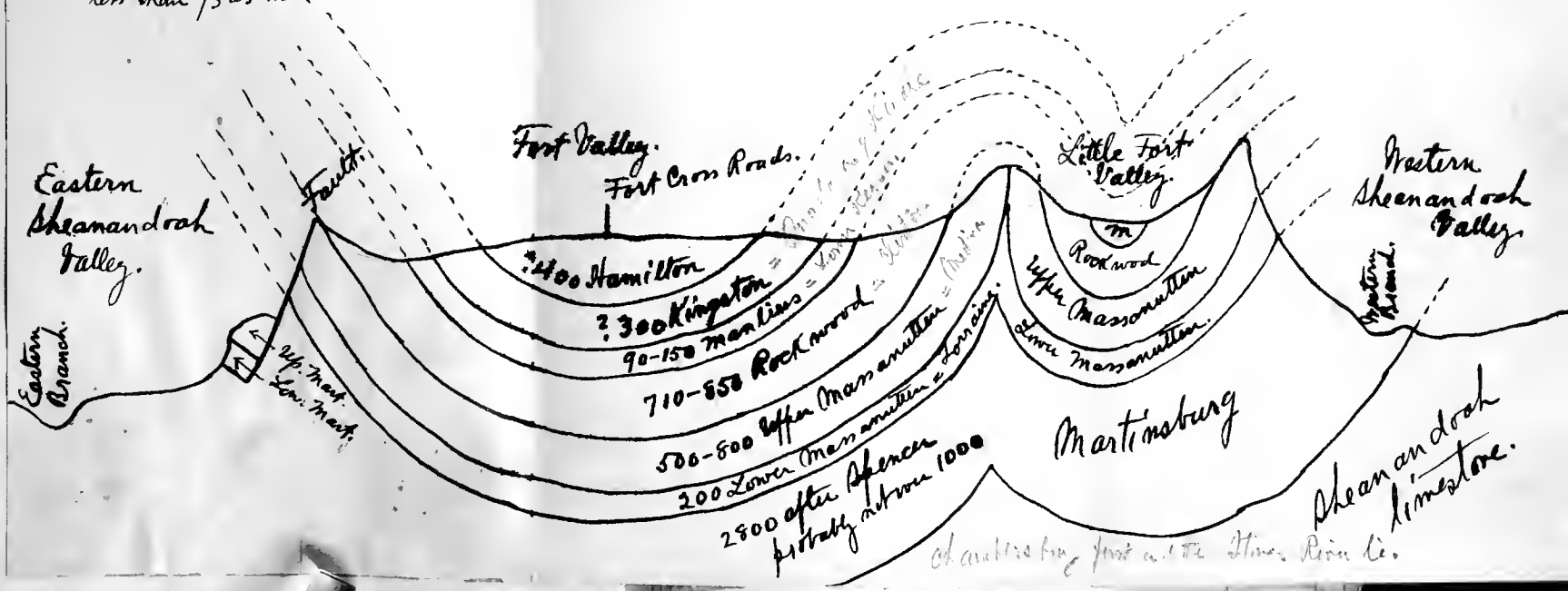
The [illegible] where the [illegible]

[illegible] phys-
[illegible] condition of [illegible] — [illegible]
[illegible]

[illegible]
[illegible]
[illegible], Com[illegible] are [illegible]
[illegible]
[illegible], as is to be seen late at Han-
cock.

Idealized section across Massanutten Mt. from east of Seven Fountains to Woodstock.

This side also has a small valley as on the west but less than ⅓ as wide.



[illegible]

It is these conchoidally fracturing light blue limestone in heavy beds ~~that is~~ quarried here on an extensive scale for lime burning. They end abruptly and then follows thinner irregular bedded and less pure limestones. Are all these upper beds (probably between 100 to 200 feet thick) to be regarded as Trenton and the light blue beds below the Stones River series? There is a very decided change in the limestone deposits at this horizon. The upper reminds of New York while the lower brings to mind the Stiff Ridge region of Kentucky. In the lower li. same ~~ooch~~-forgotten.

The Martinsburg at the contact with the limestone shows it ~~to be~~ typical ~~Utica~~.

Combined with the Grove Massanutten results it runs up into the Lorraine.

About 3 miles west of Martinsburg limestone appears again. Its lithological aspect indicates it to be the same series that underlies the Martinsburg near the city. If this is true the Martinsburg lies in a syncline and its thickness is probably that given it by Keith 700-1000 feet.

~~[illegible]~~ September 15-1908 Ulrich and Bassler have this sun cracked zone down the entire Shenandoah Valley. It is the Lowville. Have a slide of it. (1921 [illegible]).

[illegible]

In nearly all the cuts through the limestone from four miles east of North Mountain the strata are more or less vertical and those so seen all appear to be of these shallow water

deposit. The country rises considerably toward the mountain and the B. & O goes through the lowest part of it.

In the cut through North Mountain we started our word in the Becraft limestone where I collected considerable loose fossils. The [E673] lot with the greatest abundance of *Rhipidomella assimilis* is from about ten feet of the top of the limestone, while the smaller lot is from a [E672] zone about five feet lower. The Becraft limestone is continued upward by a shale series in which few fossils can now be had due to the mountain making. These shales become more calcareous towards the top. *Phacops* and a small cup coral are ~~the only~~ ones readily seen, but on breaking some of the limey pieces from ~~th~~ near the top of the series collected *Styliolina* ostracods, an *Orthis* and *Anoplia*. I have taken these fossils. The limestone has at least one zone of conglomerate.

The Marcellus black shale rests directly and ~~[illegible]~~ [illegible] on these Helderbergian strata. The two seem to be conformable but there is here absent all of the Oriskany and Onondaga. (These, the [illegible] of the Onondaga fauna.)

Above, comes in the Hamilton (the calcareous zone) near the base of which Reeds collected a slab with *Spirifer zigzag*, *Orthothetes* and *Chonetes* (See

(in the concretionary beds)
slate). Higher up Nolke collected *Tropidoleptus carinatus*, a large *Parenella*, and saw *Spirifer mucronatus*.

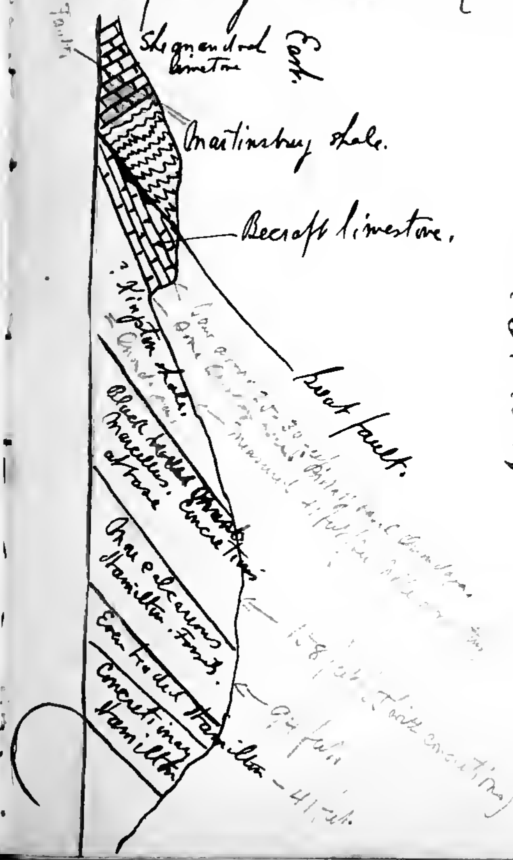
Nolke soon determined the overturned nature of the syncline but at first drew it as an anticline. Reeds saw nothing more than ~~an~~ a descending series ~~but~~ and did not make use of the overturned syncline.

Resting on the Becraft limestone is another greatly crumpled shale series which at first I thought may be Salina. After some work collected on the dump to the north of the tracks near a farm house several specimens of *Climacograptus*. The horizon is therefore Martinsburg and the great overthrust fault here lies between the Martinsburg and the Becraft. At this point ~~there is~~ there is therefore cut out some of the Helderbergian, all of the Salina, Rockwood and Massanutten.

Driving south from North Mountain station to Hedgesville I saw in a stone wall of the boarding house on the line blocks of what appeared to be the Massanutten and certainly blocks of the red continental

little deposit of the basal Rockwood. The ridge of North Mountain is considerable higher here and rises to the south and gives the appearance of having on its crest the Massanutten quartzite. In other words the great overthrust fault of the valley reposes on any Silurian horizon up to the Becraft.

The following is the section (diagrammatic):-

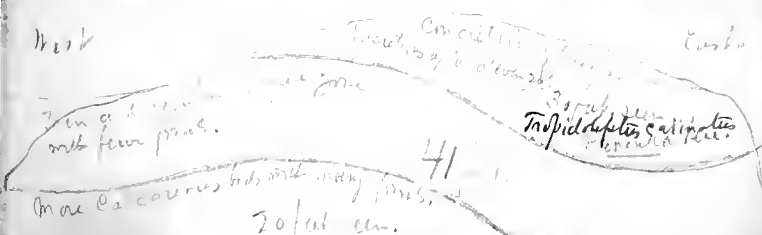


Continued closed syncline at North Mountain, one mile north of North Mountain station on B. & O. R.R.

Martinsburg. Monday July 15-1907

Cherry Run to North Mountain.

the Becroft are one continuous ... and there is no essential difference in lithic appearance between them except for the chert.
The thickness by stepping is 84 yards with a dip to the west of 30° This makes the thickness 100 feet.
[F 675] The ... rock collected are from the base as then determined. ... , ... ,
Streptelasma rectum &c.
The section is continued further with the thin bedded limestone, but the section is not well exposed. nearly 75 ft. difference
These ... own side ...
... i.e. ...
... and ... the ...
The Marcellus ...
considerable ... . Rock River. ...
... appears, Tentaculites ...
In a cut on the side of the ... the Hamilton ... as follows.



The ... zone has in abundance Chonetes ...
C. coronata
C. ..., ... mucronata, Tentaculites,
...
...

[illegible] cut [illegible] may

[illegible] 46

It is in this zone that the two limbs of the syncline rest against each other

[illegible] North [illegible] regular [illegible]

[illegible] 41

[illegible]

[illegible] a measured [illegible] 94'

[illegible] a measured

[illegible] 158 feet. [illegible] basal [illegible] 55 feet) [illegible]

[illegible]

[illegible]

[illegible] Beecraft.

[illegible]

doc. 93
July 15

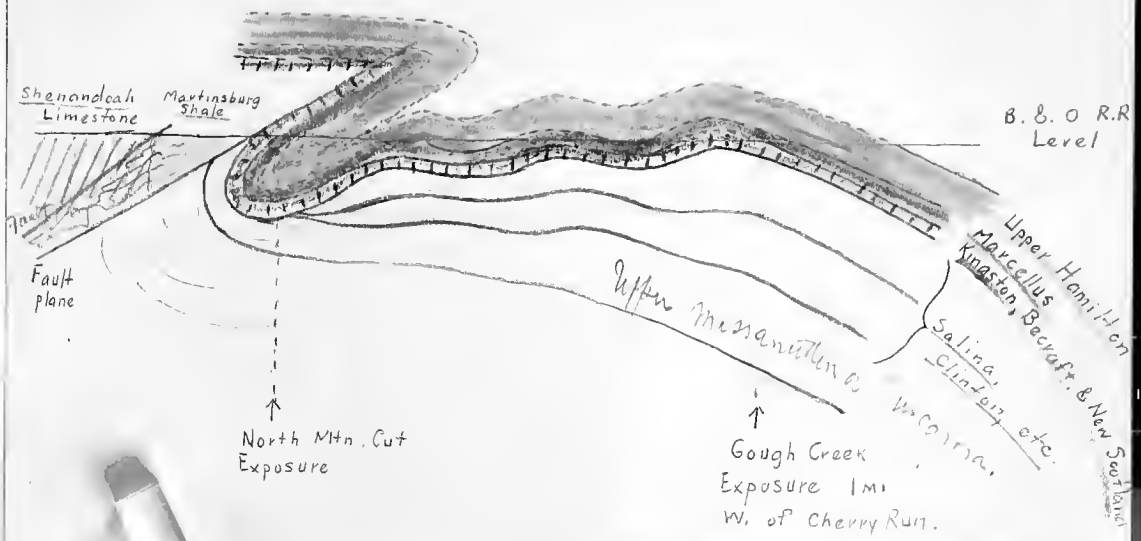
Idealized Section

on B & O. R.R. level between North Mountain and Gough Creek.

(Wm L. F. Mills).

E

W.



into a sandstone, the thickness could not be determined but it cannot be less than 40 feet thick. Therefore three times as thick as at Trough Run. This is undoubtedly this layer that shows in the [illegible] limestones of Seven Fountains in Massanutten Mountain.

(1921. That is the conglomerate at the base of the Conococheague lies on the [illegible] dolomite.

Martinsburg. Tuesday July 16-1907

Bancroft, W. Va. and Md.

farther east is more fossiliferous. Stictopora is abundant. Other fossils are [illegible] and some [illegible] see the list.

The Oriskany sandstone beneath the Marcellus was measured and gave [illegible] = double 220 feet [illegible] this cut no [illegible] are seen but in the quarry they are very common. Among these Spirifer arenosa, Rensselaeria ovoides and [illegible] are most in evidence [illegible] (Rensselaeria) [illegible]

The siliceous cherty shale with chert [illegible] the Oriskany was measured [illegible] (67 feet [illegible] like Cash Valley [illegible]) [illegible] from [illegible] [illegible] white [illegible] [illegible] they are not [illegible] identical [illegible] as the [illegible] Lower Oriskany [illegible] was [illegible] fossils [illegible]

[illegible] beneath the [illegible] beneath the Oriskany there is [illegible] difference [illegible] the [illegible] not on the [illegible] bottom beds are different than the middle [illegible] was [illegible] and [illegible] but I think [illegible] called out [illegible]

Originally it must have been more [illegible] with [illegible] technique of the [illegible]. Anything of [illegible]

The Oriskany

doc. 93

At Hancock glass sand mine the Oriskany is 180-200 feet thick. Just a little east along railroad it appears like cut out by fault.

Told me by Mr. Stone.

According to Stone a little farther east it is 50-60 feet thick.

April. 1908. in conversation with Stone

and seen in [illegible] section.

These light-blue limestones [illegible] in the

By rail-road it is about 10-11 miles from [illegible]rock to [illegible] Farm and while here there is

[illegible] at the Patty place [illegible]

[illegible] # [illegible]

[illegible] at this locality

[illegible] unmistakable [illegible] clearly marked track [illegible].

Originally it must have been one identical with [illegible] because of the many [illegible]. Anything of the living [illegible] in life, all are casts. The sandstone in the great anticlines is a water zone and [illegible] in the [illegible] that has followed [illegible] the line. The [illegible] that [illegible] [illegible] in places [illegible] [illegible] [illegible] [illegible] [illegible] writing.

[illegible] [illegible] again visiting [illegible] limestone quarries [illegible] [illegible], they have a length of [illegible] miles. The material is [illegible] [illegible] [illegible] metal and flux in steel making! Some is burnt for lime, [illegible] [illegible] [illegible].

In all the quarries [illegible] [illegible] is the light blue (weathers white) limestone of even grain in [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] uneven grained limestone. It has fossils [illegible] [illegible] could be made out. I was [illegible] [illegible] to find <u>[illegible] [illegible] limestone [illegible] [illegible] [illegible] decidedly [illegible] [illegible]</u>. These [illegible] [illegible] [illegible] [illegible], the [illegible] [illegible] [illegible] [illegible] and [illegible] in [illegible] [illegible] [illegible] in the section.

These light-blue limestones [illegible] [illegible] in the

Great Cumberland [illegible]
July 17 Wednesday

Took the 6.30 train [illegible] section and crossed the river [illegible] the [illegible] R.R. at Tonaloway. There at once is seen the [illegible] sandstone dip [illegible] about 20° to the N. with a thickness of about 200 feet. [illegible] are [illegible] Rensselaeria ovoides

These sandstones [illegible] mud [illegible] on which [illegible] Spirifer arenosus, Leptaena [illegible], [illegible]. These [illegible] but this is a [illegible] as the [illegible] is much [illegible].

[illegible] these [illegible], then [illegible] [illegible] [illegible] abundance [illegible]. These are the [illegible] al. B 3. of Cumberland, [illegible] section then [illegible] into the [illegible] of Cumberland.

Above the [illegible] R[illegible] [illegible] [illegible] [illegible] red [illegible] [illegible] green, [illegible] light [illegible] [illegible] [illegible] [illegible] R[illegible] [illegible].

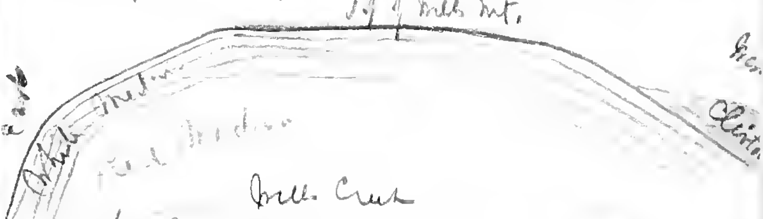
One is impressed with the reds where the cement in it being to decidedly sun cracked. [illegible] for a thickness of [illegible] [illegible] mud these are at times shown in fine [illegible]. Spaces are are sun cracked. The redding is [illegible] distinct to be of a continental nature and of the sun cracking [illegible] great mud flats exposed to the sun. [illegible] rivers and wind [illegible] [illegible] accumulation. [illegible] [illegible] may well get at Cumberland [illegible] been an abundance [illegible]. The red rocks with the [illegible] green mottlings are the result [illegible] before the cement [illegible] and [illegible] [illegible] sand [illegible] are laid down. Later the [illegible] are the great calcareous series of [illegible] [illegible] are laid down.

3rd [illegible] for
[illegible]

Cumberland, Md.

Wills Mt. near Cumberland Sept 6-1909

The red Medina sandstone shows much cross bedding but is not extensive. Cuts not over one foot deep. Seems equal in grain throughout. In some layers irregularly sided vertical holes that were once filled [illegible]. These [illegible], [illegible] one of organic origin but [illegible] [illegible] [illegible].



Wills Creek

The Red Medina is a series of alternating sandstones and red sandy shales.

Red Medina [illegible] [illegible] into White Medina. The latter [illegible] into Clinton

The White Medina is first a heavy bedded [illegible] fine grained quartzite with some cross bedding. Then becomes thinner bedded with heavy beds and then more shaly and finally into the Clinton shales.

Red shales 6"

[illegible] 14"

Red shales

Lower Section at Keyser.

Thin bedded dark blue waterlime stone
Beds rarely 2 inches thick when weathered
About 18 feet.

A similar zone with shale beds at top and bottom each about 5 feet thick. Central dark blue li. in beds from 2 to 8 inches thick 10 = 20 feet.

Dark blue waterlime stone in beds from 5" to 24"
About 18 feet.

Shale zone 4–5 feet.

Dark blue li. waterlime in beds from 2" to [illegible]
120 to 130 feet.

Becomes less pure below [illegible] a magnesian shale. Horizon of Judge Albers R. Lamellosa zone

End of quarry. Bottom.

The lowest layers weather into the [illegible] shaly li. & holds (at base) a fauna similar to the Cash Valley Manlius. Rhynchonella [illegible] R. lamellosa [illegible] Bryozoa, Atrypa [illegible] and Ostracoda.

See the little fauna collected above [illegible]

shales of the Lower Oriskany appear. In these beds I saw Leptocoelia [illegible], L. imbricata, Orthothetes (a specimen) and the new Spirifer described by me. The covered zone is [illegible].

The erosion of the [illegible] beneath the Lower Oriskany is decidedly different between here and [illegible] Valley. At D. B. B. only 10 feet of the [illegible] and [illegible] cliff. At Conrijanville [illegible] of the same amount is present. At Capt. Valley all of the [illegible] as the Lower Oriskany [illegible] on the Manlius.

Out of the [illegible] layer 3C Rudes [illegible], Hedrodella galeata and Spirifer (an [illegible]). These occur in a rolled mass as if [illegible] into the limestone, i.e. a rolled mud ball. It is difficult to understand the [illegible] [illegible] on the [illegible], a [illegible] feature. We see [illegible] and [illegible] deposits. Certain it is [illegible] limestones seem [illegible] water [illegible] for one sees these same [illegible] limestones [illegible] into normal marine deposits [illegible].

Cumberland,

July 23. Tuesday. Cumberland.
Pinto = Potomac section, Maryland.

Took the [illegible] train [illegible] [illegible] [illegible] [illegible] [illegible].
Just at the station we see an iron ore [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible]
which has a thickness of about 15 feet, about one half good
iron ore. Beneath is a shale zone [illegible] [illegible] [illegible] upper where
another [illegible] iron appears but in a [illegible] ore. This zone
has [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

The iron ore bed has an abundance of [illegible]
Orthocera and some small [illegible] [illegible] [illegible] [illegible]. In
places an abundance of [illegible]. These ore beds are [illegible]
due to subsequent [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
rocks [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
with [illegible] sand and a yellow [illegible] [illegible] [illegible]
ores. Many [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

Passing over a little hollow we come [illegible] the [illegible]
mill and continuing [illegible] [illegible] along the B. & O. To [illegible] Clinton.
The Clinton is [illegible] [illegible] from the [illegible] [illegible] by
a double sandstone, [illegible] [illegible] about 2 feet thick, [illegible] by
shales and sandstones about 3 feet, and another sandstone
about 18 inches thick.

The Clinton [illegible] [illegible] other than the sandstone
[illegible] [illegible] [illegible] and beneath these sandstones [illegible]
3 feet the beds are red, green and black = variegated

looking like that of the Mu... land. It does not seem possible that they are [illegible] here for the yellow (weathered) part of the Lower Oriskany sand is seen in the road of the hill. A little farther at the hill is a [illegible] indicating the presence of the lower [illegible]. The entire thickness of the Oriskany here cannot be much more [illegible] for the Romney is seen a little farther on in the road.

Valuna [illegible] is 1080

Mapaan [illegible] " " " 345

Make these [illegible] in my [illegible]

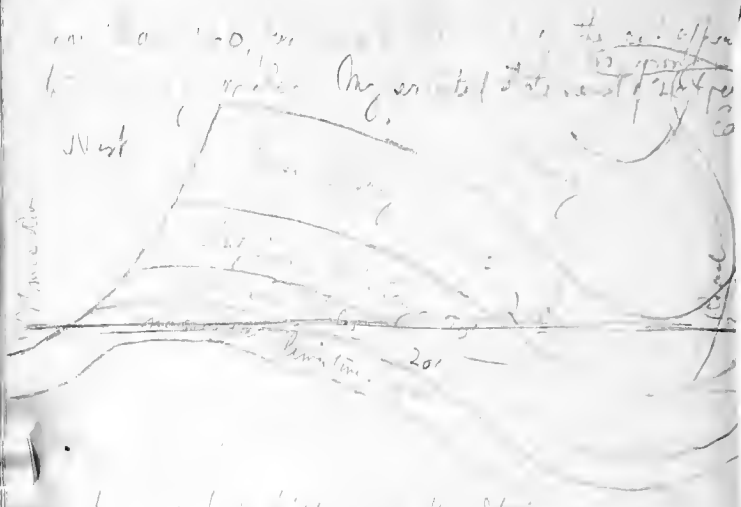
The [illegible] is first [illegible] [illegible] be even [illegible] for [illegible] turns [illegible] 10 degrees. On the Winchester road is seen [illegible]

[illegible]

[illegible]

[illegible] 2nd [illegible] and examined the section in the [illegible] Saw nothing to add to my [illegible] a few fossils from the [illegible] horizon above the marine [illegible] limestone.

We [illegible] the Lower Oriskany to have [illegible] i.e. Gofah. [illegible]


West
20'

Lower section at Keyser, W. Va. (doc. 93)
September 8–1908. July 23

Base. Thin bedded dark blue argillaceous. Beds rarely 2 inches thick when weathered. About 18'

A similar zone with shale beds at top and bottom, and about 5' thick. Central dark blue lime in beds 2"–8"
About 20'

Dark blue argillaceous limestone in beds 6"–24" About 18'

Shale zone " 4–5'

Dark blue argillaceous limestone in beds 2"–24" Becomes less pure below, passes almost into a magnesian shale. Horizon of Judge Adkins R. romeliana across the hill. About 120–135'

End of Lower quarry. At the base of this quarry a small fauna reminding of the Coal Valley fauna. Rhynchonella neglecta type, R. romeliana, Bryozoa, Rhynchospira, Ostracoda.
Trace this fauna from this quarry.

It is about 100 feet to the base of the large quarry higher in section and of which a section has been published.

See Hanging Rock section at Kapaconon W. Va. at end of this book.

no macropleura but have other New Scotland fossils. These chert beds then soon give way to heavy bedded dense crystalline and crinoidal limestones of the Coeymans. Balance of section measured by Reeds but I did not take thickness because the contact was not so readily determinable as some years ago when I did the work for the [illegible] survey.

At Twenty Mile Bridge the lower limestone has of the macropleura zone as in the Keyser gorge [illegible] do not have this fossil. In both places the shale immediately above belongs with the New Scotland. The Lower Helderberg here comes in sharply and distinct. There are no transition zones.

July 25 Monday Cumberland.

Packed our collections, [illegible] and [illegible] have 5 to go to Cincinnati.

[illegible] that we may [illegible] continue [illegible].

[E5622]

2939 ↓

July 26 [illegible]day. To Cincinnati.

[illegible] for Cincinnati on the 5.12 P.M.

At Clarksburg [illegible] and [illegible] when Ohio [illegible].

[illegible]

[illegible]

[Jul 27]

[illegible]

[illegible]

[illegible]

[C0520] + C9218

[2939]

July 29 Monday, North Vernon, Ind.

Left Cincinnati with the O & O. at 8.20. At North Vernon we were late 20 minutes and missed connections for Madison. Had to wait until 5.50 P.M.

Just east of North Vernon [illegible] can be seen the Buck Creek shale [illegible] on more Black shale free of [illegible] (of the latter there are about 4 feet). About one [illegible] east of the station in a small stream [illegible] can be seen [illegible] Hamilton [illegible] [illegible] [illegible]

[illegible], [illegible], Tropidoleptus [illegible], [illegible] [illegible] [illegible]. [illegible] etc. [illegible] abundant.

The peculiar [illegible] are here [illegible] [illegible] [illegible] are distinctly cross cracked. The [illegible] are decidedly [illegible] as seen [illegible] in those [illegible] the upper [illegible] are [illegible] seen [illegible] more [illegible] the posts mentioned above.

[illegible]

[illegible] here [illegible] more dolomite [illegible]

D4683

[illegible]

[illegible] pair [illegible] and [illegible] down to the [illegible]

the [illegible] [illegible]

[illegible] [illegible] [illegible] [illegible]

[illegible]

[illegible] south-east and [illegible] little [illegible]

[illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] are in a [illegible] [illegible] the [illegible] the country is again flat and remains [illegible]

[illegible]

C9222

July 30 – Tuesday. [illegible]

The section at [illegible] [illegible] down the [illegible] to [illegible] (in [illegible])

Heavy [illegible] Niagara dolomite with casts of *Favosites radiata*, *Calymene reticularis* and [illegible] ([illegible] much thicker) [illegible] [illegible] [illegible] [illegible] [illegible]

Then [illegible] dolomite, almost [illegible] [illegible] [illegible] [illegible] (that [illegible] [illegible] [illegible] [illegible] [illegible], *Calymene reticularis* [illegible] 100 or 12 feet. ([illegible] 2–5 inches).

[illegible] normal [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Hewitt [illegible] [illegible] [illegible] [illegible] [illegible] no fossils.

[illegible] [illegible] (coarse grained) (coarse like sandstone) [illegible] (has 18 or 20 feet). [illegible] here [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] 25 [illegible]. The [illegible] [illegible] [illegible] the top.

Following the same [illegible] [illegible] [illegible] (3–6 inches). [illegible] 8 feet [illegible] [illegible] [illegible] [illegible] [illegible] 2 almost a reef [illegible] [illegible] *Calapoecia* and some [illegible], [illegible] feet.

[illegible] [illegible] the [illegible] [illegible] [illegible] then and [illegible] [illegible] with few fossils. About 8 feet.

Then the thin bedded limestone [illegible] [illegible]

Cincinnatian

Ordovician

July 31 Wednesday. Louisville Ky.

[illegible] visited the [illegible] at [illegible] in West Louisville. Here the [illegible] in which a [illegible] Chaetetes [illegible] is most abundant. These [illegible] are [illegible]. The Cement [illegible] are also [illegible]. We did not see the [illegible] in the [illegible] its presence in the [illegible] nodular [illegible] about [illegible] and the [illegible] the [illegible] the [illegible] the [illegible] Louisville [illegible] after a [illegible] are [illegible] caespitosum, [illegible] [illegible] and [illegible] [illegible].

This is a remarkable phenomenon to [illegible] [illegible] uniformly followed by the [illegible]. We [illegible] and [illegible] [illegible] that the [illegible] does not alter the [illegible] of the [illegible], [illegible] [illegible] any [illegible]. [illegible] [illegible] sees [illegible] of [illegible] is [illegible] one.

[illegible] of the [illegible], [illegible], Halysites, Eridophyllum, [illegible], [illegible]

2948

August 1 Thursday. Marysville.

Spent the morning on the hill to the [illegible] of Reservoir Hill, the one with the many small surface quarries [illegible] as per hand [illegible]. Near the top occur the greatest abundance of Orthorhynchula linneyi, Orthis [illegible], [illegible], Platystrophia [illegible] laticostata. Rafinesquina. This zone is about five feet thick. Near the base, below, [illegible] feet thick, hill Isochilina. Lower on the same hill to the [illegible], about 30 feet lower, are the [illegible] beds. Here also occur Orthis [illegible], [illegible] at [illegible] in Columnaria alveolata.

For other details see notes [illegible] made [illegible] years ago.

In the afternoon to [illegible] hill [illegible]. [illegible] [illegible] [illegible] [illegible] the state [illegible] quite [illegible] [illegible] the hill in the old [illegible] occur the [illegible] [illegible] [illegible] collected. [illegible] Orthorhynchula I collected a [illegible], [illegible], [illegible], Lichas, and [illegible].

If these beds are [illegible] Trenton [illegible] [illegible] Trenton. [illegible] equivalent of the [illegible] the southern representative [illegible].

Aug 2, Friday, [illegible], Tenn.

[illegible] Otree [illegible]

[illegible] from [illegible] about 16 [illegible]

[illegible] Then walked 3 mile [illegible] the track [illegible]

the [illegible] quarry [illegible]

[illegible] the following section.

Fullers quarry.

This shale is [illegible] in the old [illegible]

[illegible] feet [illegible]

[illegible] 30 feet [illegible]

[illegible] Hudden. — Chalk

[illegible] see [illegible]

[illegible] — Chalk.

[illegible]

Louisville [illegible] limestone [illegible]

[illegible] grey hard limestone. [illegible]

[illegible] as at Louisville.

Shale 2 ft
[illegible] 1 ft.
[illegible] 6 inches
[illegible] 6 ft
[illegible] 4 ft } The horizon [illegible] the [illegible]

Ore 11' 6"

[illegible] for [illegible]

[illegible]

[illegible] crystalline [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Popham Section (2 miles W. of Fuller quarry Ransom) showing Hamilton above Oneida.
Photo by Foerste.
See S. D. A., XII, ~~pl.~~
p. 408, fig 1. 2.

{ Marcell shale
{ 1-2 feet sandy shale onto Ransom
{ = Hardy sandstone

1-2' heavy bedded ~~ha~~ arenaceous ls.
Anchyrocrinus bulbosus and
~~[illegible]~~ [illegible] in bed of Cornell bed & Louisville beds
? Private mill of [illegible] Crinoidal
8' heavy bedded crossed crystalline
ls. with Onondaga fauna.

Oriskany

Louisville Niagara.

In conversation with Lasler April 10 '08

[illegible] Saturday. Ransom Tenn.
Took the 7 A.M. train for Ransom. I looked up the old [illegible] quarry near the station but seemed to me less [illegible] in the Fullers quarry. Louisville Beds only present. Rocks noted the Fuller quarry but rain soon set in and stayed all while. Returned at 1.32 P.M. and looked three boxes. The [illegible]

Secured a great quantity of Waldron crinoids and brown shells.

The dip is to the west and [illegible] time quarries the beds dipped is a [illegible] 20% [illegible]

The Waldron fauna is as prolific here as in Indiana and so far as the brachiopods are concerned there appears to be no [illegible] seen. The only absent form is Rhynchotreta americana. Among the crinoids there are several local [illegible] forms (Eucalyptocrinus) and a ? Caryocrinus quite [illegible] from [illegible]. None of the crinoids are complete all have been broken before entombment. Many of large calices lie with the broad typical side downward and the basal [illegible] is more or less [illegible]. Many of brachiopods are separated valves. The bryozoa are less common here than in Indiana and this is especially true of the Trematopora.

Crevent ? Saturday. [illegible] Tenn.

Took the 7 A.M. train for [illegible]. I looked up the old [illegible] quarry near the station but secured far less than in the Fellers quarry, a small lot of Waldron only present. Rains [illegible] the Fellers quarry but rain soon set in and stayed all [illegible]. Returned at 1.32 P.M. and packed three boxes. The [illegible]

freight and mail bill of lading to Camden.

2949

[illegible] Sunday 4. Camden.

Left Nashville on the [illegible] C. N. & St. L. [illegible] for Camden. Arrived about 5 P.M.

[illegible] the [illegible], [illegible], [illegible] Ellen [illegible] with Hewson. [illegible] through [illegible] black shale and [illegible] into [illegible].

(4) [illegible] Monday 5. Camden

Collected in the Camden [illegible] on the [illegible] the village to the south. [illegible] on the hill slope back of the houses in the northern [illegible] the village. [illegible] than [illegible].

[illegible] of [illegible] [illegible]. It certainly is not the black shale. The shale [illegible] [illegible] [illegible] [illegible] [illegible] the [illegible]. All of these [illegible] [illegible] [illegible]!

2949

The Camden [illegible] dip [illegible] not consume them. [illegible] that these Lower Devonian appear at once on the south side of the Tennessee,

August Tuesday 6. Hollidays.

Started out with a buggy [illegible] on Hollidays and after driving for more than one hour found that we were on the [illegible] road. In driving westward of Hollidays we came [illegible] the Helderbergian about 1 1/2 miles to the east of Sis Hindays in a small stream bottom, where we saw a few [illegible] the top of the [illegible] immediately beneath the Camden chert. The former is of the same character as that near Hollidays, more a thin bedded limestone thin shale. These beds [illegible] the [illegible]. The Camden comes in sharply - there being no transition between the two the Camden and [illegible] Helderbergian.

(1) About four miles [illegible] Hollidays beside the road we spent the day in the upper beds of the Helderbergian. Here it is a thin bedded limestone series with shale [illegible] bearing a [illegible] [illegible]. At least 25 feet is shown to the road. [illegible] these beds [illegible]

pentamerus, [illegible] are [illegible] galeata are seen. In other words, [illegible] New York basal New Scotland.

(2) [illegible] from [illegible] limestones, to the [illegible] the road down to the stream may be seen the shaly series of the New Scotland [illegible] with [illegible] [illegible] [illegible], [illegible]. [illegible] [illegible], [illegible] pentamerus, [illegible] the middle of the thickness may be seen part of a Camarotoechia pavement. This zone is mostly only 15 feet thick. [illegible] the stream may be seen [illegible] crinoidal limestones [illegible] top layers [illegible] have Camarotoechia in abundance and stems, [illegible] would be called [illegible] [illegible]. This is undoubtedly the same [illegible] zone [illegible] in my [illegible] [illegible] Camarotoechia [illegible]

[illegible]

August [illegible] day, 7. Perryville.
Packed our [illegible] [illegible] [illegible] at Camden. Left at 9.58 A.M. and [illegible] for Perryville via Hollow Rock and Lexington. [illegible] at 6.30 P.M. after a [illegible] of [illegible] [illegible].

2947

August [illegible] [illegible] Perryville.
[illegible] up at 5.30 and [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] about the [illegible] [illegible] of the village.
Here may be seen the [illegible] 20 feet of the Browns-port upon which with [illegible] [illegible] [illegible] the New Scotland. It begins with a limestone [illegible] [illegible] [illegible] [illegible], a crinoidal limestone [illegible] an abundance [illegible] [illegible] [illegible] and [illegible] of Camarotoechia. These same beds [illegible] [illegible] [illegible] New Scotland [illegible] [illegible] in it [illegible] [illegible] [illegible] [illegible] [illegible], [illegible], [illegible] and [illegible].
These limestones are followed by blue shales that weather out as a type of sticky clay full of fossils of a New Scotland type, [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. Here appear the first [illegible]a and [illegible]a.
Above is a debris of Camden chert [illegible] with sand and some of the (?) [illegible] clay. [illegible] clay

2947

August 10 Saturday. Return to Louisville

Shipped one box from Perryville.

Left at 7 A.M. Arrived at Lexington 9 A.M. Departed at once for Paris where I arrived at 11.30. Left Paris at 5.10 P.M. & arrive at Louisville at 3.10 A.M., [illegible] had a berth in a sleeper did not have to get up until 6 [illegible].

August 11 Sunday.

Left Louisville at 9 A.M. Arrived at Cincinnati at 1.50. Had dinner at the Grand Union and left on the Big Four at 3. P.M.

About 25 miles east of Louisville on the [illegible] the last of the [illegible] plain is seen. From there topography is undulating and the [illegible] of Richmond appears seen at [illegible] Madison, Ind. Then eastward the road drops constantly into lower Cincinnatian beds.

Arrived at Cleveland at 8.40.

Stopping at American Hotel.

[2944]

August 12. Monday. Sandusky

Left Cleveland at [illegible] for Sandusky 60 miles west of Cleveland. Then motor car to Lake port to take the [illegible] across the bay to the Peninsula. Landed at Ohlemacher where one of the large quarries of the Marble Head [illegible] is situated.

These quarries show about [illegible] feet exposure. The material is largely quarried for lime making and [illegible] for the upper layers fossils are most abundant. [illegible] in the [illegible] [illegible] [illegible] [illegible] [illegible] Other fossils are Heliophyllum?, [illegible] small [illegible] [illegible] [illegible] [illegible]. Of corals there are many Cyathophyllum? [illegible], Favosites? conicus, F. [illegible], Cystiphyllum? &c. [illegible] Conocardium? and [illegible] (one about 10 inches in diameter) were seen in the [illegible] [illegible] near [illegible] Lakeside.

From a quarry man crane [illegible] [illegible]

2 [illegible] for $2.25 [illegible] William Bird, Lakeside Ohio.

[illegible]

[illegible] There is nothing disagreeable

of the Hamilton present. The lower 10 feet are of heavier beds and apparently more magnesian and less fossiliferous. It is this zone that is preferred for lime. The other 10 feet are [illegible] thinner beds - even shaly. However no separation can be made at this point for the cond[illegible] in both [illegible] are identical.

In places the beds are glaciated and deeply channeled (not so pronounced as at Kelleys Island).

The Lakeside quarries seem to be operated by the Kelleys Island Lime Co.

These beds carry more [illegible] than the same beds on the north side of the lake at Port Stanley. Here they are more brachiopod bearing, there more coral reefs. While the same corals occur in both places [illegible] they are more abundant on the [illegible]. In the north the beds are more cherty and the fossils nearly all silicious. Has this silicification [illegible] nearer a shore or is this alteration due to leaching in the north and [illegible] here [illegible] because of the Black Shale cover?

It seemed to me that the [illegible] cuts are most abundant in the coral layers. They are present in good abundance and especially in the lower 10 feet. They are far removed from [illegible] lands

August 13 -14- Tuesday. -Wednesday- Canton, O.

Packed the Sandusky [illegible] and shipped by Express. [illegible] in the [illegible] for Canton at 11 A.M. [illegible]

Met [illegible] [illegible] [illegible] a [illegible] talk with [illegible]. Remained at his home until the next day at 11.30. Returned on the [illegible] to Cleveland. Left the latter place at 2 P.M. and arrived at [illegible] Falls at [illegible] 9 P.M. [illegible] time. Stopping at Imperial Hotel.

August 15 Thursday. Lewiston.

Started out along the [illegible] hand [illegible] Lewiston.

[illegible] series of [illegible] in which [illegible] the [illegible] (many [illegible]) [illegible]. Otherwise [illegible] one sees [illegible] [illegible]. The [illegible] and [illegible] Towards the [illegible] [illegible] [illegible] — [illegible] — [illegible] [illegible] but [illegible]

ripple layered. Beneath the cross bedded layer a bed about 3 feet thick shows wave action of some force for the material is considerably thrown up in waves thus

Beneath this layer the dolomite is drab, arenaceous, shaly and weathers out as an [illegible] shale

Then zone is about 5 feet thick and then appears the regular Rochester shale, so far as general appearance goes almost barren of fossils.

The first abundant fossil zones in the Rochester begin to appear about 15 feet from top. [illegible] [illegible] [illegible] about 25 feet This zone goes down to [illegible] thick and has some thin layers of limestone filled with the [illegible] [illegible].

Then [illegible] [illegible] — a mass heavy bedded fossiliferous [illegible] [illegible] about 15 [illegible] thick. [illegible] of the [illegible] [illegible] [illegible] [illegible] of them gradually [illegible] common. Also some

Then a green shale [illegible] about 4 [illegible] [illegible] no fossils.

Then a greenish grey heavy [illegible] sandstone slightly crossbedded and in [illegible] about 6 feet. Followed by variegated red and greenish cross bedded sandstones passing below into alternating shales and then green [illegible] sandstones. Then the regular [illegible] [illegible] Medina series for Arthrophycus harlani appears at once in these thin beds of sandstone. Sometimes the sandstones have [illegible] [illegible] of rolled irregular mud balls up to 1/8 to 1/2 inch. At other times flat shale inclusions up to 2 inches across. In other [illegible]

the red shales [illegible] very [illegible] to the green [illegible]
[illegible] The [illegible] [illegible] washed out [illegible]
filled with sandstone [illegible]

[illegible] due [illegible]
[illegible] and
late filling in the [illegible].

When one is [illegible] 15 feet [illegible]
the Madison the [illegible] become
decidedly [illegible] and [illegible]
of [illegible] acuminata, [illegible] and
[illegible] becomes [illegible] and
[illegible] Conditions [illegible] closing.
[illegible] any [illegible]
[illegible] then [illegible]
conditions. Then for about 12 feet [illegible]
[illegible] occur the
[illegible] species
[illegible]
[illegible] Madison with
the [illegible]
[illegible]
[illegible] 25 feet [illegible]
[illegible]
[illegible]

for thin sandstones near the center. This zone is about 25 feet thick.

Then heavy bedded sandstone probably ten feet thick (Could not see beneath the cliff). Is is 25' thick

Below are red shales [illegible] sandstones or hard beds. [illegible] seem to go down to the river and may be over 100 feet thick [illegible] exposure.

From the evidence today it seems to me that the Medina is far more closely related to the Niagaran as here shown than to the Richmond of any area. There is not a single Richmond fossil present in this Medina while all seem clearly related to the Niagaran.

The Upper or fossiliferous Medina is clearly a marine deposit for about two-thirds of it is regularly bedded, one always sees traces of the Lingula and at about 27 feet from the top in a zone not over 4 inches thick is where I collected the pelecypoda.

This Upper Medina clearly goes over into non-typical marine deposits in which there is much cross bedding, some scouring out of deposits and subsequent filling of the cavities, rolling of mud into irregular pellets and brecciating of shale into the sandstones, and occasionally a little evidence of irregular

sun-cracking. It is in these deposits that one finds the Arthrophycus and other so called fucoidal markings. Finally the red color leaves these deposits and the last 6 feet or so are a white sandstone.

Above these sandstones follows at once a different colored shale — a green shale and then the Clinton dolomites. There is hardly any thing about these Clinton fossils to distinguish them from the Rochester shale — it is only the presence of a few things as the Meristina cylindrica and the Atrypa quadrifficata.

Can it be that the top of the Medina represents a land interval and that this Clinton is the final or topmost member invading from the east. It is at Rochester that one finds the Pentamerus oblongus in the Clinton but it is not present here in the Niagara River gorge. Then too it is at the close of the Clinton that one finds the reefs with the western species.

At the top of the Clinton here there are no reefs and all the fossils seen are those of the Rochester.

The next highly fossiliferous zone is near the center of the Rochester shale and for about 20 feet one sees the regular bryozoan and associated fauna. Then practically barren shales passing rapidly over into the fossiliferous dolomite.

I was greatly surprised to find beneath Arthrophycus bearing beds and the regulation Medina fauna the same bryozoa beds seen by me some years ago at Hamilton and now at Washington. These fossils which will certainly pronounce Clinton as it has one of the characteristic Clinton bryozoa (?Escharopora) of this, Further it is from this zone that came the starfishes sent me by Grant. Amongst these bryozoa I saw a valve of Orthis [illegible] and the slabs taken will indicate the balance of the fauna. If these fossils correlate with the Ohio Clinton then clearly the true Medina fauna is above and is of Silurian age.

August 16 Friday. [illegible]

Departed at 8.20 in the [illegible] arriving there at 9.00 Called on [illegible] T. MacBride and he took me to the Whitmore quarry. Here about 20 feet of Medina is shown. The basal layers for [illegible] feet are [illegible] white sandstones with little cross bedding. [illegible] follows about [illegible] of thin bedded sandstones with some shales. These sandstones are decidedly cross bedded. Thin towards the top [illegible] the bedded sandstone [illegible] [illegible] contains some of the Medina fossils. Then come in mostly shales with some thin sandstones some of which are well ripple marked, and others (not the cross-bedding [illegible] for the [illegible])

show plainly the [Flatwash or Sill] [illegible] ariced. On such a lawn may be seen numerous rubbles of the stiller breaker and here and there a [illegible] or [illegible] part will rills around it. [illegible] is [illegible] these [illegible] [illegible] and get more [illegible] to follow a [illegible].

Along these [illegible] which [also rare] rarely [illegible] [illegible] [illegible] [colmate], are found some [illegible] [illegible] sometimes. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] [illegible] originally [illegible] Medina [illegible] [illegible] and [illegible] only determinable at this locality.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] and [illegible] [illegible] [illegible] [illegible] [illegible] the Ohio and [illegible] [illegible] [illegible].

MacLeode has a fine series [illegible] [illegible] from specimens 3/5 inch [illegible] up nearly 4 inches.

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] of the section [illegible] [illegible] [illegible] [illegible].

August 17 Saturday. Hamilton, Ont.

At the head of J[illegible] Ave on the side of the "mountain" may be seen two [illegible] City quarries. quarries.

The lower face of about 35 feet is in the main a blue-green shale [illegible] below [illegible] [illegible] 2 to 4 feet (they are about 6-7 feet thick) [illegible] then [illegible] thin sandstones below a [illegible] and there [illegible] the dolomites appear. [illegible] in the upper 8 feet and about mid way in these 8 feet there is a thin foot layer [illegible] 2 to 3 feet thick. This [illegible] the upper 8 feet [illegible] fossils [illegible] (Clinton) [illegible] that the lower dolomites [illegible]

Upon these [illegible] dolomites following more blue shales in which [illegible] abundant, [illegible] finally these [illegible] persist [illegible] In these [illegible] at [illegible] (8 feet seen) [illegible] This zone is about 20 feet thick. In [illegible] above the blue (? Lockport) shales [illegible] one sees the [illegible] [illegible] [illegible] (the large one) Calymene, large head [illegible] Homalonotus, the [illegible] [illegible] Dalmanites, etc. [illegible]

[illegible] In the upper [illegible] where the [illegible] [illegible]

J. M. Cl.

In another quarry, a large one, a few hundred feet to the south may be seen the following:-

At the top the the reddish cherty dolomite used for road metal (as in the [illegible] quarry). About 8 feet thick. This passes gradually into other dolomite in which the [illegible] more or less stand out, the dolomite hard, crystalline, and heavier-bedded, a [illegible] white, about 8 feet thick. The [illegible] are these [illegible] for the [illegible] quarry.

Below a series of [illegible] with [illegible]. [illegible] 10 [illegible] $1\frac{1}{2}$ [illegible]
[illegible] below [illegible]
[illegible] Spencer and
Seeley.

The [illegible] one bed of dolomite [illegible] thick.
Then 3 pieces [illegible] 1-4" x 1-6" x 1-6" [illegible]
[illegible] Then dolomite [illegible] thick. [illegible]
another [illegible] larger than [illegible]
[illegible]
Then a little shale and then another stone [illegible]
[illegible]
[illegible] The [illegible]
[illegible]
[illegible]
Clay [illegible] like [illegible] than [illegible]
[illegible]

hillocks beneath the base of the grass. These make the top of the Ordovician. [illegible] rises 10 feet above the section of the first grassy [illegible]

To the south east of the mountain [illegible] in another quarry. Here [illegible] the base is about the [illegible] Ordovician [illegible] Their [illegible] about 32 feet high.

The Ordovician [illegible] are [illegible] at the top of the first visible quarry. The [illegible] about eight feet beneath the [illegible] the [illegible] from them downwards. The [illegible] fossils.

A little [illegible] and one sees that the dolomite seems [illegible] cliff. And the limestone beneath [illegible] as one sees.

The Ordovician [illegible] about 8 feet beneath the [illegible]

[illegible] the [illegible] the [illegible] and it is of a red [illegible] Ordovician shale rain in the [illegible] From the [illegible] level of the hills the elevation may be 200 feet

Boxes shipped

1 from Vincentown by Express. Met.
5 " Cumberland, Md. Freight.
1 " Louisville, Ky. express
3 " Nashville, Tenn. Freight.
2 " Camden Tenn "
1 " [illegible]ville, Tenn "
1 " {Cleveland O. Express
{Sandusky [illegible].
1 " Niagara Falls Express

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are no exposures and the Lockport is down upon the upper Clinton that extends to Niagara Falls and Buffalo.

The Medina [illegible] is therefore a broad interval over which the Clinton and lower Silurian seems transgressed.

The Lorraine is found in loose boulders at Hamilton, thrown up by the lake. At Toronto the Lorraine is exposed. See Parks for a section.

Aug 18. Leaving Niagara Falls.

Leaving the Falls today. Will leave on the 7.30 P.M. for New York. Shipped a box by express.

In the afternoon we visited the quarries of

Buffalo Cement Co. Took three pictures. The [illegible] rests rather unevenly on the [illegible]. [illegible] [illegible] of [illegible] are as dusty as usual. [illegible] [illegible] be seen [illegible] directly in the [illegible].

The walk between the Hotel and [illegible] [illegible] [illegible] [illegible] [illegible].

Left [illegible] at 7.30 P.M. Buffalo 8.35 and [illegible] have been in New York at 8 A.M. but did not arrive until 10. This is the "[illegible] Railway in America". The Porter said this was the [illegible] [illegible]. Several [illegible] traders [illegible] us.

Hanging Rock section Sep. 9-1908 At Grapocomo W. Va. (1)

doc. 93

Upper Oriskany.

Heavy bedded whitish sandstone with zones of conglomerate near top. In other words the Oriskany becomes coarser towards the top. Conglomerate zones with rounded[?] [illegible] ... quartz pebbles up to 3/8 inch, rounded.

Lower Oriskany

[illegible] ... cherts interbedded with the [illegible] ...

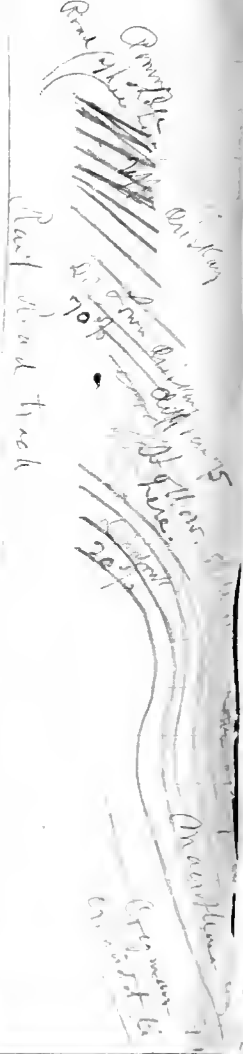
Transition between the two zones [illegible]

Lower Oriskany in [illegible] near north end of section about [illegible] feet [illegible] ...

Platyceras abundant, [illegible] ... *[illegible]* most common near here

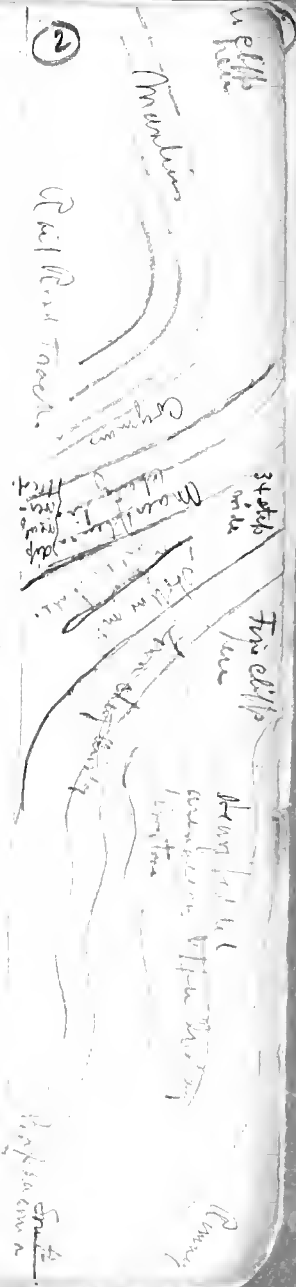
Helderberg. Onondaga[?]

[illegible] ...



and above the Macrofleur i.e. the
diff above sea is 20 one of the
other 70. [illegible]
70 steps or jumps.
Thickness of the Macrofleur
chert limestone about 30-35 feet.
Makes a cliff
The fossils are the usual ones
D. macrofleur, D. [illegible], D.
golpterus, [illegible] etc.
Rhipidomella, Gypidula, Eatonia
medialis, Stroph. [illegible]

These beds pass down [illegible] without break into Coeymans and gradually lose their chert. The Coeymans becomes nodular and begins to resemble the Manlius very less regularly bedded and not the ribbon limestone.
The cliffs here show the 35 feet of Macrofleur and at least 25 feet of the Coeymans. Beneath the arch not to be seen down to the tracks at least 30-40 feet more of the thin bedded nodular Coeymans.



A little farther south the red rises higher and the Moenkopi appears down to the [illegible] [illegible] forms all [illegible] of the D [illegible] section.

Shaly zone at south end of cut about 32 yards across, dip at one side being vertical and the other about 50 degrees.

Lower Cristiany. At south end of cut in the cliff about ~~[illegible]~~ 285 feet high above South Branch. Of this about 260 can be seen.

Here the separation of the chert from [illegible] from the Upper Cristiany is marked. Fully 90 feet of L. C. [illegible] seen. This then would make the Upper [illegible] 185 feet thick and all of the Cristiany about 260 feet thick. [illegible] [illegible] [illegible] interpreted [illegible] the [illegible] [illegible] above the Moenkopi red.

At the south end of section [illegible] [illegible] the Parson House (hotel) may be seen 20 feet more of the [illegible] [illegible] [illegible] Upper Cristiany or [illegible] all the Cristiany here measures 280 feet. [illegible] [illegible] [illegible] [illegible] [illegible].

As one goes to the top of the mountain back of the Parson house the coarse sandstone and bands of conglomerate are very noticeable. The pebbles cover the ground and some are as large as half an inch.

The Cumberland gulf continues the entire Silurian time passing without break into the Manlius. A low topography prevailes to the east for the deposits are essentially limestone, though somewhat impure. This is continued into Oriskany [illegible] the [illegible] a higher topography begins to appear seen in the chert beds of the higher Onondaga. This becomes more decided in the Marcellus beds and then the sea becomes very muddy and finally [illegible] land.

The Lower period in the western Cumberland Gulf prevailes while in the east was depositing the Becraft and [illegible] the [illegible] the water again becomes general throughout the Cumberland Gulf. Elevation of the land continuing to the east on the Piedmont Slope and the Oriskany looses more and more of its lime and becomes sandy and finally a conglomeratic sandstone is deposited. Elevation continues and all becomes land.

At Cumberland on the [illegible] the same conglomerate appears as here. See the conditions in journal for the Cumberland Gulf.