

Cumberland R
of Tennessee
1899

15
75

'99

K423

CUMBERLAND RIVER
and
TENNESSEE.

If found, send by mail to

Aug. F. Foerste

1417 W. Grand Ave.

Dayton, Ohio.

Tuesday 18.

1. Steamboat Landing, Burnside
2. Eastward dip of lower part of
Wavely at Waitsboro Shoal,
a little down stream from
beginning of shoal.

Waitsboro Shoal 588.8 - 585

Wednesday 19.

- 3) View of flat boat rigged up with
- 4) stern paddle wheel. Travels
- 5) 40 miles down stream a day;
25 miles up stream a day
6. Mill Springs. view of sluice
bringing water to mill, upper
part of stone with places for drink-
ing troughs etc. The lower part
going directly to mill, of wood.
Fine section at landing.

Thursday 20.

7. Cliff, S. side of river, at curve
of river S.W. of Forbush Creek.
- 7 1/2. Prof. Miller took a view of the
same cliff looking down stream,
including our boat.
8. Rocks dipping N. on west side
of river, just below a point di-
rectly opposite the mouth of For-
bush creek. Some of exposure
about N 30 W.
- 9 View across Forbush shoal,
with cliff on north side of river
northwest of mouth of Forbush creek
as a background.

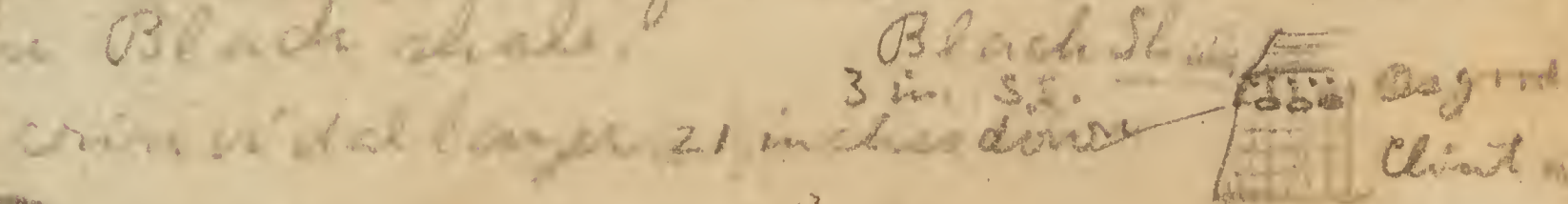
Base Black Shale 632.

Thursday - cont.

Section at William Richardson's house, north of mouth of Forbush creek, on NE side of river, from top of section Whitfieldia layer. See opposite page of this book.

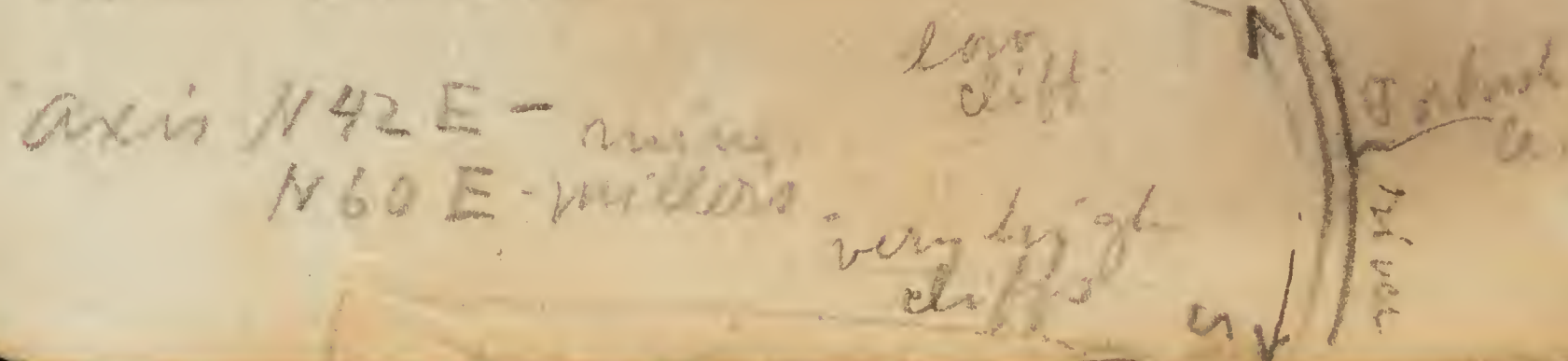
The readings all with hand level. The Whitfieldia layer is 50 ft above mouth of Forbush creek, corrected barometric reading.

About 1/4 mile eastward up the creek a small stream comes in from the north. Here there are 15 ft. 6 in. of limestone below the Black shale. This is indicated in the section on opposite page. A 3 in layer of sandstone seems to occur just beneath the Black shale but only a trace is seen. The crinoidal layer occurs 21 in. below the Black shale.



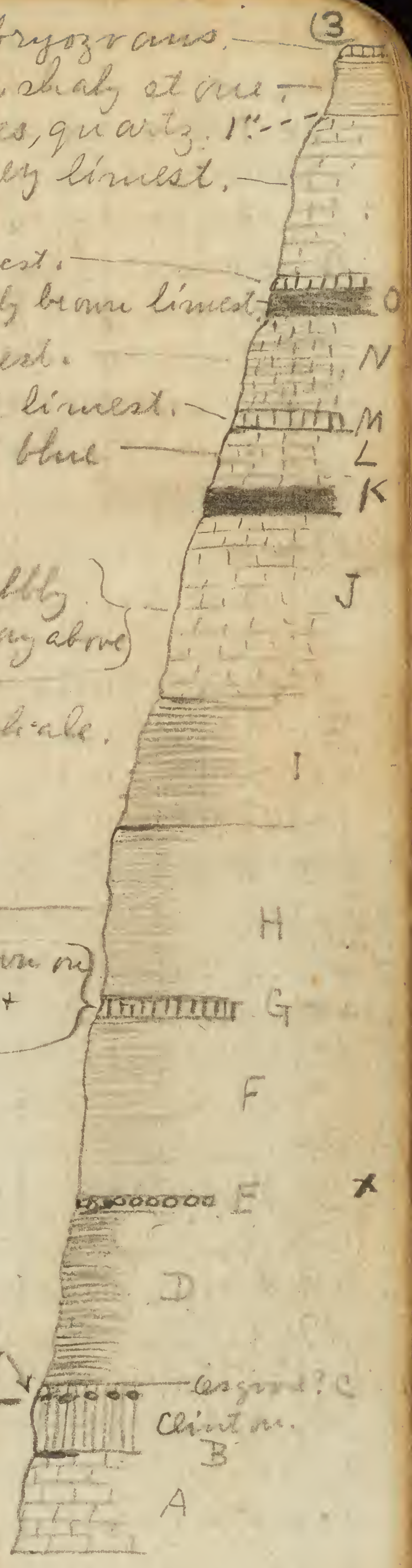
Opposite mouth of Forbush creek, on W. side of river, the Madison bed is 21 feet + thick, here not seen. Added to section on opposite page. Dip south.

From hills on west side the cliffs south of Forbush creek are seen to dip north. Anticline.



2 ft. shaly limest. full of bryozoans.
 13 ft. poor exposure. clayey, shaly at one.
 Tert. = lowest water worn pebbles, quartz, 1"
 Poor exposure. 35 ft. clayey limest.
 2 ft. 6 in. crinoidal limest.
 5 ft. 9 in. chert layers in rubble brown limest.
 20 ft. impure shaly limest.
 5 ft 9 in. solid crinoidal limest.
 12 ft. impure limest. light blue
 5 ft. chiefly chert.
 40 ft. bastard limest. rubble }
 decaying to brownish clay above }
 whitish clay below. }
 28 ft. harder more bluish shale.
 35 ft. soft grey shale.
 5 ft. limest. weathering brown on }
 surface, with chert nodules + }
 layers abundant. }
 39 ft. grey wavy shale,
 11 in. phosphatic nodules.
 39 ft. Black Shale,
 Wharf. cylinders, with large crin }
 beads, in upper 15 in. of limest. }
 15 ft 6 in. limest. greyish blue, }
 weathering much brown. }
 21 ft + bluish clayey Madison }
 bed, with coral, Columnaria? }
 many preserved.

Section N. of house of William Richardson.



X

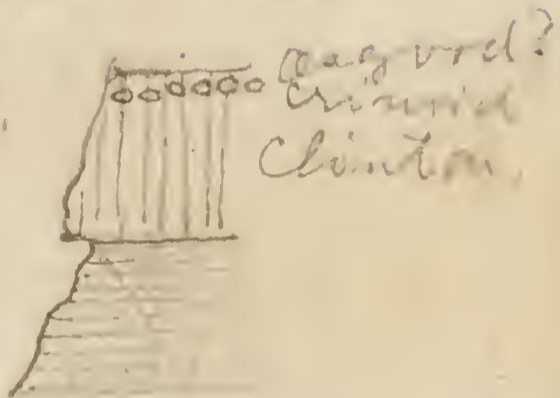
Base Black Shale, Little Cut Creek 591

Friday, 21 July '99.

10. View of Clinton rock exposure.
Just below the mouth of Little Cut Creek. Dip N 68 E, in the layers some nearest the mouth of the creek. Dip N 22 E near west end of exposure. Down stream on west bank the dip is southwest, precise direction of dip is unknown.

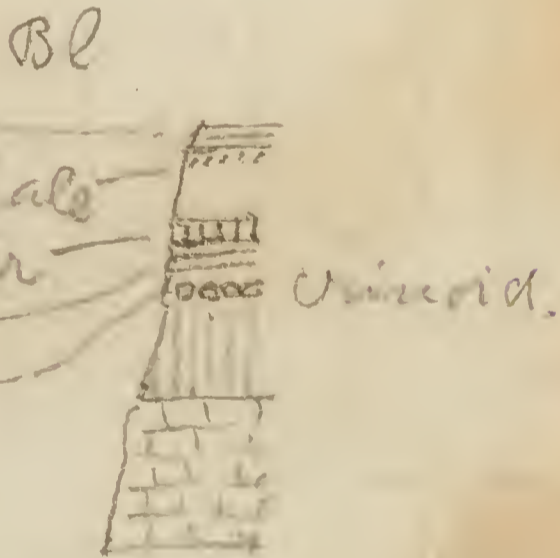
Section of view just below Little Cut Creek. Instead of following section take out below.

19 ft. of blue siliceous limestone weathering rusty brown.
19 ft +. Madison bed. clayey calcareous rock, very much like beds in Madison Co. etc.



Section of view just below Little Cut Creek.

Black shale
9 ft. probably all greenish clayey shale
2 ft of clayey limestone layers over
2 ft 6 in. of green clayey shale.
3 ft 4 in. Osgood limestone.
15 ft 8 in. Clinton limestone
19 ft. Madison.



Notes on above section.

The entire thickness of continuous limestone layers is 19 ft. but the base of layer with many large crinoid beads and what is called cylinder on 3 ft. 4 in. below the top, hence the amount of top of section is considered Osgood l.

Over this lies clay shale, then clayey limestone; these are well exposed at mouth of Little Cut Creek. Above this there is no continuous exposure; greenish clay shale is exposed at various levels, and 1 foot of this clay shale occurs just beneath the black shale as indicated in the section just described.

This makes the thickness of the total Osgood about 17 feet.
Clinton 15 feet 8 in.
Madison 19 feet.

Dip seems to continue southward as far as Norman's Landing.

About 1/2 mile east of Norman's Landing the layer marked I seems to occur at water's edge. At any rate it is the dark blue clayey wavy shale, and over it lies a thin limestone ledge with good *Spirifer* etc, and above this plenty of additional clayey shale.

See next page.

Beyond all question, there is no lower Silurian, Clinton, Osgood, or Black Shale here, nor is there any grey limestone. This indicates the existence of an anticlinal axis along the north-western edge of the river course.

Rained nearly all day.

Saturday, 22 July

Morris's Sanding, 2 mi. above Norman's Sanding.

R At this locality 26 inches of very fine-grained light blue dolomitic looking limestone is found overlying the thin bedded Madison. This may be equivalent to the gastropod layer of the Ohio river section.

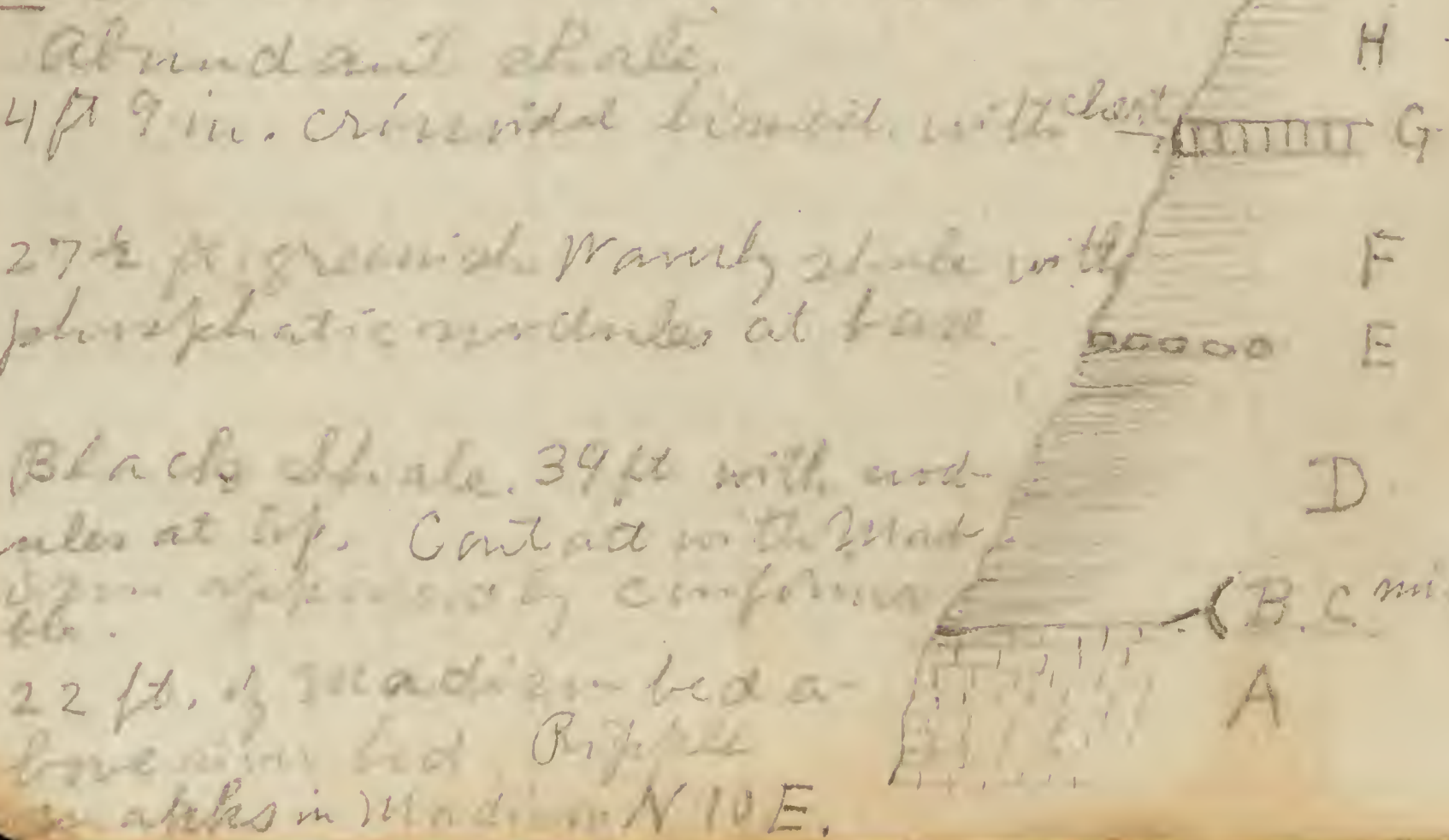
A comparison of the next two notes indicates a fall of layer G of 28 1/2 ft. toward E in going 1 3/4 miles.

Base of Black Shale 508.5

About 1/4 mile E of Morris's Sanding towards mouth of Falls Creek the layer G is found at water's edge. This is about 1 3/4 mile from next section.

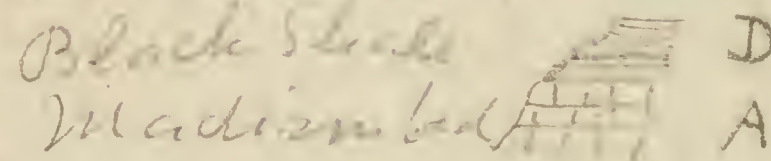
Base Black Shale 597

Section west of Norman's Sanding, just E of sharp bend where Cumberland river turns N. near Leadville. Section above this not measured.



Saturday cont.

Just above Thomas Branch on E side of river is Madison bed dipping N60W. The Madison bed here is a thin bedded sandy limestone, the thin beds however being together not being separated by clayey courses. The thin bedding shows up beautifully in cross-section. Ripple marks 1 foot below Black Shale N47W. Black Shale rests on Madison bed directly.



No legend or column.

Ripple marks strike in various directions in upper beds of the Madison beds. These directions change too much to make it worth while to record them.

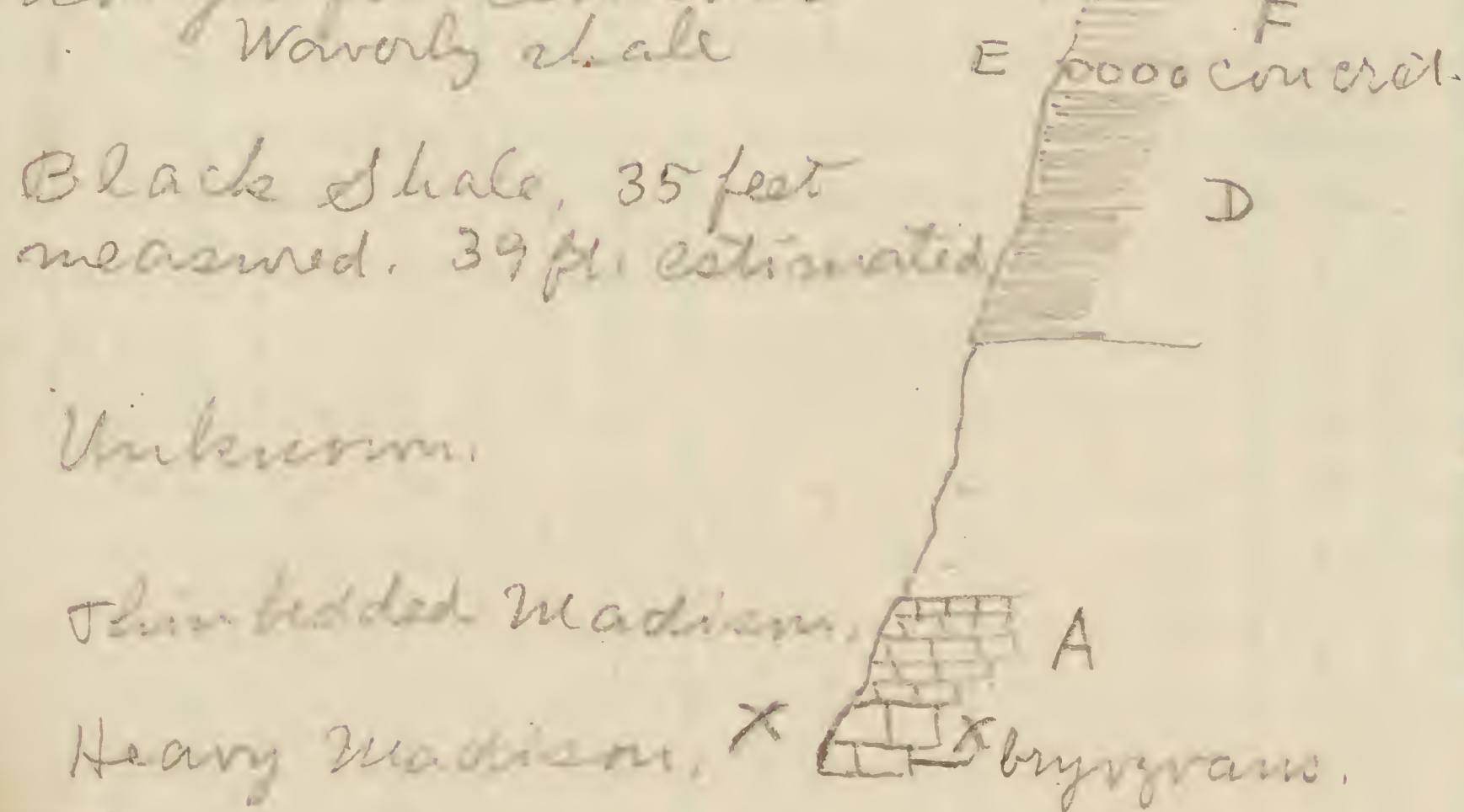
R Just below the mouth of Thomas Branch the Madison beds rise going north west and still further north west they dip north westward again. All the dips near Thomas Branch are merely dips of rocks as seen at their exposed edges along the river bank which here runs about N30W.

North west of Thomas Branch about 1/2 mile the top of the Black shale with characteristic nodules is found 99 feet above river, estimating the thickness of the Black shale at 39 ft, the base of the Black Shale is found at 60 ft. above water edge. The massive Madison beds are found at the base of the section at the mouth of a creek West of the creek the highest part of the underlying thin bedded Madison is found at 25 feet above the water edge. The missing part of the section is unknown. Strickland

Base Black Shale 632.

[*Heterospongia* (see below)]

be the remainder of the Madison section but there is room enough for Clinton:



About 1/8 mile north westward of last section is the second creek coming in from NE side of river, since passing Thomas Creek. Here some sponges & bryozoa were found near lower part of massive Madison beds, and these were sent to E. D. Ulrich.

Mr. Joseph Morrow, Rankin, Wayne Co. was present on this trip. See section above to which this fact was added.

Sponges = *Heterospongia subramosa*, Ulrich.

Rained nearly all day.

Tried to buy a wheel for our boat. Could not back the us.

Rock rise on going west to top of anticlinal. See next days work.

There evidently has been a rise of 60 feet for the base of the Black shale from Thomas branch to the creek just E of the anticline.

Base Black Shale 572.

Sunday July 23, '99.

Anticline near middle part of course of river where it flows westward, a short distance farther west it begins to flow southward. The fossiliferous beds below the Madison are brought up by the anticline. The axis of the anticline is a short distance east of the main bend of the river, changing from a northerly to a southerly course. At the axis of the anticline the section as far up as the massive Madison beds is exposed. Up the first stream going westward, and then up a small branch coming in from the north, the section is continued up to the Black Shale. The combined section is given below:

Base Black Shale 625

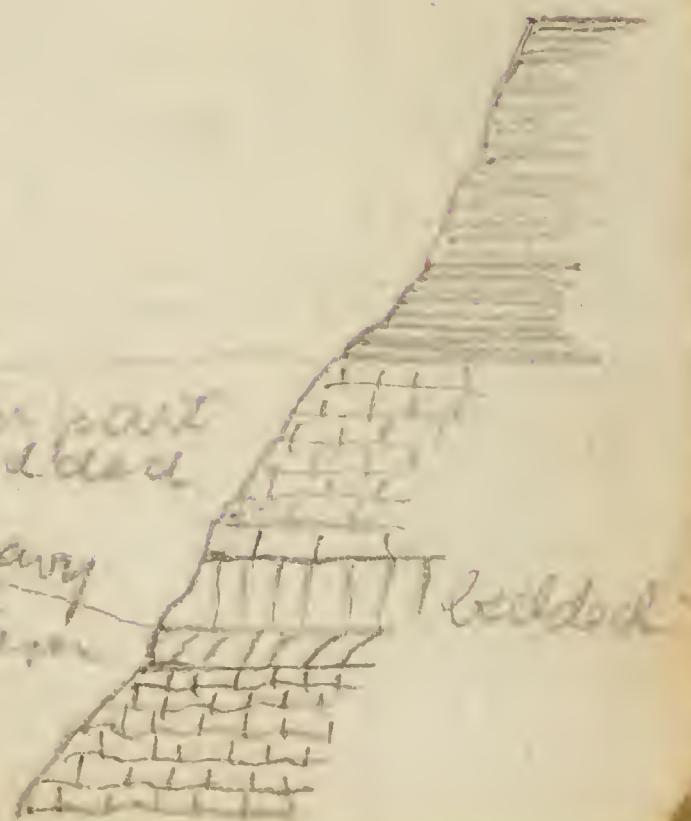
42 ft. Barometric. Prof. Miller Black Shale.

32 ft. Madison beds.

Upper part thin bedded 9 1/2 ft. heavy

4 ft. Transition beds to Madison

17 feet of Richmond beds.



July 24th

Sunday.

Continuation of section described
in preceding page described by
Prof. Miller. Heights are barometric.

Conglomerate gravel

Porous cherty fragments

Shale

Sandy crystalline limestone
crinoidal.

Cherty shaly limestone.

Dark chert or flint.

Sandy shale, more
irregular and calcareous
at top.

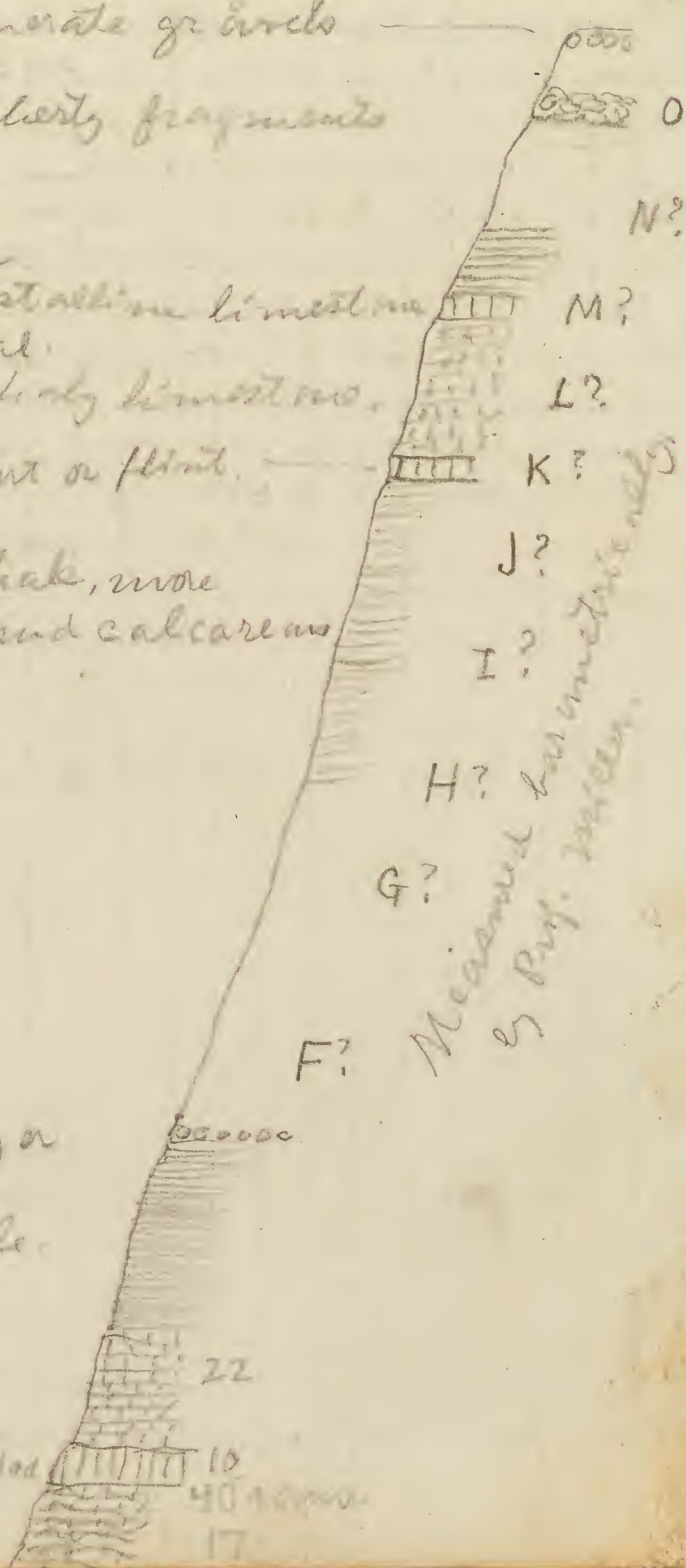
x Nodular layer

Black shale.

Thin bedded
Madison

Thick bedded Mad.

x Richmond
beds



22

10

40

17

Sunday.

Orthis bifurcata occurs in the thick-
bedded Madison bed from 3 feet
above the base to 7 ft above the base. It
is rare but can be found. 14 specimens
were found between the anticlinal and
the place called the ripple in the map.

The branching bryozoans are found
from 5 feet above the base to 7 ft 10 inches
above the same. 15 specimens found.

The globular bryozoans are found
from 5 feet to 6 1/2 feet above the base
of the heavy Madison beds.

Considering the fact that the heavy
Madison beds are 9 ft 2 inches thick
here, it will be seen that some *S. lucina*
fossils are found through its entire
thickness. Moreover the thick bedded
Madison is lithologically the same
as the overlying thin bedded Madison,
but the thin layers hang together and
therefore have a total massive effect
and break off in larger masses from
the cliffs. Moreover the beds are often much
thicker than the beds in the thin bedded
Madison are often only 1/3 inch thick.

Note the absence of the 26 inch blue
limestone layer (R) from above the
Madison. This denotes that the Black
Shale does not lie on the top of the
Madison, some of the Madison having
been removed by erosion.

The Richmond beds contain chiefly
Orthis bifurcata, and bryozoans.
Orthis occidentalis is rather but common.

Base of Black shale 617

a short distance west of Harmon's creek, the fossiliferous Richmond beds occur at water's edge. The base of the Black shale is exposed 58 feet above the river and the Black shale seems to be 33 feet thick. The top of the Madison beds is capped by a greenish shaly clay. The Black shale rests on the Madison. From the anticline described in the last section westward the rocks dip southward, but at the Harmon shales they dip northward and west of Harmon creek the base of the Black shale is almost as far above the river as at the anticline.

Base Black shale 618

Monday, July 24, '99.

About 1/2 mile E of Difficult creek

The following section is exposed:

- 15 ft. limestone, weathering to sandy rock
- 11 ft. white limestone
- 22 ft. sandy rock fragments, formerly limestone
Fine exposures.
- 32 ft. dark shaly rock, with occasional thin limestone layers.
- 4 ft. crinoidal limestone.

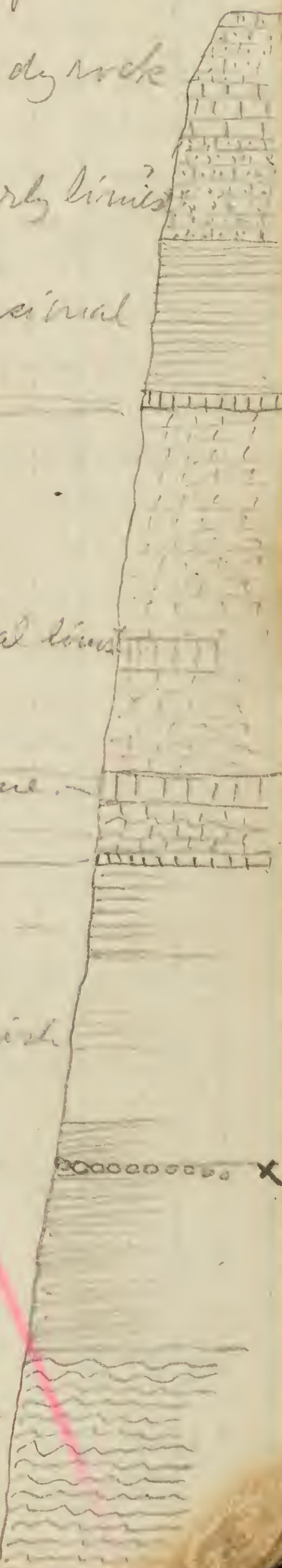
- 76 1/2 ft. Sandy stone, once a limestone?
Poor exposures.
- 4 ft. crinoidal limestone

- 6 1/2 ft. massive layer limestone
- 10 ft. rubble limestone
- 1 ft. fine grained limestone

- 66 ft. Wavy { dark blue shale
weathered brownish
nodular layers gray shale

40 ft. Black shale

- 51 ft. Richmond beds { upper part with
Citharis bifurcata
abundant
+ lower part with
Gastropods +
Pelecypoda.



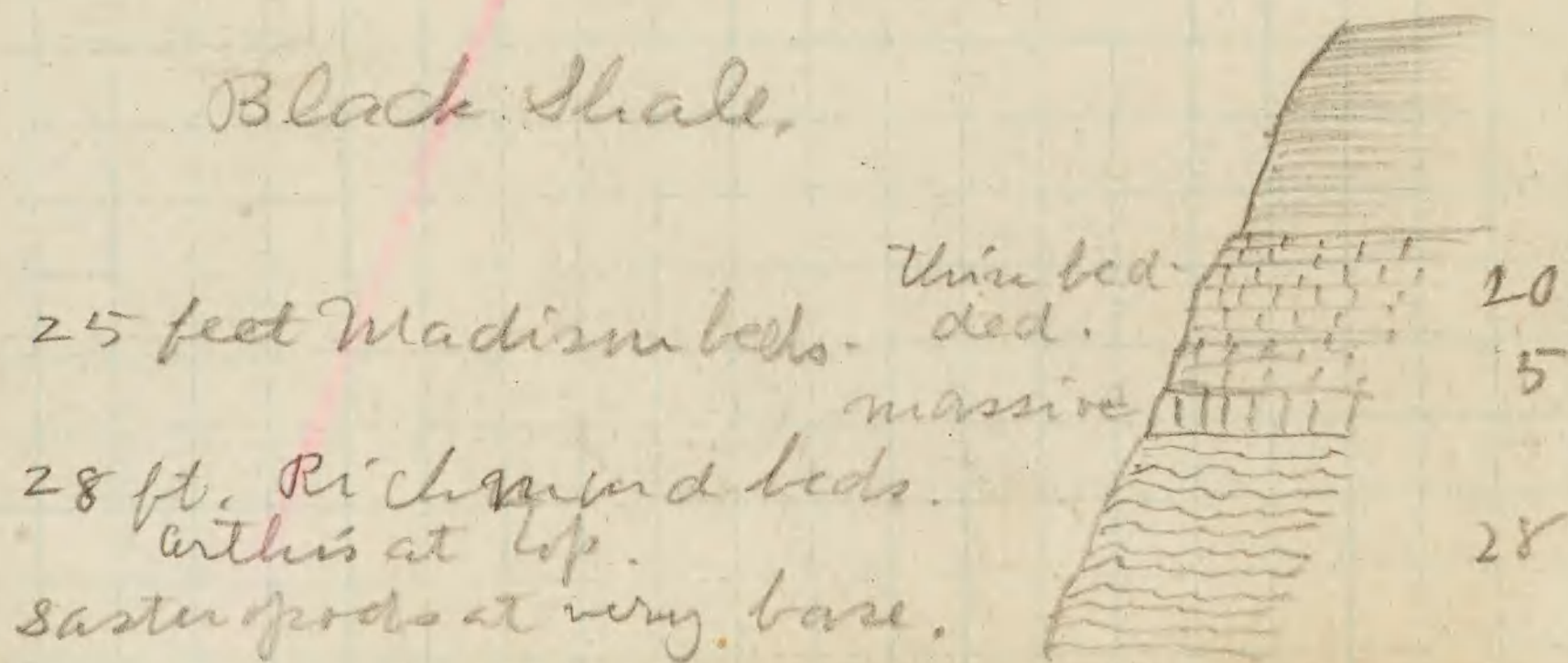
Monday, July 24, '99

If the upper part of the Richmond section of the preceding section, in preceding page is equivalent to the Madison then the lower Silurian age of the Madison is abundantly proved by the many lower Silurian fossils.

This is however very unlikely, since farther west, there where the river after flowing a little north of west turns north, and after 2 miles reaches the mouth of Wolf creek, the Madison is seen well exposed, the basal thick bedded layers and the overlying thin bedded layers being just as characteristically developed as in any previous section. It is very unlikely that in such a short distance the Madison beds should leave entirely but their characteristic features, and then have resumed them again a short distance farther on. This is the section at the bend of the river 2 miles S. of Wolf Creek:

Base of Black Shale 620.

Black Shale.



Monday July 24, '99

The Madison continues to be exposed in well recognizable form up the river as far as within 1/2 mile of Green or Dravin bar.

Section up the hill above the store, south of mouth (above the mouth) of Wolf creek.

Unknown. No river gravels seen.

8 1/2 ft. Chester sandstone. Raskaskia thinbedded.

22 ft. unknown.

3 ft. limestone

8 ft. unknown

17 ft. limestone, very crinoidal at top.

11 ft. unknown

11 ft. limestone.

11 ft. unknown. soft stone?

11 ft. limestone, upper layers with chert

12 ft. shaly limestone

22 ft. limestone. white, hard, with gray chert layer 16 1/2 ft above base.

33 ft. of darker clazy shale becoming lighter colored + more massive at top.

41 1/2 ft. crinoidal limestone. fine continuous section. Top layers with many small nodules

65 ft. Dark blue shale above.

Unknown.

5 feet limestone. Prof. Miller.

15 ft? Blackish shale. Prof. Miller.

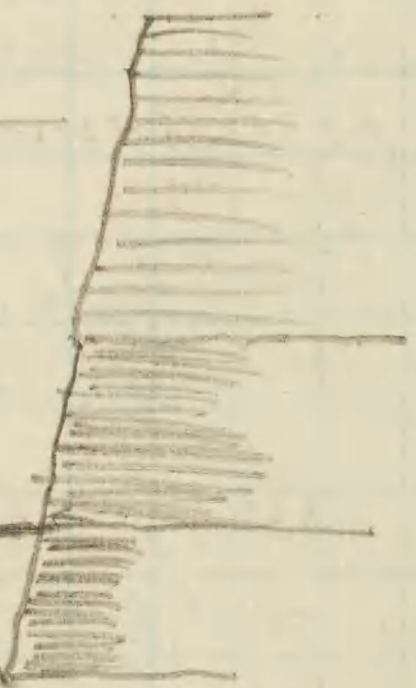
7 ft massive limestone about 7 feet

Continuation of section on preceding page.

39 ft. Wavy shale

22 ft. Black shale above water edge, River.

Probably 17 ft Black shale below level of river.



- 11. Views of river bottoms and cliff ss.
- 12. Carpenters from hill above Wolf creek store. The first view was taken from a higher altitude. Cloudy.

Set 2

- 1. Views of contact between thinbedded
- 2. Madison + Black shale, with 2 inch layer of sandy rock between. Prof. Miller says this is the phosphate bed beneath the Black shale, in Tennessee.

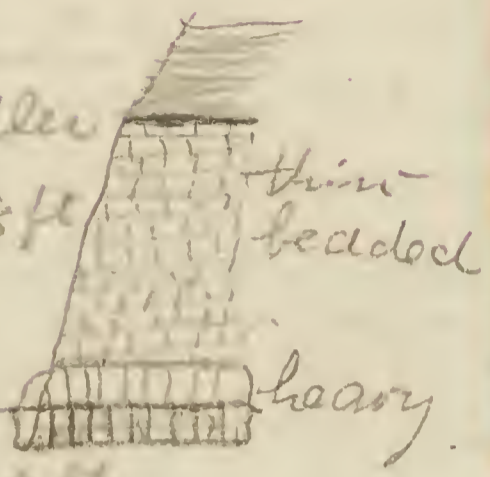
No. 3 spoiled. Shutter open. How this comes to be I do not know.

Black shale down to river edge to within a short distance of Sreasy Shoals going down the river. Madison top is beneath the river beds.

Base Black Shale 600

A short distance below Sreasy shoals on the west bank of the river is the following section:

2 1/2 in Sandy layer. Phosphatic bed Prof. Miller
 Thin bedded 28 ft thin bedded
 Madison beds 38 ft.
 Layer with branching layers and heavy
 Thick bedded 10 ft. heavy



About 5 1/4 feet below the top of the heavy Madison beds is a layer with more limestone character, containing quite a number of branching layers. Typical Madison corals found below this layer. *Orthis bifurcata* is found less than 2 feet below the top of the heavy Madison beds.

Tuesday July 25 '99, Bl. Shale 629, 19

About half way between Sreasy creek and Belk Island, on the west shore, the following strata is found:
 Black shale.

3 in. layer, sandstone, phosphatic with *Orthis bifurcata* & *Orthis recidivata* seen at very top.
 68 ft Richmond beds



The lower 20 feet are very fossiliferous, including *Orthis bifurcata*, *Orthis recidivata*, *Strophomena* etc.
 From 1-3 feet above the base of the Black shale a greenish clay shale intervenes. Black shale below. While the number of fossils decreases towards the top of the section and the layers become more clayey, there are nevertheless plenty of fossils here.

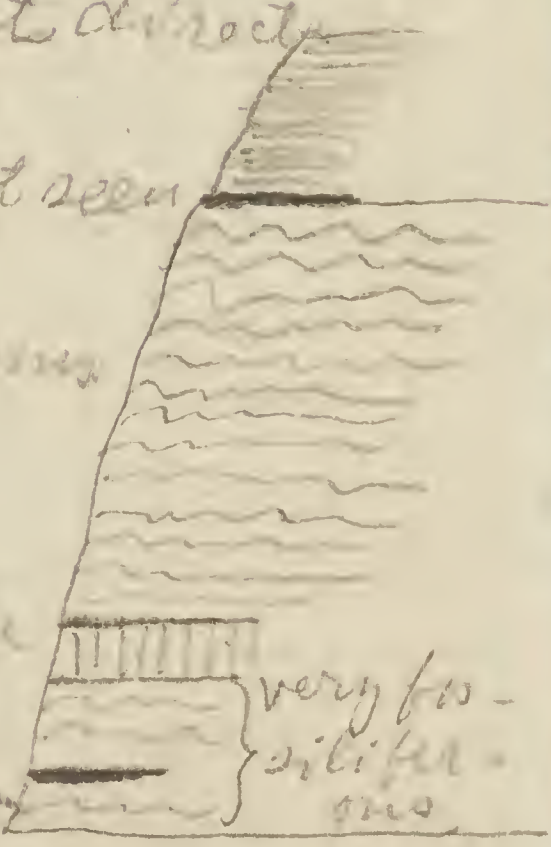
Along the bank north east of Belk Island very fossiliferous thin bedded layers with very marked layers, are exposed for a long distance dipping west.

At the southern end of the island, the east bank of the river shows the same strata dipping east.

About 1/4 mile beyond Belk Island, on the east bank of the river, the rocks dip west almost as far as Belk Island. Further southeast down the stream, there seems to be a southeast dip again, all of these dips are well marked but gentle.

Tuesday July 25, '99.
 About 1/4 mile beyond Belk Island,
 on the east bank of the river, where
 the high cliffs begin, the following
 section is found:

Black shale apparently rest directly
 on Richmond beds.
 white layer possibly absent, not seen
 more clayey, less fossiliferous
 chiefly brachiopods, massive
 very fossiliferous.
 5 ft above river. *Sabellia* + *Tetradium*
 abundant.
 the Black Shale 631.



Upper 50 feet of the Richmond beds
 more clayey and less fossiliferous
 weather less carry *Orthis bifurcata*
Orthis occidentalis enough to make
 possible to find these fossils at all

50 feet of rock below these 50 are more
 in appearance and are char-
 acterized by containing chiefly
 large *Orthis*.

The 17 3/4 feet are very fossilif-
 erous to the fact that these
 consist of regular limestone
 bed by thin clay partings,
 as to have the appearance of
 at Whiffen can well + can
 some fossils.

At the bottom of this section
 is a thin layer of *Tetradium*
 in a layer 2 1/2 ft thick.

Tuesday cont.
 At the bend of a river, about 1/2
 beyond Belk Island, I took the
 following photographs.

- 5 } a little further down the river.
- 6 } One a time exposure.
- 7 } One a time exposure.
- 8 } a little further up the river.
- 9 } One a time exposure.
- 10 }
- 11 } Still further up the river.

All of these views were taken in
 300 feet of one another. The
 long notes will enable me to
 analyze the elements of the sections in
 these photographs.

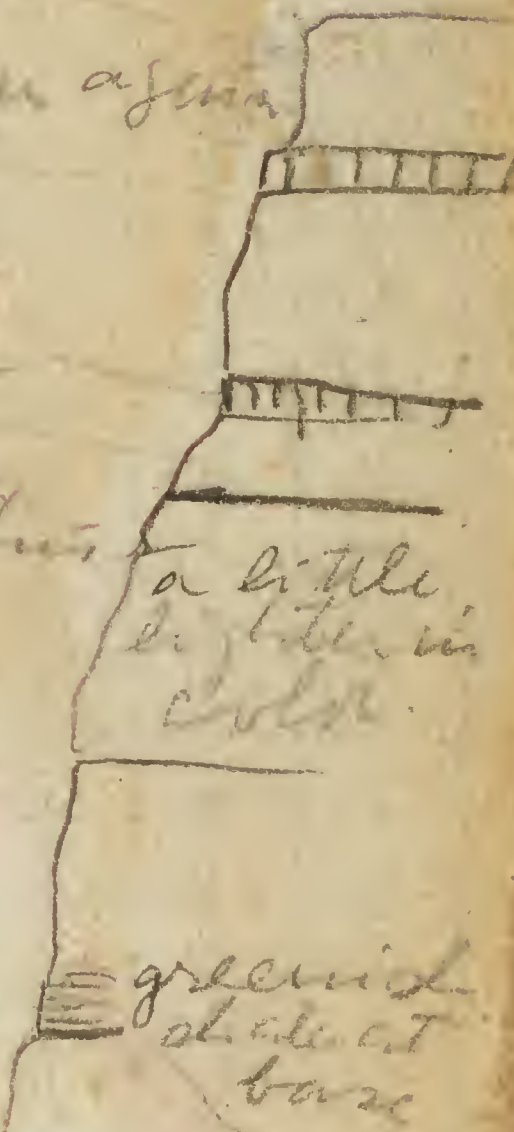
More white shale.
 A little above here trees begin again
 Thick limestone
 very light wavy
 a limestone layer
 a little more bare.

Tops of trees reach about this
 level.
 Wavy shales

Black shale

Trees begin at this level
 Vertical cliff of Madison
 with few fossils.

Well bedded Richmond



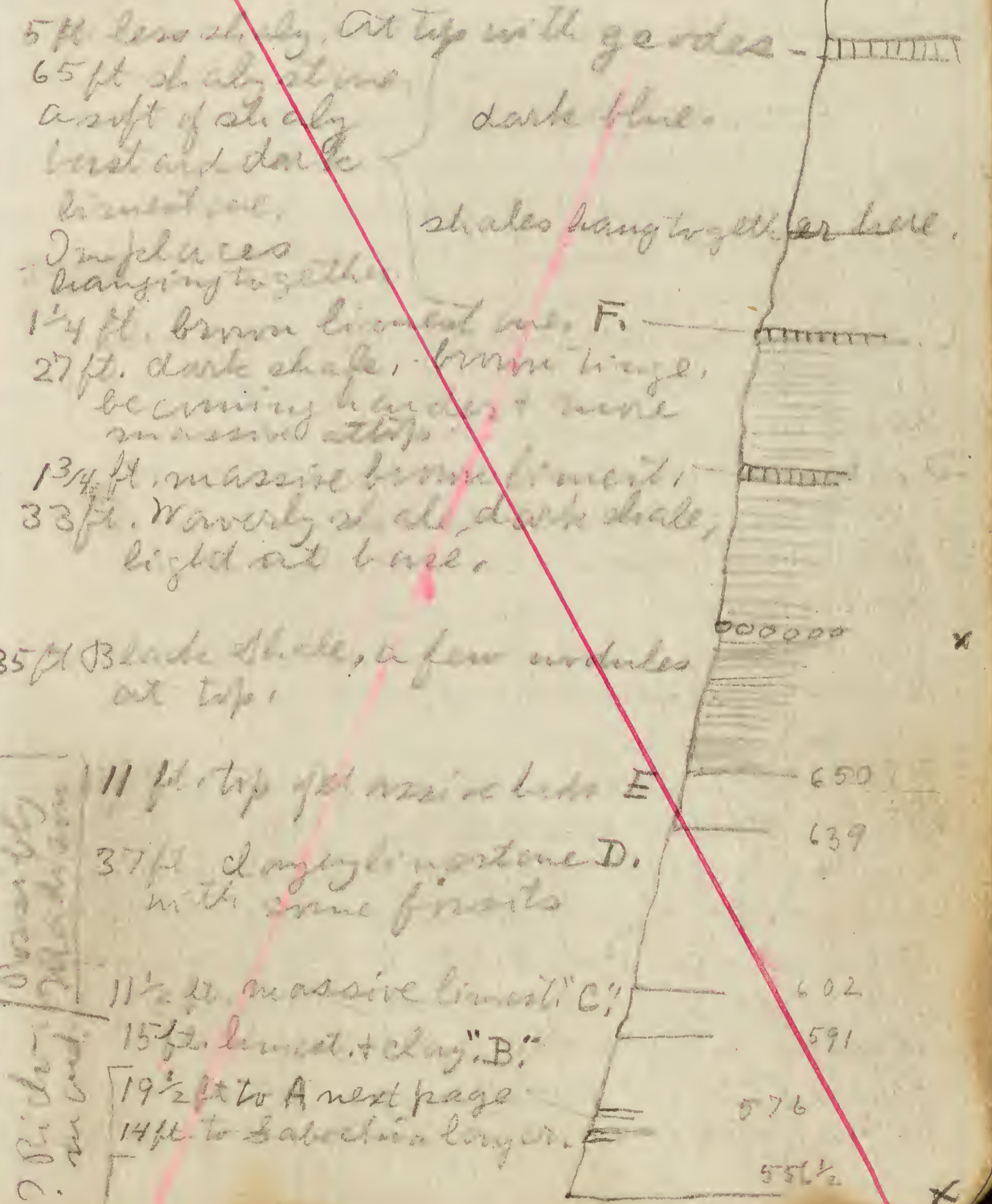
Tuesday.

At this place about 2 feet of greenish shale can be seen only at the base of the Black shale. Only about 1/2 foot of black shale intervenes between the greenish phase of the Black shale and its base. This greenish phase of the Black Shale was first noticed half way between Greenay creek + Belle Island. See notes 3 pages before this.

About south of the western end of Belle Island, on the next turn of the river, where it flows west, on the north bank of the river, the rocks dip east. About 10 feet of very sandy limestone with marked crossbedding are exposed. Towards the top Bryozoa remains, and a few *Latonia occidentalis* + *O. bifurcata* come in. About 10 feet of fossiliferous limestone marks the sandy beds and about 2 1/2 miles above Romney the rocks dip west again and about 2 miles above Romney, the *Tetradium* and *Sabochia* beds are found about 10 feet above the fossiliferous beds last mentioned. All of these are arrangements and phases but the important part is the existence of strongly crossbedded beds at an great distance below the *Sabochia* beds of the area on 1/4 mile below Belle Island.

Wednesday July 26, '99, Bl. Shale 650 (23)

Just below Mason branch, at the beginning of the high cliff exposure on the north side of the river, 2 miles above Romney, the following section is seen:
5 1/2 feet thin shales, dark.
1 ft. massive limestone weathering brown
45 ft. dark shales - limestone shales.



Wednesday.

- A. 19½ feet above river to a layer with small specimens of *Sabachia* + *Tetradium*.
- B. 15½ feet of limestone layers and clay layers in about equal proportion well interbedded. The layers about 3-4 inches thick. Here I found *Strophomena alternata*, *Crustaceia festuciformis*, *Pterinea demissa*, *Orthis bifurcata*, a form with scarce by any large line. The uppermost layers contain good *Sabachia* + *Tetradium*.
- C. 11½ feet of massive limestone well exposed.
- D. These massive clayey beds with a few fossils, resemble the Madison beds in many ways but differ in containing fossils. At the very top is a bed with very many *Orthis bifurcata*.
- E. 11 feet of same kind of massive beds. *Orthis occidentalis* is found within 6 inches of Black Shale. The base of the Black Shale rests upon this massive beds and Prof. Miller dug out shale resting upon *Orthis bifurcata*, in such a manner that an impression of this fossil was preserved in the lower part of the Black Shale.

Wednesday.

F. 14 ft. brown limestone, with not many small rounded beads + a few *Spirifer*, inclined to break up into shaly fragments.



G. 22 feet of massive white limestone, with nodules, especially near the top - St. Louis according to Prof. Miller.

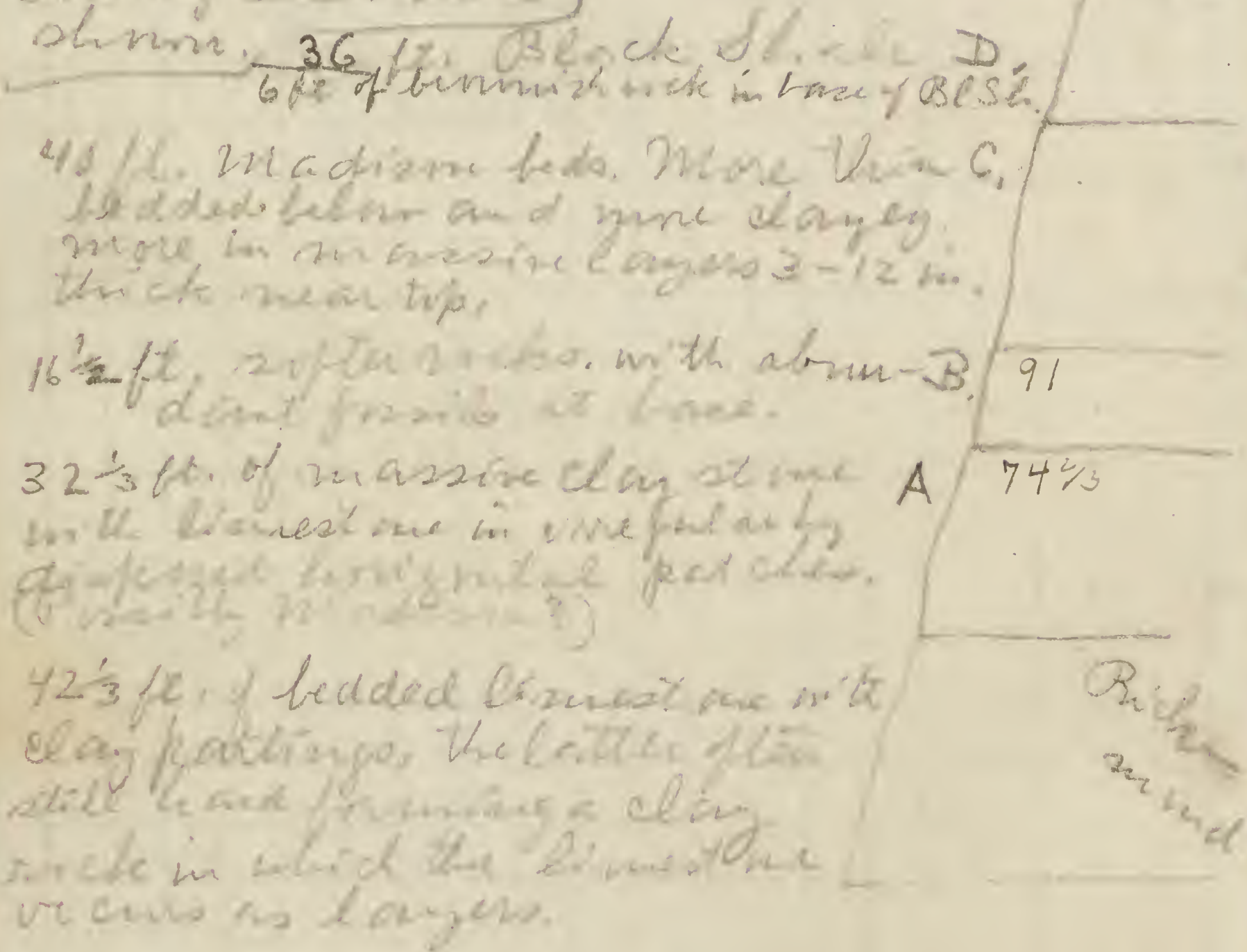
at Rowena. The lower Richmond beds, 20 feet exposed on Sairosville side. About on horizon of part just below Madison.

Set 2

12. View of a well pump, in principle of sand pump, 65 foot driven well owned by store keeper at Sairoville.

x The day, July 27, '99.
 Black Shale 681.

About half way between Indian Creek and Long Bottom Island, a little nearer Indian Creek, a short distance before reaching the strong bend to the right, the following section is shown.



- A. *Isotelus*, *C. bipartita*, *A. vici*, *Lentile*, *Canabell*, *truncata*, *truncatiformis*, *Bucania*.
- B. Section above base not exposed.
- C. This is the appearance the Madison bed should have if this bed changed to a gentle fine limestone. The limestone is very dense, very fine grained, of medium blue or rather light blue color. Where weathered, it shows that it is made up of very thin bedded layers.

Thursday
 bringing together. It is practically impossible for me but I found in it one specimen of *Singulopsis*. Does this indicate Lower or Upper Silurian age. at top =

The occurrence of quite typical Madison beds on the clayey beds with few regular limestone layers, which I have suspected to be Madison further up the river at a number of points is very interesting. Does this mean that the Madison does not become fossiliferous when followed horizontally from exposure to exposure?

at base of black shale is a brownish sandy appearing rock which when freshly fractured appears as though it might be the base of the Black shale here, corresponding to the greenish more clayey beds seen in the base of the Black shale in the section half way between Greasy creek + Belle Island. See 8th page preceding this. The very thin bedding shown by this brownish rock is especially characteristic and suggests relationship to a shaly rock and as I suppose from previous sections, to the base of the Black shale.

See 4th page following.

Thursday, July 27, '97 cont.

The section just described is a little east of the center of a long low flat syncline. For a short distance below Indian Creek strata the rocks dip westward, at first rapidly & then more slowly. Then for a long distance they are nearly flat. A short distance above Snybottom Island the same rocks dip quite strongly southward a little east of south.

At the lower end of Snybottom Island the rocks dip northward or northeast. Half way between Snybottom Island and Little Indian Creek the rocks dip northeast again. The dip in the opposite direction between these two localities was not very marked.

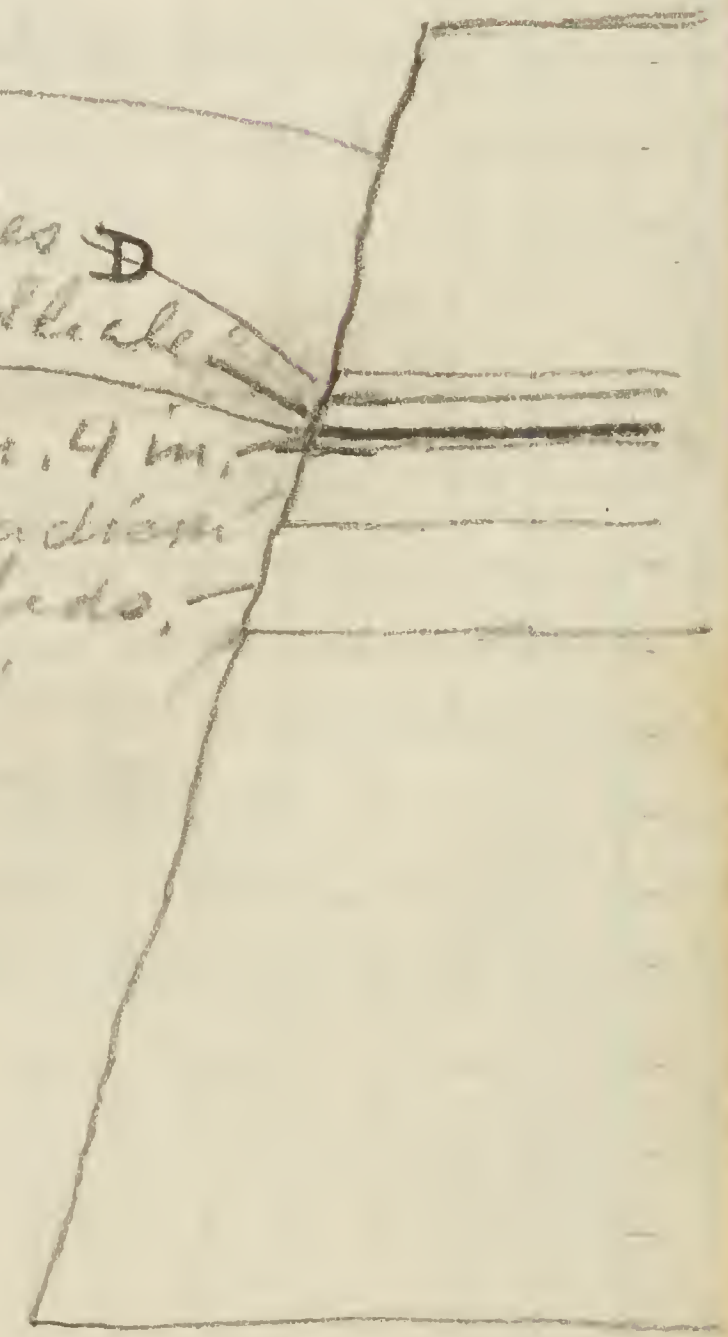
Near the northeast end of the high cliffs extending on the west bank of the river from Snybottom Island, northwards, a path leads up to a house, and thence a road leads back of the highest ridge up the river, to a school house which may be seen on top of the high ridge, on coming down the river. Half way between the house first mentioned and the school house, is a log cabin opposite which is a little gulch in which the following section was found:

Bare Black Shale 656.

See 2nd page beyond for continuation of upper part of this section.

Black shale,

- 2 1/2 ft. Rather coarse dark shales ^D
- 3 ft. Greenish layers in Black Shale ^D
- Black Shale 4 inches.
- Residual phosphatic layer, 4 in.
- 12 ft. 9 in. Thin bedded Madison
- 11 ft. heavy Madison beds.



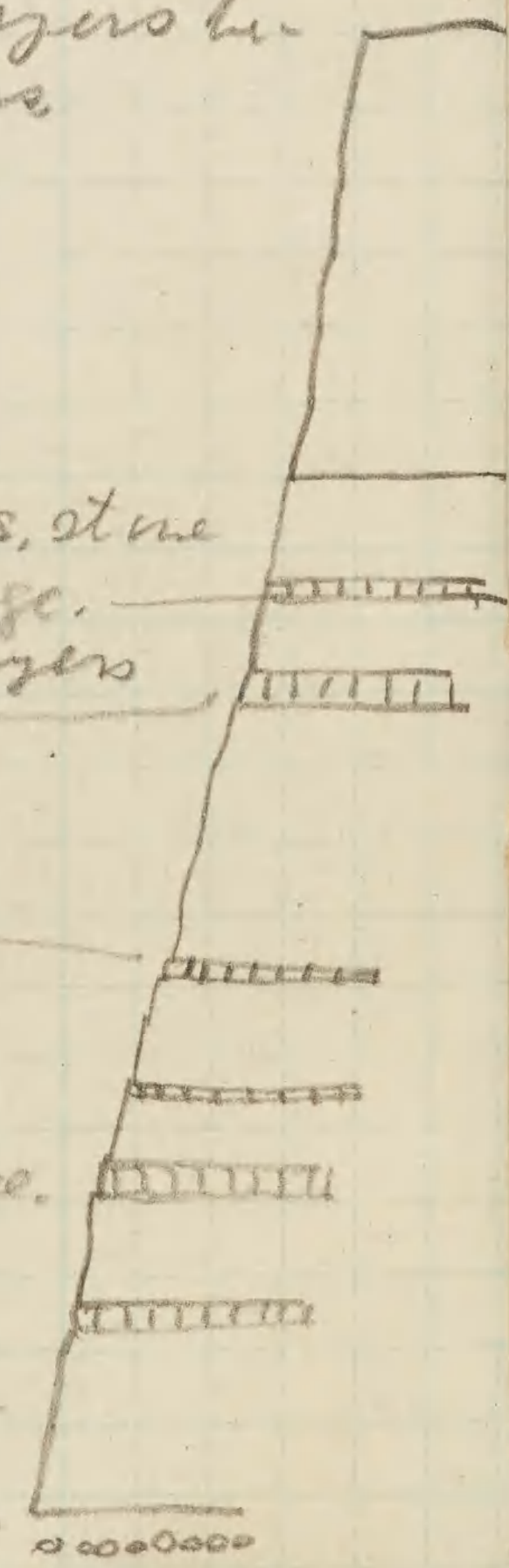
83 ft. not observed.

^D These shales look a great deal like some of the dark Waverly shale. They are irregularly fractured, and do not break up into the thin fissile shales characteristic of the normal Black Shale.

Continuation of section on 4th page preceding, half way between Indian Creek + Smyth Island, Barometric measurements by Prof. Miller

Top of knob, where the layers become more calcareous

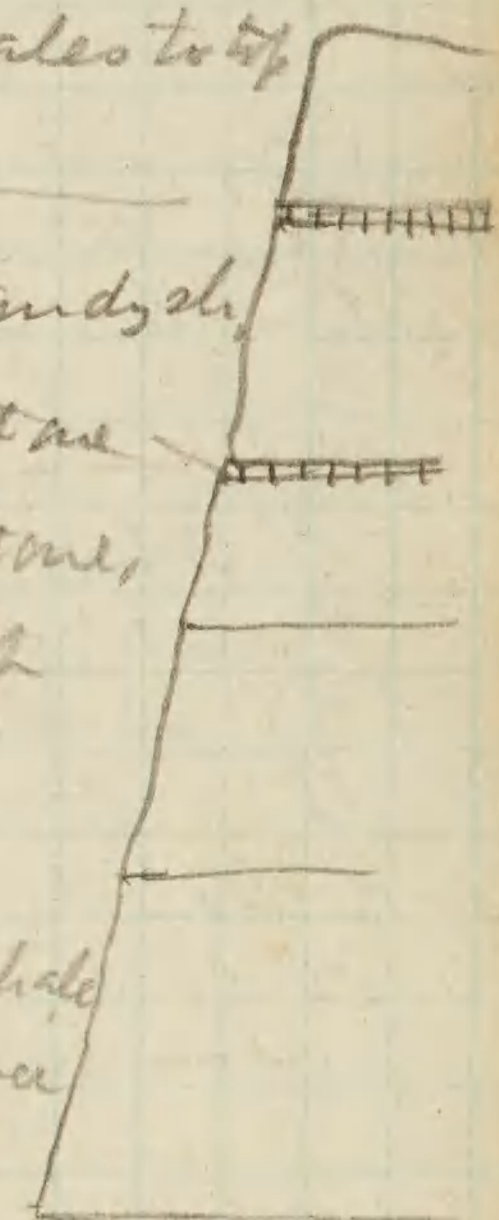
- 60 ft. shaly sandstone.
- 15 ft. shaly calcareous ls. stone
- 2 ft. sandy limestone ledge.
- 10 ft. sandy calcareous layers
- 4 ft. limestone
- 35 ft. shale.
- 2 ft. limestone
- 15 ft. shale
- 2 ft. limestone
- 10 ft. shale
- 3 ft. Yellow limestone shaly at base.
- 15 ft. shale.
- 3 ft. reddish brown limestone
- 25 ft. sandy shale
- 4 ft. Sand ore
- * Nodular layer



Continuation of section described on the 2nd page preceding this, but the measurements are all barometric, by Prof. Miller. = Upper part of section at Smyth school house

- About 20 feet of calcareous shales to top
- about (2) feet of limestone.
- About 30 ft. of shaly limestone + sandy sh.
- about (2) feet of massive limestone
- about 18 ft. of shale + shaly limestone,
- About 30 feet of massive ledges of limestone, Waverly.

40 ft. These must include Black Shale and base of Waverly, Only the lower part of Black Shale is exposed.



Friday July 28, '99 **Black Sh. 670**
 Section above Rock House Natural Bridge
 20 feet to top of knoll, not exposed,

44 ft. of sandy brown rock, once a sandy limestone.

19 ft. of wavy shale, harder, forming cliff.

77 ft. of wavy shale breaking down.

7 ft. of limestone weathering rusty brown.

21 ft. wavy shale.

* Black Shale Typical Black Shale.

37 ft total Base of Black Shale weathering soft
 5 1/2 feet of solid blue limestone C.

Mediam Thin bedded mediam D
 Heavy mediam

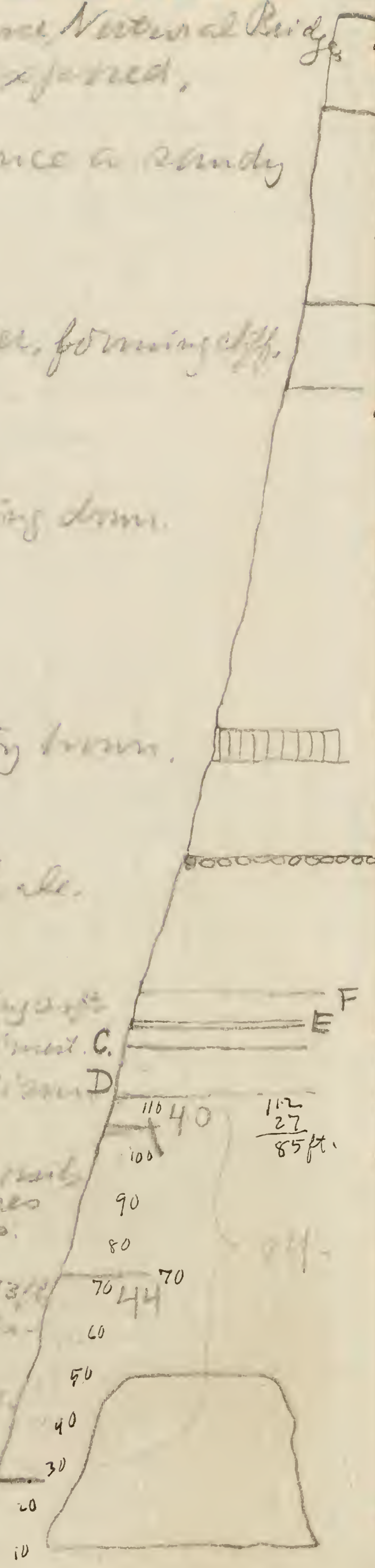
Clay beds with fossils
 rather in soft masses
 not forming good beds.

Plenty of fossils up to 73 ft
 in clay with. Dinosaur
 fossils above.

49 1/2 ft to top of Bridge

27 1/2 ft to top of rocky
 fossiliferous beds

Richmond 11 ft. to base of Bridge



Set 5 (35)

8. Time, large view of view from top of cliff above
9. Instantaneous. Bridge, looking south towards crevasses. Showing broad bottom included in U shaped course of river. Looking towards crevasses, a few houses in distance on left side of river. The river course is indicated by the long run of trees. The hills on left of these are the plateau margin in the valley which the river has cut.
10. View up stream. View from cliff above Bridge.

11. Two views of cat fish which ran away
12. with pole + was caught 2 hours later.

Explanation of section on preceding page.

- F. From river bank the base of Black Shale cliff is seen to weather + form a sort of soil.
- E. Residual layer, hardly 2 inches more like SS.
- C. This stone corresponds to the stone in which I found Lingulella. It is very finely grained + dense, and cut into very small pieces which I do not recognize. Some of these fossils are gastropods. This stone corresponds lithologically best with the gastropod layer, near Mediam, Indiana.
- D. Judging from amount exposed on vertical side of cliff when it could not be measured, its thickness is about 12 ft. This number is partly secured from a previous section. 6th p. preceding

8 Oct 6

1. Two views from lower part of river
2. Back towards the Rock House.

About 1 1/2 miles S. of Self also the lower 2 1/2 - 3 feet of Black Shale still weather more readily and form a soil in which trees take root.

(Fossils at Fowler's Sanding.
See 2nd page following this)

- Isochilina suburosa var.
- Modiolopsis sp.?
- Ischyrodonta near truncata.
- Glyptodesma gibbosa.

(Fossils above Baker's Sanding)
See 6th page following

- Ischyrodonta near truncata
- " " elongata
- " " discipiens.

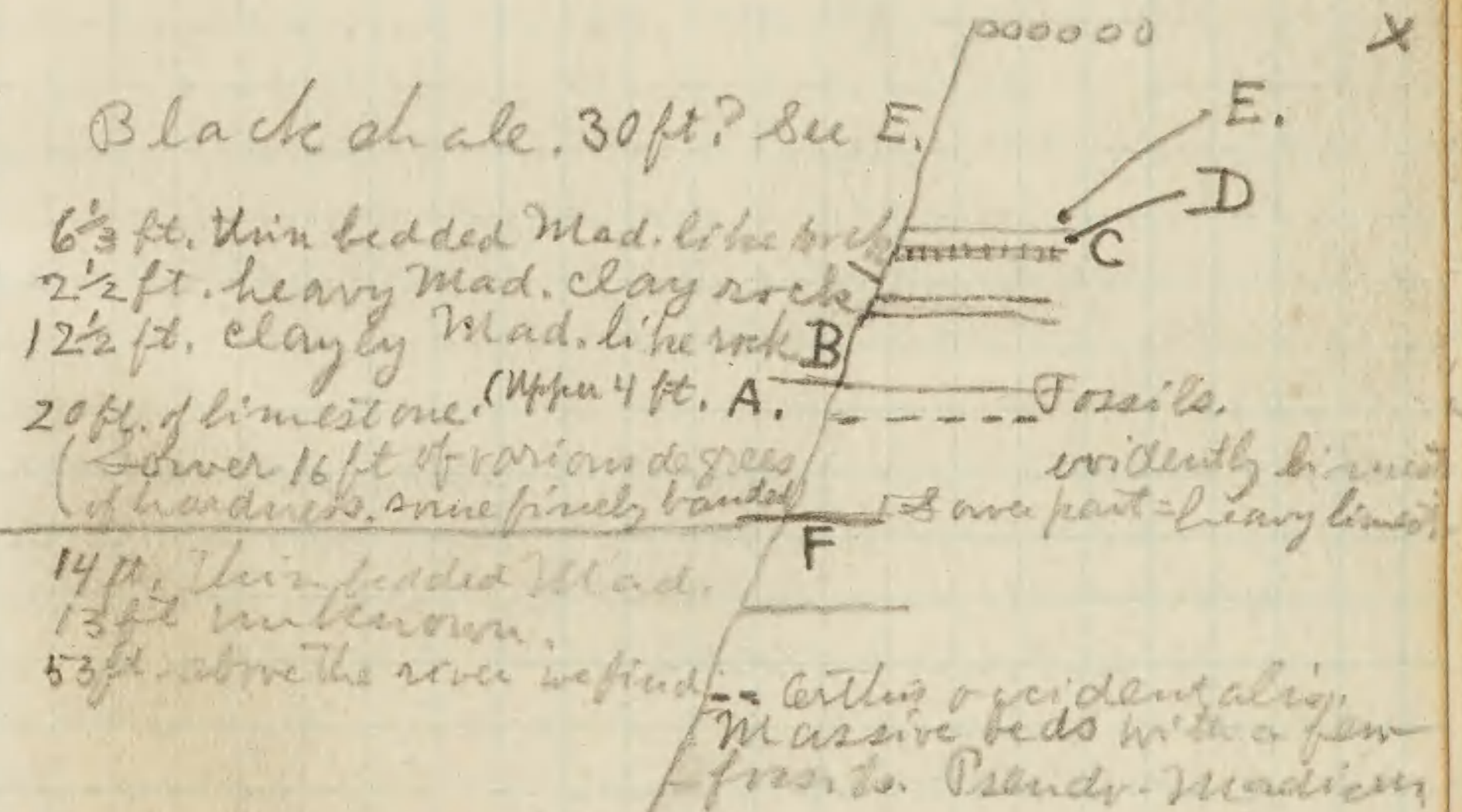
- Byssozonia robusta
- Aphyospora Bordeni
- Bellerophon Mohri.

Saturday, July 29, 1899.

Just below Willis creek also I began the following measurements but the upper part of the section was completed above Sick Creek, up the hill above the stone, i.e. N.E. of Fowler's Sanding.

- 3
- 1/2
- 6 1/3
- 2 1/2
- 12 1/2

Base Black Shale 660.



A. Upper 4 feet of the 20 ft. of limestone consist of dense blue limestone, in 4 layers. The top layer is very fossiliferous and contains *Arthroceras*, *Murchisonia*, *Pterinea*, *Modiolopsis* ^{var.} *occidentalis*, & a smaller *Modiolopsis*? I collected quite a number of fossils here. (For fossils see 2nd page preceding this)

The lower 16 feet also consist of limestone but it is evidently a thin-banded limestone, though the thin bands being together so as to form quite a firm stone. These thin banded limestones however weather more readily than the limestone courses which do not show any bedding.

The upper limestone beds show on the weathered surface, gastropods and other fossils very much in the same style as does the gastropod layer along the Ohio river country near Madison Indiana and thence southward. They correspond to the massive beds at Rock House, apparently by, or overlie these beds.

B. 12 1/2 feet of clayey rock, weathering into clay shale. The basal part formed of hard, rather siliceous looking thin courses.

C. 7 inches of rather solid limestone.

D. 3 feet of clayey Mad. like rock massive looking; weathering into a soft clayey rock.

E. At the base of the Black Shale, the lower 3 feet weather more readily. The total measured section up to the nodular layer gives in 30 feet for the thickness of the Black Shale. Perhaps the nodular layer has fallen down the hill side a little but of this I have no evidence.

F. The lower part of the section was secured from the end nearest W. Ellis creek shovels. The 14 feet of thin bedded clay limestones there underlie 3 1/2 feet of heavy limestones. These limestones I assume to be the lower layers of the 20 feet of limestone shown in the Fowler's Sanding section.

According to this interpretation, we have here at least 21 1/2 feet of rock above the rock shown at Rock House.

In that case the thin banded limestone which has the massive appearance and which evidently belongs above the thin bedded limestone contains chert. Unfortunately I do not remember whether the limestone bed with chert actually was at the base of the 20 ft. of limestone at Fowler's Sanding. I am not certain.

Just above the mouth of Crocus Creek the following section was exposed:

Rest of section above this same as at Rock House.

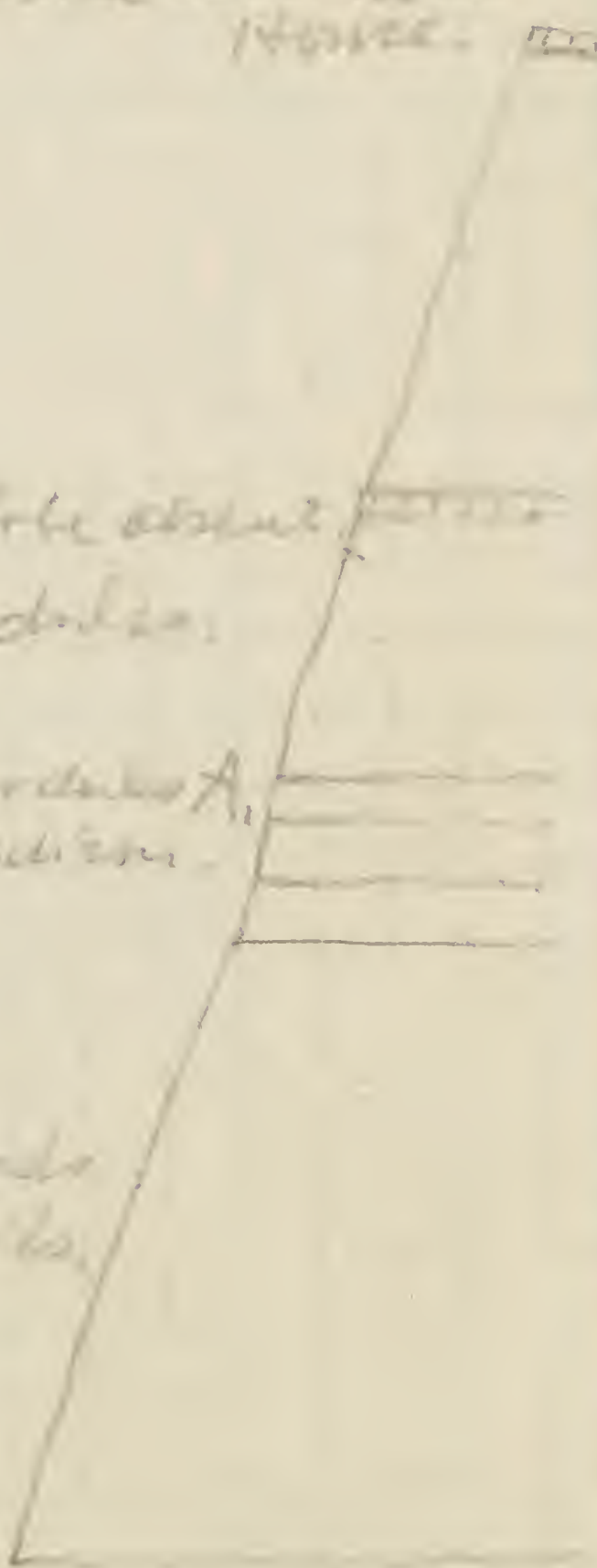
1 1/2 ft. almost one.

57 feet Sandstone

3 ft. thin limestone
Lower variety recognizable about

35 ft. of Black shale & sandstone
Prof. Miller found one

4 3/4 ft. heavy limestone with chert nodules A
8 1/2 ft. thin bedded clayey limestone
8 1/2 ft. not exposed



A. This is the layer at top of Rock House below Siberian. Is it at the base or top of the 20 ft. of limestone exposed above Fowler's Landing.

Just

West of Crocus creek is a strong westward dip of the rocks. These place the oil wells were once situated. The oil bubbles up part of the time and the wells were sunk 700 feet on the northern river bank.

Set 6

- 3) Views of the westward dipping
- 4) rocks at the oil wells. 2/3 there
- 5) is an anticline here the east side of the anticline is not seen here.

A little farther west a layer corresponding perhaps to the same as Madison at the base of the Madison, and almost immediately underlying beds containing fossils. Contains either granules or clay pebbles of about the same character. The fact that all the pebbles are about the size suggests that they are nodules. Found 21 feet above water. Nodules 3-3 1/2 in. diam. 2 in. thick. Thin bedded Madison 17 feet thick immediately above, present as with chert nodules over this.

Sunday July 30, '79.

Set C

6. Views of synclinal just below
7. mouth of Rennie's Creek. There
were formerly oil wells here. The
Big American well was sunk
into the bed of this creek.

A short distance above Bakertown
Sanding, where a stream of water
runs over the cliff rocks (only a
small stream, towards the hill
summit, a considerable number
of limestone fragments, partly cherty,
are found, and contain the same
fossils as those found at Fowler's Sand-
ing. (For fossils see 6th page preceding.)

At Bakertown Sanding, up the cliff
just above the Sanding, the lower
shaly Madison rocks are well ex-
posed near the upper part of the cliff
section which is free from chert. The
top part of the cliff section free from
rocks is formed by about 4 feet of lime-
stone with chert nodules. ^{Rock House} Above this
are quite a number of feet of thin-
bedded limestones, weathering shaly
in places. Above this occurs several feet
(4?) of fossiliferous limestones, con-
taining the same fossils as those found
at Fowler's Sanding. Above are about
10-12 feet of thin bedded rock, in which
are thin siliceous masses looking like
siliceous forms of *Syellia* until exam-
ined. The Black shale probably once oc-
curred immediately above this.

Just above the mouth of Rennie's Creek
the following section is shown:

Base Black Shale 620?

Black shale?

5 6 1/2 feet. thin bedded limestone
+ clayey limestone.

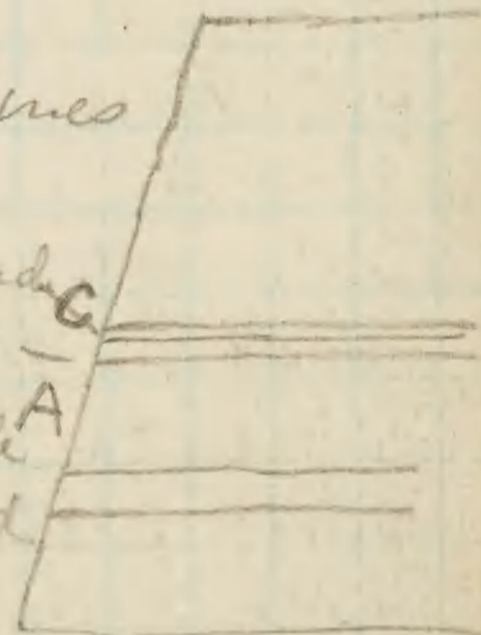
1 1/2 ft. heavy limestone, lamellibranch C

2 ft. of dark shaly limest. or clay. B

13 ft. 9 in. thin bedded limest. + shale A


5 ft. Rock House limest. with chert nod.

14 ft. clayey shale, thin layers.



A. Main part of section consists chiefly
of thin bedded clayey shales, but lower
part and upper part of section con-
sists of thin bedded limestone, easily
breaking up along the bedding. The upper
1 1/2 feet of this rock probably formed
part of the 4 feet of limestone inclu-
ded in the upper 4 feet of stone sepa-
rated from the 20 feet of limestone at
Fowler's Sanding under the name
of the fossiliferous beds.

B. With *Orthis occidentalis*, *Am. long-*
chra radiata, *Pterinea acuminata*.

C. This limestone is very fine grained &
still belongs to fossil limestone beds.
Same as at
Fowler's land.  1/2 X

Just below Rennie Creek is a well marked syncline which was plotted & graphed. A little farther down is a very strongly marked anticline. At Rennie creek the pseudo-Madison beds do not appear at all. They come up however at the anticline farther down the river.

At Rennie creek there are 56 feet of rock exposed above the fossiliferous limestone beds. Does this mean that in the Rennie Creek syncline a greater thickness of Madison beds was preserved than for quite a distance up the river. At Rock House the Rock House cherty bed is preserved. At Fowler's Landing the Fowler's Landing fossiliferous limestone, and at Rennie creek, the Rennie creek upper Madison beds. This indicates a thickening of the Madison series in this direction.

Set 6

- 8) Below Alexander Bar, just before reaching the bend of the river,
- 9) there is a strong dip of the rocks
- 10) up stream, then they are nearly level for a long distance. Apparently a sort of anticline structure with a nearly level axis.

Monday July 31, '99.

About a mile above Burksville, on the south side of the river, the following section is exposed.

Black Shale (About 156 ft. above river.)

44 ft. about to base of Black Shale.

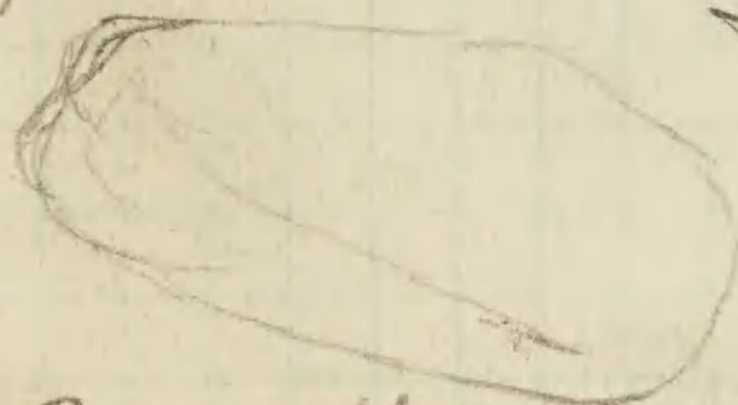
24 ft. additional to top of fossiliferous layer. A.

88 ft to heavy limestone with chert

156 ft.

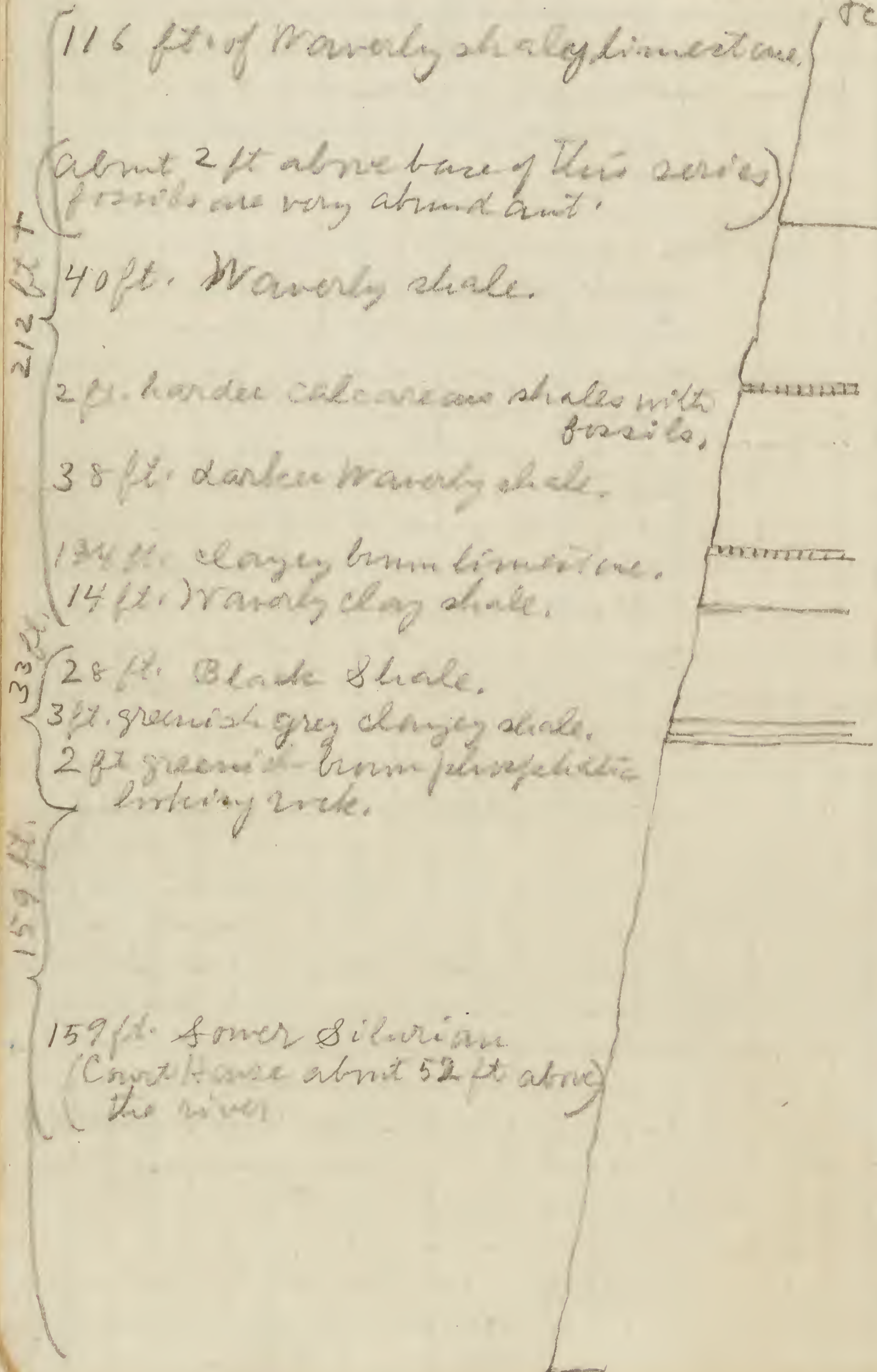
156
44
112

A. This is the typical fossiliferous layer. The upper 1-1 1/2 ft. of limestone is dense and massive. The shaly bluish limestone below contains *Pterinea*, *Orthis occidentalis*, 1 ft. thick.



Beneath is limestone with branching bryozoans.

Section at N. end of road leading
N. from Court house at Barksville,
etc.



A number of silicified *Lamellia*
branches (masses of natives) collected
by the natives show that the fossilif-
erous beds occur here. But their exact
distance below the Black shale was
not noted.

Tuesday Aug. 1, '99.
Packed up, leaving boat in charge of
mill owner. Paid \$25.35 as my share
of expenses.

Wednesday Aug. 2, '99.
Took stage, Barksville to Glasgow.
Good road as far as Willow Shade.
The Lower Silurian is exposed as
far as Willow Shade. Just beyond
Willow Shade the Black shale over-
lies it. The elevation of the face of
the Black Shale is 133 ft. corrected
barometric measurement below the
elevation of the post office, Court house
square, at Glasgow. The elevation
of the depot is probably a little above
that of the P.O. but the difference is
supposed not to exceed 10-15 feet.

At Marmorine there is a fossilifer-
ous layer in the Lower Silurian only
11 feet below the base of the Black
shale. A fine piece of silicified wood
was shown me as coming from there.
Glasgow = 780. Base Bl. Sh. at W. Sh. = 630?

Thursday Aug. 3, '99.
Took train to Glasgow purchased then to
Boarding screen. Confined to lounge al-
most entire time.

Friday Aug. 4. '99.

Went to Nashville. Prof. Safford had gone to Monteagle, a summit resort in SE corner of Blue grass region. Mr. Killebrew was strangely ignorant of the distribution of the sedimentary rocks of the state. Phosphates had recently been found in Tennessee at the base of the Black Shale and in the Nashville series, 30-70 feet above the top of the Trenton. I saw specimens at the RR exhibit which had been prepared for the Nashville exposition, and which was still open for inspection. Took evening train to Gallatin.

Bledore Black Shale ⁴⁹⁶ 1953 = 611

South Tunnel = 806.
Base of Black Shale = 770 ft.
Top L.S. 712

Gallatin 496.
Base of Black Shale. Lafayette. 772
Top L.S. 772

Baker 545
Base of Black Shale 595
Top of L.S. = 513.

Pegram = 533
White Cliff = 819.
Black Shale W of Pegram = 520?
Top L.S. = 440.

Newspire = 537
Black Shale base = 650
Top L.S. = 537?

Saturday Aug 5. '99.

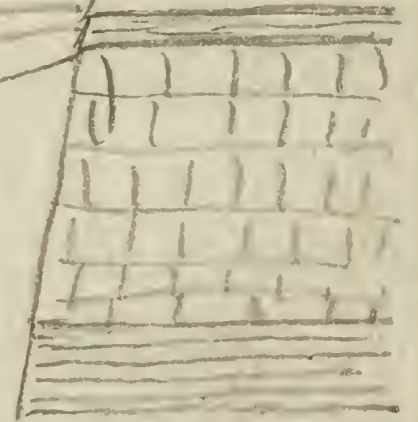
⑦ South Tunnel Station 297 ft above Gallatin.
Between 2 Tunnels = 268 ft above " " "
Lower end 2nd tunnel = 263 ft " " "
Top of Upper Silurian = 260 ft " " "
Base of Black Shale


It should be remembered that there where the Waldron bed is exposed the dip is strongly northward.

South Tunnel.

Section 2nd cut south of 2nd tunnel:

Modules at top at 1st cut. >
Black Shale Thickness?
Phosphatic at base
4 ft. Waldron bed.
Cretaceous 1 ft. at top
33 1/2 ft. Laurel limestone
11 ft + Csgood shale + clay rock



Near top of Waldron shale: Dalmanites tail + Atrypa reticularis.
In Cretaceous layer: Atrypa reticularis, Stroph. rhomboidalis, Whitfordia.
at base of Laurel,  not rare. rather common at middle of Laurel. Orthoceras like O. annulatum but narrower like amyens.

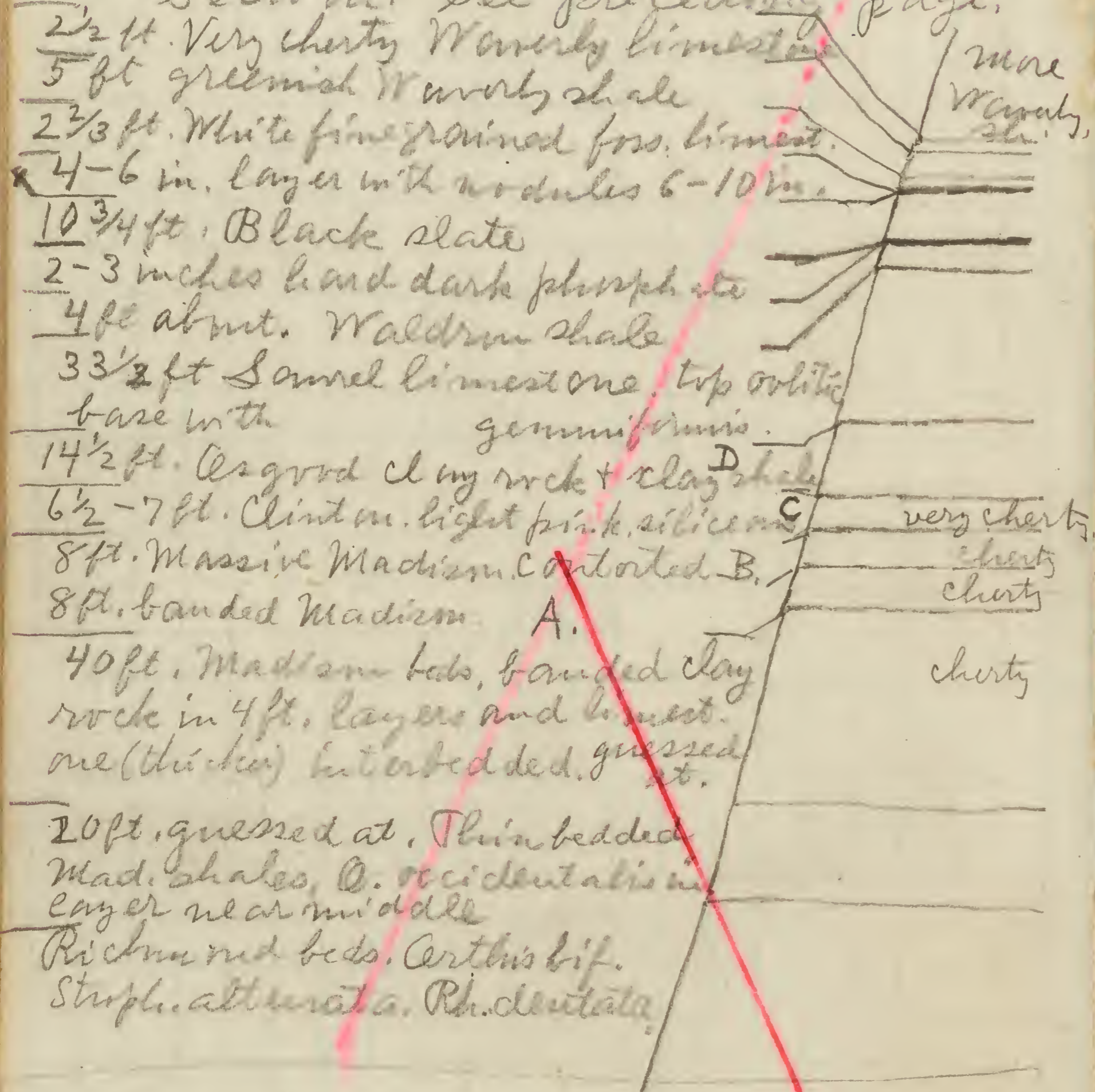
Sunday Aug 6, '99.

Ballston, Tenn., Franklin, Ky.

Monday, Aug. 7, '99.

South Tunnel.

Section. See preceding page.



(cont)

The 40 ft. Madison beds belong to the Madison series they show that the Madison beds change partly into limestones SW.

A. This is not disproved by the 8 ft. banded Madison which evidently is only the upper part of the series below. Near the middle it contains limestone, but the fossils can not be readily recognized, being brachiopods, bryozoa, not well preserved.

At Ballston this layer is the top of the 40 ft series, containing Strophomena, small

the im alternata, common in brief. Septena sericea, Cyclonema, Conella branches, brachiopods, bryozoa. The rock of the 8 ft. layer 8 ft. A. is bluish even when fresh and more clayey than calc areas in appearance. Sewel's branch in chert.

B. The great 8 ft layer has a very even base and top notwithstanding the fact that the layer itself is apparently very much contorted. It is still a bluish rock of clayey character like the rocks below.

C. The Clinton is bedded very much like some of the Madison beds but its color is more whitish or light pink, and it has the appearance of the siliceous limestones of Indiana. Near the middle it is very fossiliferous + cherty.

C. Later than on next page. Cherty Clinton 3 1/2 - 4 ft. One the 3 ft of siliceous rock, wonder what Clinton? See sections west of Saffordville.

7cm

C. Clinton fossils.

[Platystrophia Niagaraensis Baker's only]

Heliolites ~~flabellites~~ wavy between corallites. Corallites 7/8 inch diameter + about 1/6 inch apart.

Heliolites like Fanner's quarry form with very close corallites.

Favosites favosus [Baker's]

Favosites Niagaraensis [Baker's]

Halysites catenulatus [Baker's]

Cyathophyllosum calycula.

iponica?

Artus bifurcata, rather small, with 2 plications in sinus [Baker's]

Artus elegantula

Artus flabellites common [Baker's]

Strophomena Homoceras

Stichel andinia Stichelandi. Common [Baker's]

Triplexia Certoni.

Atrypa undulata. Not rare.

Platystrophia neglecta

Cyclonema with bridges along convolution. Not large.

Delaceras ambiguum.

[Plurifera fudra. Baker's only]

D. Osword beds. A regular Madison like clay rock at top and about 3 ft down. Most of the remaining beds rather shaly but not as in Ry.

Sand limestone, for fossils see 3rd page preceding.

In Walden was found pygidium of Dalmanites. See 3rd page preceding.

7cm

Plumbeate rock very typical.

Black slate more than doubled by fault shearing.

Nodules unusually large.

Analysing from stone unusually white + fine grained for a Waverly limestone.

Waverly shales above the described section very thick + well exposed but not measured.

Tuesday, Aug. 8, '99.

① Southeast of Lafayette, Macomb Co. Tenn. 1/2 mile. In the gully that leads to the "Sulphur Spring."

From hotel at Lafayette to top of section = 81 ft.

46 ft. greenish wavy, crinoidal clayey limestone, cherty

13 ft. Black Shale. Above the base is shale crumbling like Waverly B.

Madison beds, heavy.

B. About 1 foot at the base of the Black Shale is characteristic + fissile. About 1 1/2 feet over this the shale is more arenaceous + crumbles like the Waverly. See sections on the Cumberland. Much trace of phosphate rock.

Lafayette is 488 ft above Hartsville

" + 416.6 above Ballatin

Then Hartsville is 72 ft. " Ballatin

Hillsdale is 428 below Lafayette

Elmoreville " 472 " "

② Black shale ^{base} at Lafayette is 348 ft above Hartsville. and 276 ft above Ballatin.

S W of town. Black shale in Madison

Wednesday, Aug. 9, '99.

③ Gap of the Ridge, 6 mi. W. of Lafayette on road to Westmoreland. Macomb Co. Tenn. wavy shale

28 ft. Black Shale.
at base is crinoidal material B
Madison beds massive

The exposure occurs on the road leading south down the gap.

At the base of the Black Shale a soft sandy material is found imbedded + interbedded with the Black Shale. This may be residual material from the Coniferous.

See 2nd section beyond.

④ Halton P. Weeks. 7 mi. W. of Lafayette. 130 ft below house is base of Black Sh. Wavy, many layers = good hard limestone. Black Shale. Wavy, like just above base. 18 ft int. (upper 7 ft = Laurel? exposed) Small 11 ft = Asgard? B
11 ft. Asgard clay exposed.
2 1/2 ft. Clinton limestone A
Madison.

Clinton with Favosites formosa, Cyath. calyculum, Antalis elegantula.

If the Asgard is 22 ft thick (see next section) there is room for 7 ft of Laurel limestone here, but there is no exposure

⑤ S. R. Wood, just W. of Mt. Pico-
gale Church, 7^{3/4} miles west of
Safayette.

From house to top of section =
74 feet.

65 ft. Waverly, very crinoidal,
like clayey crinoidal
limestone. (At the Meeks lo-
cality = good limestone with
Spiriferus & crinoid bands)

27^{1/2} ft Black shale (Base = 230?
ft. above Gallatin, barometric)

6-16 in of dark rock, somewhat
= very crinoidal, upper half phosphatic.

18^{1/2} ft. Sandstone. Dalmatites lim-
ulium, Atrypa reticularis, C. bifor-
rata, all at top

22 Ozark clay.

2^{1/2} ft Clinton certain.

Favosites favosus

14 ft down to rock bottom
to be certainly L.S. small *Strophomena*
foss specimens

About 3 ft of rock below the cherty
fossiliferous Clinton looks very
much like Clinton both layers
by. The same would be found
at South Tunnel. Where only
the cherty limestone 2^{1/2} - 3^{1/2} ft
thick may be Clinton.

Thursday Aug 10, '99.

Back to Gallatin, to Nashville

Friday, Aug. 11, '99. Pegram, Tenn.

⑬ Section just E. of R.R. bridge,
west of Pegram Station. The
base of the Black Shale here is 265
feet below White Bluffs, and
only 10 feet below Kinglet in Springs

Pegram = 533

White Bluffs = 819

Greatly shaly shales

Phosphatic nodules not numerous

7^{3/4} ft. fissile Black Shales

11 ft. more earthy (Waverly like) shales

14 in. Phosphate rock with *Singularis* E.

8 feet crinoidal limestone D.

7^{3/4} ft clay above clayey limestone

22 ft. Clayey limestone + rock C.

? 20 ft. clay rock exposed up creek B.

Uniform thickness of well bedded

limestone flags. A.

A. These are exposed N. of R.R. cliff
exposures, up Furbee + Greer Hollow
No special amount of chert noticed
here.

B.C. This is a rock varying from clay-
ey Madison-like rock to a clayey
limestone. 3 Feet below the Mal dome
shale the very flat horn coral was col-
lected. About 13 feet below shale, a
pygidium of *Dalmanites verrucosus*
was found. Apparently also a
specimen of *R. round*, very
flat!

Friday Aug 11 '99.

(13 cont)

D. This should be the Waldron shale. The lower 1 3/4 ft. consist of shaly limestone with fossils. Among these the large *Pezomachus* *Stricklandi*.

Above this lie 6 ft of clay with numerous specimens of the flat brown ones. This layer is an ore fossiliferous east of Pegram 1 1/2 miles. See photo next page.

E. This is a very fine building rock and should be equivalent to the Sumnerville limestone stratigraphically.

Phosphate rock abundant in Singulac. Up Furber + Greer's Hollow the following section is found. Brown phosphate rock 3 in, at base / 6 in of fissile Black shale / 9 inches of dark phosphate rock with Singulac. Plenty of Black shale with earthy layers intercalated at various levels.

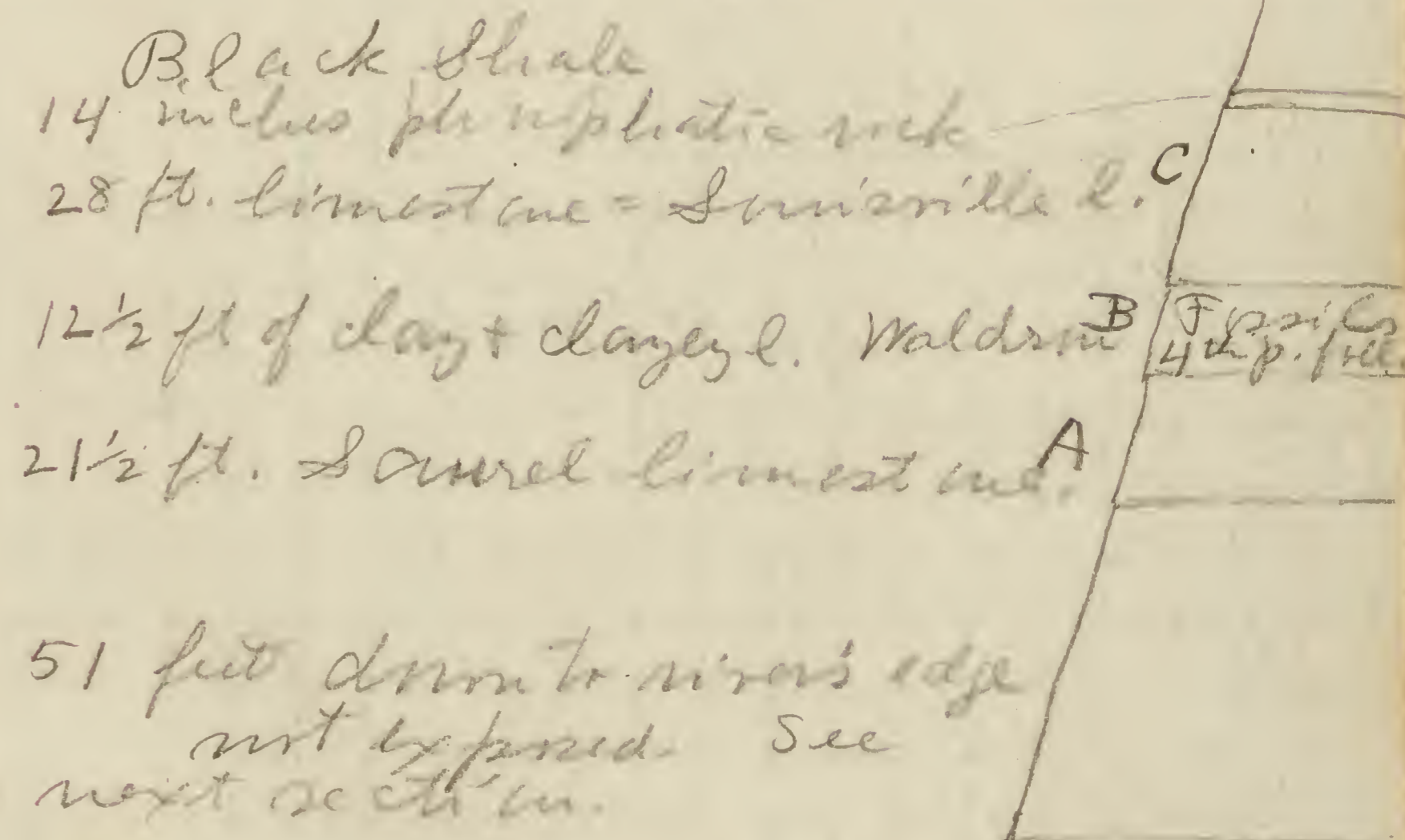
A cherty bed about 1 foot thick occurs about 10 feet over base of Waverly.

The Black shale probably goes under cover a short distance W. of the bridge. It dips strongly SW. so as to get to the water's edge, a quarter of a mile south of the bridge. Coming to the same place the lower horizons are quickly brought up on going E.

Saturday. Aug 12. '99.

(12)

About 1 1/2 miles E of Pegram Sta. on N. side of RR is house of Sam Walker. A short distance west of house a road leads SW through the woods to Harpeth river. Another road runs along the north bank of this river, and following this road eastward, the following section is found at the end of the cliffs, near the point where the road leaves both the cliffs and the river.



- A. *Pezomachus gemmiferus* occurs below the Waldron shale beds.
- B. The lower part of the Waldron shale is more like a clayey limestone + is very fossiliferous. The upper part is more clayey. The very top is not exposed. Buried at.
- C. The Sumnerville limestone is 20 ft thicker here than 2 1/2 miles westward at the bridge W. of Pegram.

Sat. continued.

(12) cont. A quarter of a mile S. of the last section, on the southwest side of the river is the house of Bell Robinson. Near the spring NE of the house the following section is exposed.

18 1/2 ft. limest. *Pisocrinus gem-*
niformis not rare at base. C

7 1/2 feet clay + clayey l. B

22 1/2 feet thin bedded limest A
 not abundant near river edge

In the shaly beds at the river edge *Favosites* is found, rather common.

1/2 feet above the river is *Halysites* in a layer about 4 in thick, several yards in extent.

1/2 feet above the river are *Illaeon* about the size + form of *Illaeon*. *Illaeon* *gemmifera* *glabella*.

This clay does not seem to end to the lagged clay layers only for about 3 feet and the part is a rotten clayey shale. While it weathers so as to carve the limestone to form cliffs and as a datum line. It seems to be a *glabella*, at least it seems to be *glabella*.

(12) cont

limestone, below the clay rocks in the hollow N of the RR. near the bridge W. of Pegram.

C. These are the clayey limestones at the bridge W. of Pegram. They have become good limestone E of Pegram.

Combining the two sections, 1 1/2 miles E of Pegram, we get:

Black Shale

Phosphate layer

28 ft. Lewisville l.

12 1/2 ft. Waldron shale

29 1/2 ft. Samuel l.
 See Newsom section.

7 1/2 ft clay + clayey l. Pisocrinus.
 See also *Halysites* layer.

Favosites

We thus find that the 2 sections supplement one another.

The Samuel limestone is either 72 ft + thick, with the base not yet found or the Samuel is about 42 feet thick with the beds under the clayey layers as Clinton. In that case the lagged beds have practically disappeared.

Saturday,

(12) (13 cont)

On going up Furber & Sreer's
Hollow, N. of the RR. and a
short distance east of the
bridge W. of Pegram, the Phos-
phatic layer at the base of the
Black shale seems to rest on
the top of the clayey Saural,
and not on the Smithville.
This accords with the great
thickening of the Smithville
E. showing marked uncon-
formity.

Saturday,

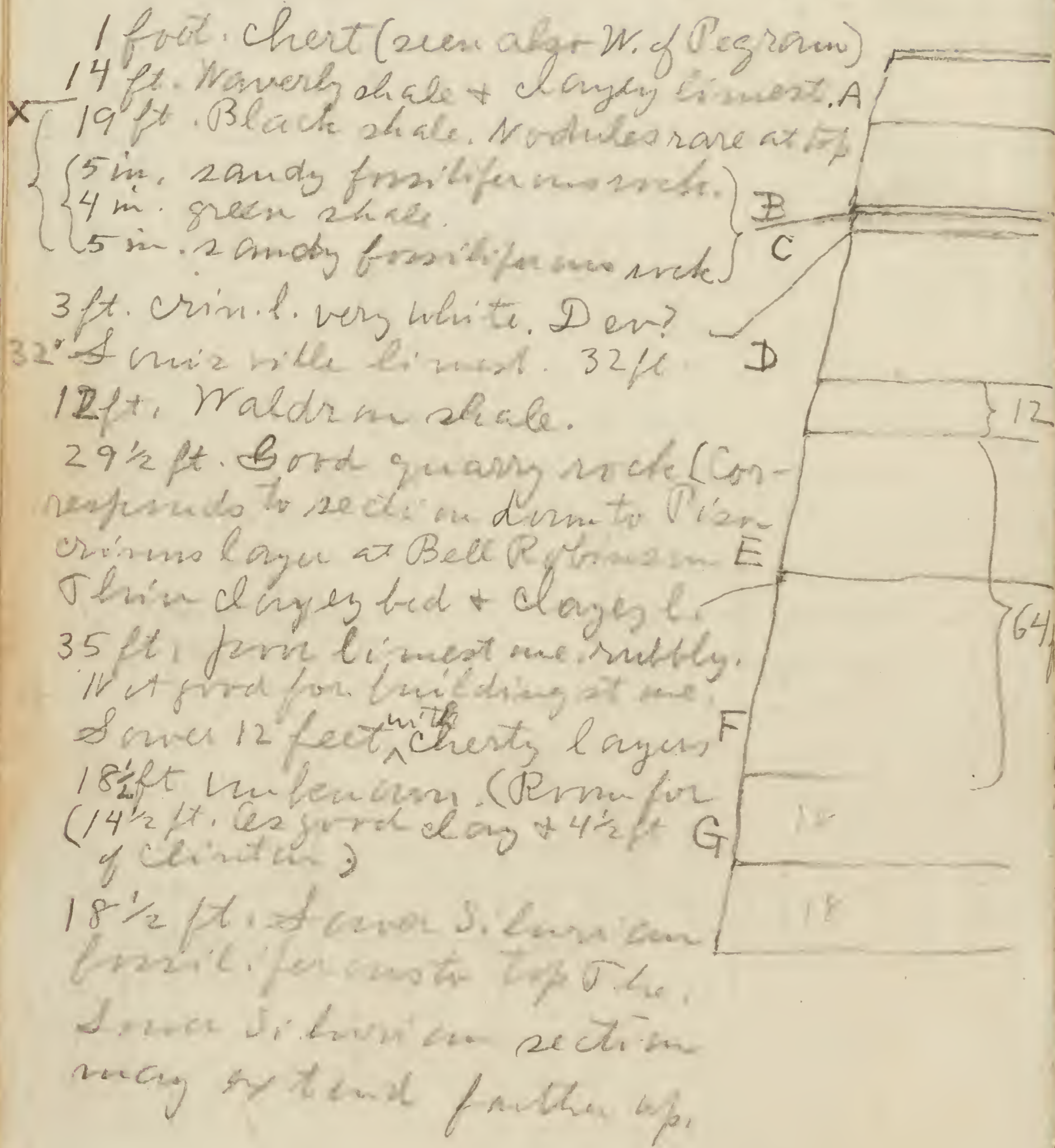
(12c) Saturday, 1 1/2 mi. E. of Pegram.

- + *Pisocrinus gemmiformis*.
- +? *Cyathocrinus* several.
- Strophomena*, size of *patenta*
but no double curvature noticed.
- Septacna rhomboidalis*.
- Spirifer*, very small, *crispus*?
- Spirifer Niagarensis*, large.
- Strong plications, + longitudinal
striae.
- like *Whitfieldella notida* but much
smaller.
- Meristella*, large, broad.
- Atrypa reticularis*.
- Rhynchonella*, *Tennesseeensis*?,
medium size, plenty.
- Pterinea bisea*.
- Platystrophia Niagarensis*.
- Calymene Niagarensis*.
- Dalmanites pygidioides* large
- Hindostrophia*? projecting spines
at rear of pygidioides crural.

Sunday, Aug 13, '99.
Washville.

Monday, Aug 14 '99.

(110c) Newsom Sta. S.W. of depot.



(12c) Monday.

A. limestone near middle + top of section.

B. Corresponds to the crinoidal rock found at base of Black shale W. of Lafayette, Macon Co. Corniferous? No trace of phosphate. Contains little pebbles.

C. This rock has a very Devonian aspect. It has a very white color and is coarse grained. It contains blue fine grained undoubted Niagara. It contains Strophomenoid shells, rather abundant, having Devonian appearance.

D. Near base is a layer with small form of Plover crinoids, half the size of P. gemmiformis.

E. The Devonian looking rock seems to run into the underlying Niagara rock, without any great break.

F. This stone is quarried at numerous quarries near Newsom.

F. From this section it will be noticed that a considerable thickness of cherty beds lie at the base of the lower limest. me. The best beds for quarries lie at the top also at Clermont, Ky. In the Bell Robinson section only the top of these cherty beds are seen.

X

part of the Laurel section
level of R.R. bed, west of
post. As good bed not exposed,
by a few strong Clinton chert
fragments seen. Clinton not
thick here.

On N. side of river, where road
crosses Eagan, the Clinton
chert in shaly fragments con-
tains:

Dalmanites *ayt hensis*, pygid.
Favosites *furcata*.
Heliolites, 2 species.

1. Waldron fossils Newson Sta.

- Dalmanites verrucosus*.
- Schisma Boltuni*.
- Cyathocrinus* 2 spec.
- Large flat granular crinoid.
- Crinoid like *Pisocrinus gem.*
but conical & larger.
- Large flat crinoid, *Secamon?*
- Triplexia*.
- Crinoid with ribs near top edge.
- Thysanocrinus* (*Dryptaster*) *inornatus* Hall
- Macrostylocrinus granulatus* Hall.
- bu. crassus* Hall
- magnus* Wether.
- terras* Wether.
- species?
- Periclyocrinus* (*saccorinus*) *Chrystylis* Hall
- Synocrinus melissa* Hall

(12c) Waldron fossils Newson Sta.
Continued.

- Astyloporina* small.
- Serpulites* *in muricella*
- Dumoulinella* *brevis*
- Flat bryozoan, oblique aperture.
- Callipora elegantula*
- Siphonalia concentrica*
- Small favosite corals.
- Arthris elegantula*
- Arthris hybrida*
- Septonema* *rhomboidalis*.
- Strophomena* *newsoni* *patenta*.
- Stroph.* *coarse* Waldron form, size
of *patenta* or smaller.
- Wrightfieldia nitida*.
- Muristina* *large* *Maria?*
- Like *Mh. nitida*, but much narrower.
- Atrypa petiolata*.
- Plectambonites* *Terronescens*.
- " *Stricklandi*
- " *acutus* typical
- " like *Terron* but broader.
- " *neglecta*
- " *Implication in sinu*
- Retzia* *erax*.
- Eckwaldia reticulata*.
- Spirifer* *ferrugineus*, long striae.
- " *strong* " long striae.
- " " transverse "
- Spirifer* *Mazar*. chunky.
- Fine lamellar branch.
- Plectambonites* *lissa*.
- Platystrophia* *Mazarensis*.
- Arthroceras* *anyens*. narrow form.
- Calymene* *Mazarensis*.

⑧ Bakers Station on the L + N.

Above the station.

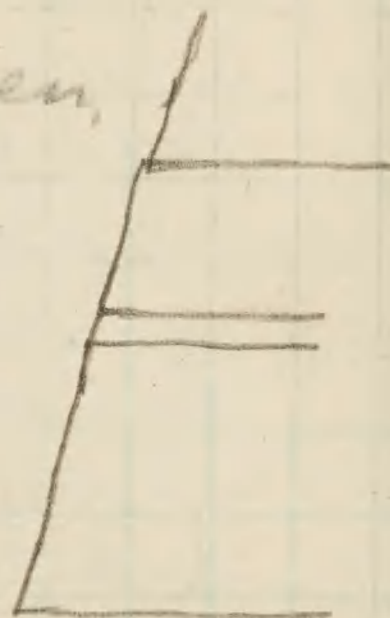
Black shale. No phosphate bed seen.

17 1/2 ft. Southerville limestone.

A { 4 1/2 ft Waldron shale.

32 ft. Laurel limestone.

Base not seen.



Below the station.

24 1/2 ft Laurel limestone with

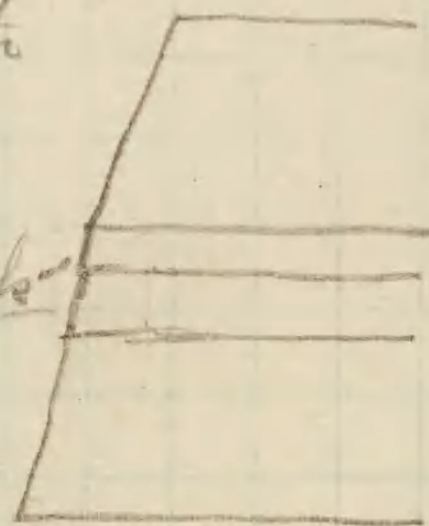
Pisocrinus common near base.

Crinoidal at base.

B { 6 ft. massive Madison-like clay rocks

7 ft. softer clay.

C { 26 ft. limestone with chert.



A Fossils in Waldron =

+ Syriocrinus melissa.

Atrypa reticularis.

Meristina Maria.

Spirifer endora.

Strophomena only convex not patenta.

B. Seems to represent the Orgord.

The lower part of this contains

Clinton fossils.

Rhinospira frondosa

Favosites favosus

" " Niagaraensis.

(8 cont)

Halysites catenulatus

Orthis bifurcata

Orthis flabellites

Stricklandia

Platystrophia Niagarensis

Crinoid base with sieve like holes frequently penetrating it.

6 Gallatin and Glasgow pike.

Black shale at 195 not corrected.

9 ft. upper part white and crinoidal becoming magnesian below. At base is *Pentamerus lirata?* with low residual fold.

8 ft magnesian limestone.
3 ft. magnesian limestone with *Pentamerus lirata?* abundant.

3 1/2 ft magnesian limestone. At base is *Halyites catenulatus*.

8 ft. mag. limestone. At base it weathers soft.

15 1/2 ft. magnesian limestone.

9 ft. crinoidal limestone. In the *Pentamerus blagovi* common especially near middle. Further south this same layer contains also *Styria reticularis*, and *Sperifer hungaricus?* with no plications, only a sinus and fold along the middle.

13 ft. a mixture of clayey and hard limestone not quarried. At one point southward this rock becomes a hard, light red massive siliceous looking limestone, with casts of *Pentamerus* in upper part, which here corresponds to base of layer above.

9 ft. Waldron clay. Above will be *Pentamerus*'s house.

62 ft. *lirata?* *oblignus* *Waldron* *clay*

6 cont

35 ft. *Sand* limestone. Some beds fine grained and hard, others more clayey. At base a clay rock weathers back strongly.

42 ft. of *Sand* limestone. The lower part shows clayey. 1 ft. crinoidal, at the house of Frank Earl's house.

15 ft. of good clay, at least. brownish above. Purplish below. 5 1/2 ft. covered. clay?

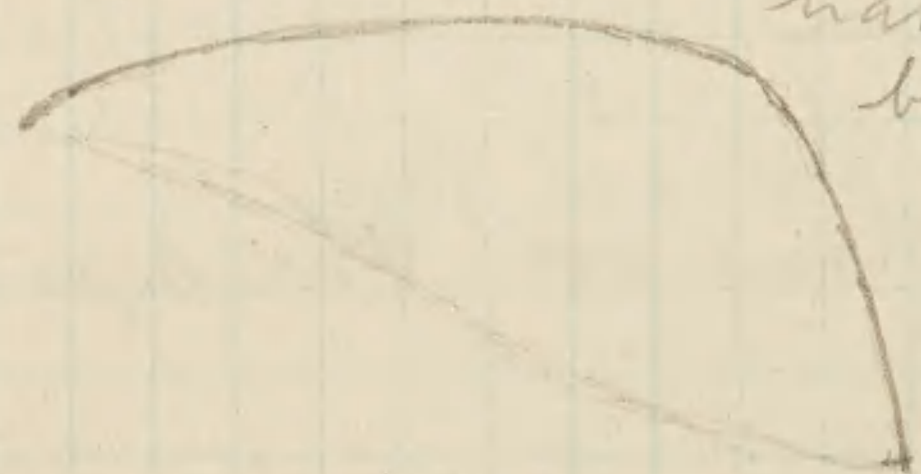
5 1/3 ft. Clinton. white. Cherty. *Favosites favosus communis*.

Pests in *Cincinnati* limestone. base. *N. of* *at* *Bear* *at* *station*.

- 240 miles Waldron to Newsom
- 270 miles Waldron to Centerville.
- 315 miles Lewis Co line to Richmond, Ind.
- 75 miles Bledsoe to Sleanings
- 40 miles Raywick to Stamford.
- 50 miles Raywick to Forbush creek.
- 35 miles Stamford to Forbush creek.
- 90 miles Lewis Co line to Bledsoe.
- 50 miles Newsom to Tennessee River
- 30 miles Centerville to Tennessee River.
- 140 miles Centerville to Niagara. End of Illinois

Nova Scotia, near than to
 Dev. + Silurian, Europe, Quebec + Gaspe,
 Anticosti.

1. *Orthoceras* of *Cyrodont* *O. cancellatum*.
2. " *armyensis* = *O. undulatum* = *O. annulatum*
 of New York Niagara, but the New
 York specimens are larger in l.a.
 l.a. *lunata* is of same size as written
O. armyensis.
3. *Stepherdnta profunda*, Hall. Clinton
 has outline shown
 below.



4. *Iliaenus armatus*
5. *Stephanovermis gemmiformis*
6. *Streptodictyon tenue*
7. *Stepherdnta profunda*
8. *Chonetes Nova-Scotica*.
9. *Bellerophon tubus*
10. *Orthoceras simulator*.
11. *Iliaenus armatus*
12. *Crania setifera*!
13. *Crania silviana*!
14. *Pholidops ovalis*
15. *Stictopora similis*, has raised margins to
 pres. Not at Newsom.
16. *Callopora singularis*, Pores with slightly raised
 margins, separated by 1 red space across
 which run lines, some of which produce
 appearance of intermediate cells but these
 are in reality closed.

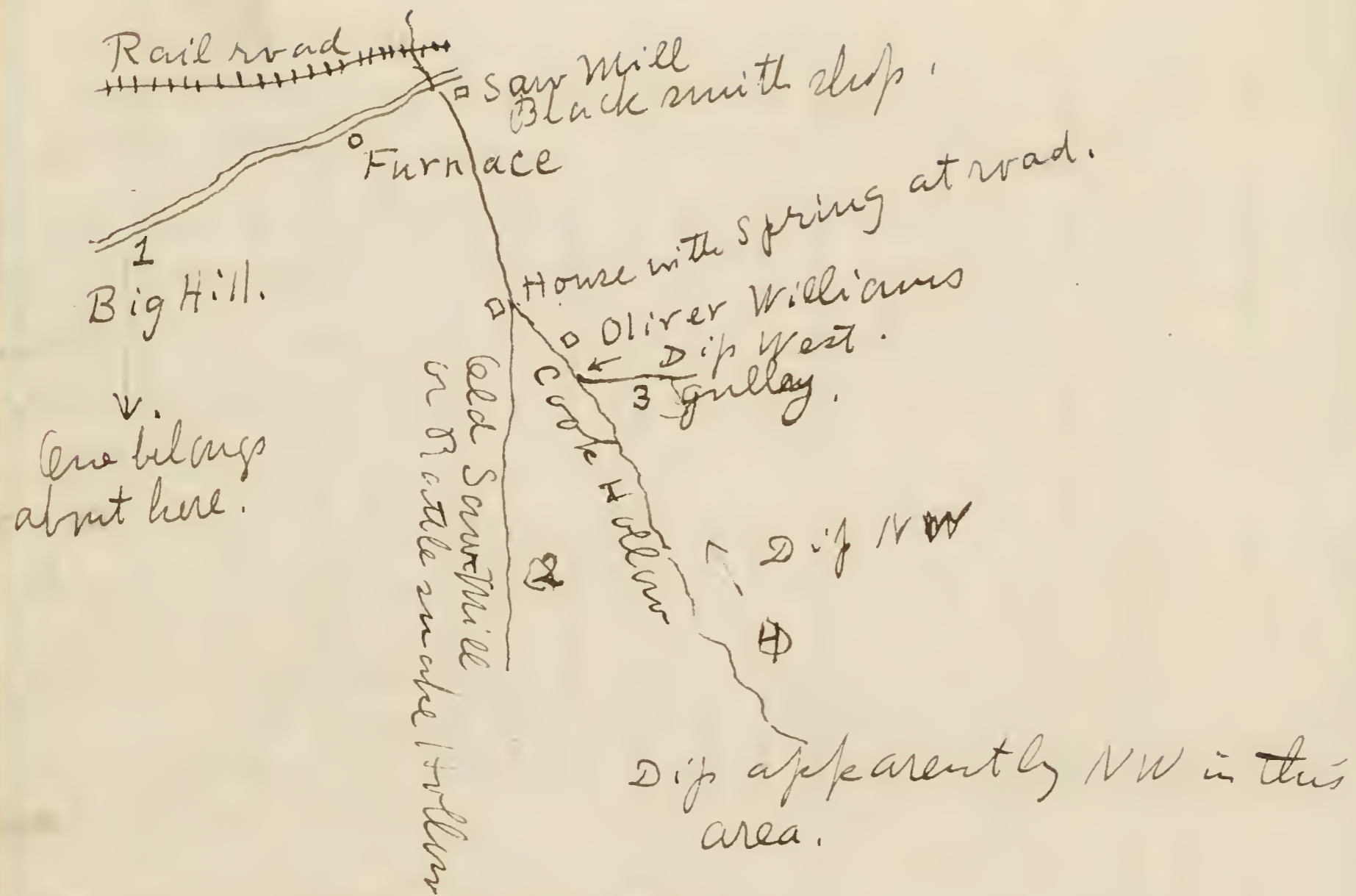
17. *Calliophora exsul*, has smaller cells and more in the same distance than what I supposed might be this form. Name is *Siddanabia*.
18. *Trematopora sclerata*. Cells long, angular, without anything between.
19. *T. oceanum* pores in very oblique lines,
20. *T. infrequens* pores more so.
21. *T. subimbricata* pores more frequent.
22. *Chilobrya varicellata*.
23. *Trematopora varia* ~ pores this form.

560 Purcell Ave.
 Bassett Road 500 Phillips Ave. 700.

Palschara apiculata is an interesting form. Cells usually smaller than a square but some of mine are about as small! I use this as identification = *Nereis*.

Whitfieldia truncata like form in blades of *Tern*.

Whitfieldia truncata - *Nereis*



v.
Cave belongs
about here.

1. Big Hill, on road from Mt. Pleasant to Waynesboro. 3 miles S. of R.R.

Measurements are barometric.

65 ft. clay, with siliceous layers rather frequent at all levels. Evidently disintegrated part of upper Waverly.

105 feet. Waverly, bluish shaly limestone with chert beds 1 foot thick towards bottom. One of these forms the very base. Base is 90 feet above level of hotel at Mt. Pleasant.

22 feet of Lower Silurian actually measured, as follows,

2 ft. clay rock.

1 ft. limestone with *Raf. alternata*.

10 ft. soft, not well exposed.

Then come 15+ feet of limestone with *Cl. bilix*, *Hebertella sinuata*, *Raf. alternata*, down to creek bottom at end of little stream.

2) Old Saw Mill Hollow.

10 ft. Waverly limestone bed, heavy, crinoidal, occurs 10 or 15 feet above the Black Shale, very white.

3 ft. "barterd slate" - very fine grained sandy bed, which elsewhere contains *Singulac*. Here it showed traces of *Clonetes*, etc. but no careful search for fossils was made. (Is this bed possibly early Waverly, the black material being derived from the eroded Black Shale?) Slate not dark enough to be black.

16 in. regular dark phosphate. This is the coarser, more sandy phase at the base of the Black shale series.

6 in. Congl. meretric bed. Base of Black Shale.

This locality is found 1/2 mile up a long hollow, on the east side of the hollow, about 40 to 50 feet above the bottom of the hollow. This hollow branches off from the Look Hollow at the point where a good spring occurs just below a house. 1/4 mile N. of Mr. Oliver Williams house, and 1/2 mile S. of the saw mill at the creek crossing on the pike to Waynesboro.


3)

SE hollow very narrow, forming a gully, not a valley. entering the Cook hollow just above a fence crossing the creek, 200 yds, above the Oliver Williams house, E side of Cook Hollow.

Waverly shaly limestone with intercalated chert beds. One of these beds is found at very base of Waverly. =

1 ft. Waverly chert.

8 in. crinoidal greenish rock, with fish teeth of dark, purplish brown color, similar to color of nodules at top of Black Shale. Probably Waverly including Black Shale material.

size = 



11 in. light green clay rock with specks of material resembling the purple brown nodule material of the Black shale.

It contains the characteristic nodules of the greenish rock overlying the black shale along the Cumberland river in Kentucky = Waverly?

18 in. dark sandy rock, partly fine congl. Then fossiliferous Lower Sil. limestone.

4) 1/2 mi. above Oliver Williams, east side of hollow.

3-4 ft. bastard slate, becoming greenish at top.

2 ft. black shale, Reported by Mr. Williams.

18-28 in. phosphate rock. 2 in. sandy, Pebble layers probably beneath. Not seen. Reported by Mr. Williams.



Mt. Pleasant.

On road leading through middle of town north westward half a mile. Waverly shale light blue, breaks up into small pieces.

Reddish nodules, purple brown, dark, with fossils, found 120 feet above level of hotel at Mt. Pleasant. Found 12 in. above level where brown conglomeritic sandstone is rather common. The section therefore appears to be equivalent to section 3 in the Cook Hollow.

The brown conglomeritic sandstone probably did not exceed 15 inches in thickness and may have been scarcely 1 foot thick.

Lower Silurian limestone with plenty of fossils occurs 10 feet below the uppermost conglomerate fragments in the soil.

Columbia 1000

Pleasant Grove 1065

Campbellsville, 1050.

Lynville 1100

Dodson 1312.

Dodson's Station. 1312

At station the top of the Lower Silurian occurs at 1353. The Black shale occurs about 9 feet above the Lower Silurian.

The Black shale appears to have a thickness of 12-15 inches and is situated about 8-10 feet above last exposures of Lower Silurian.

The sandy phylloclastic rock was seen at no locality west of the station. It is probable that the unexposed part below the Black shale is clayey rock belonging to the Lower Silurian. Section probably same as NW of Mt. Pleasant on preceding page

NE of Lynville about 1/2 mile, along E side of RR track. A hill near top shows Lower Sil. limestone at 1265. Less than 10 ft. above are several inches of Black Shale. Above this are wavy shaly fragments with many fossils.

Kentucky.

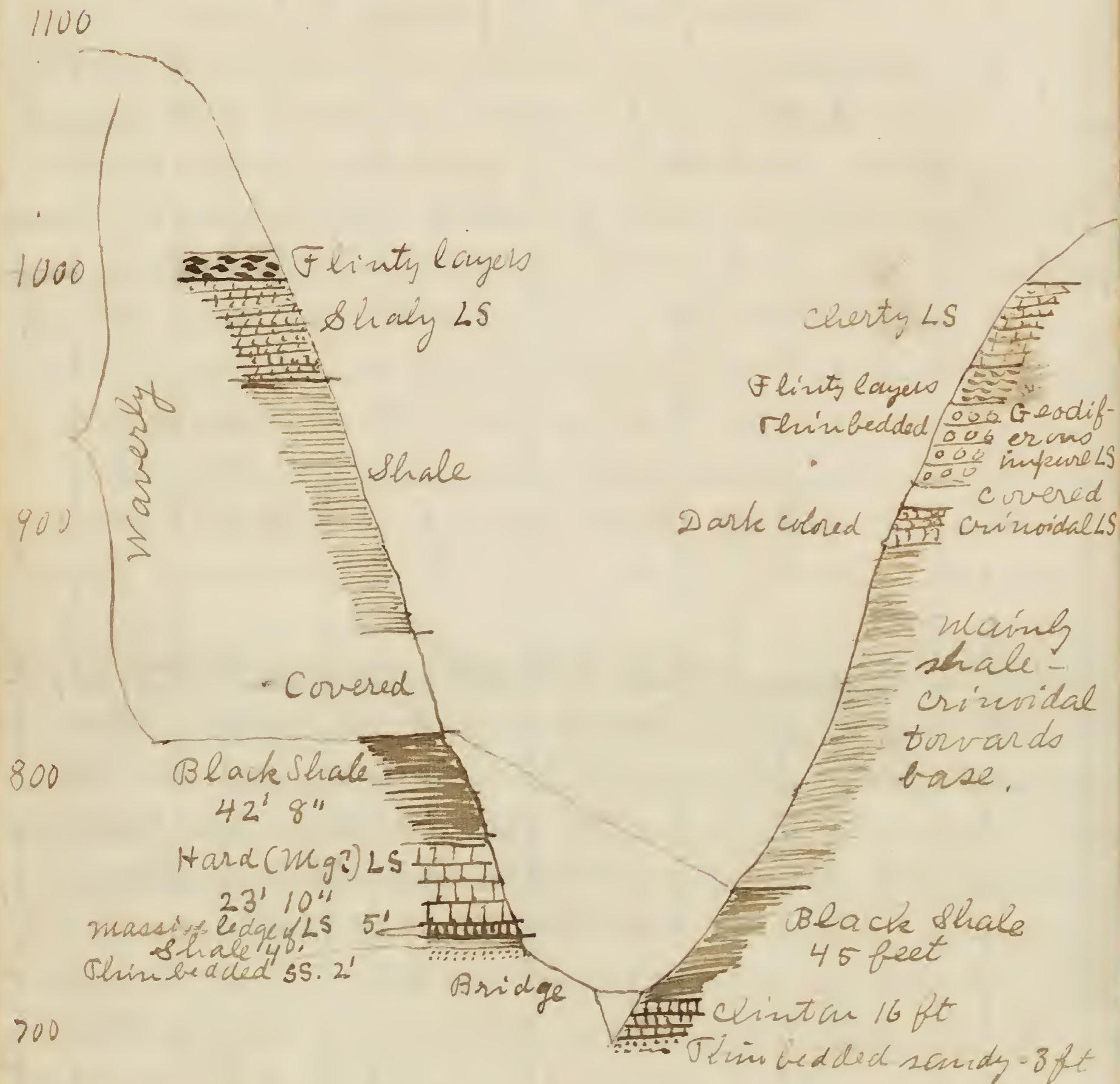
Cumberland River.

Arthur M. Wheeler.

Aug. 10, 1902. Letter.

Dud

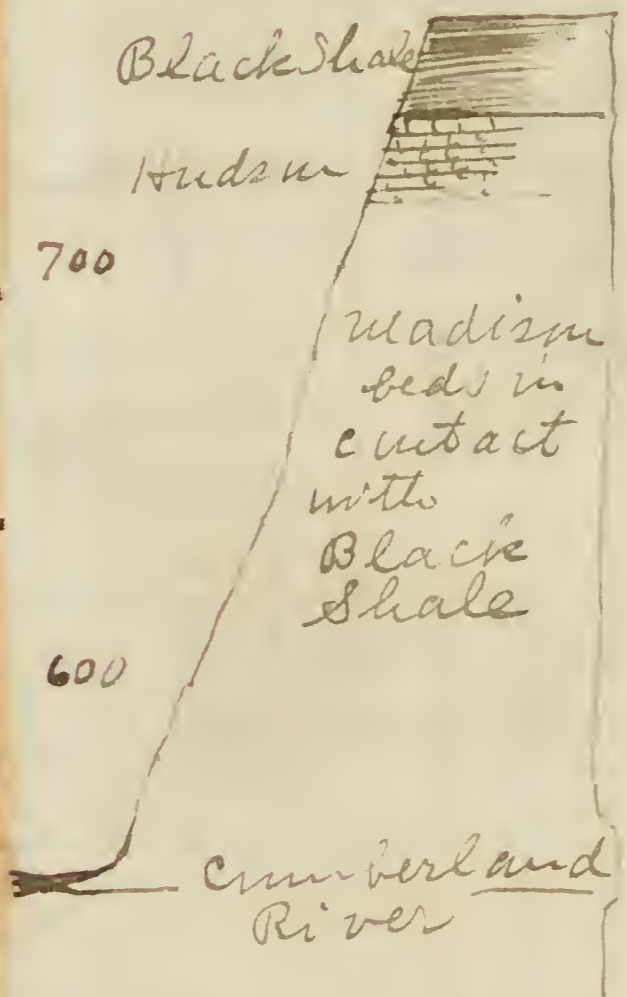
Fishing Creek. West of Somerset, Pulaski Co., Ky.
On Somerset-Columbia road.



Whether there is a strong dip to the eastward here or the dropping out of the layers above the Clinton and below the Black Shale in crossing the stream accounts for the lower elevation of the formations on the east side. I could not positively identify the formations immediately following the shale on the west side, as I could find no fossils. Found ripple marked and sun cracked

(the latter very fine) Cumberland SS. as lowest layers at foot of hill on west side, and thin bedded sandy layers not exactly like this immediately below Clinton on the east side. The Black Shale rest immediately on undoubted Clinton on this side. There peculiar crinoid buttons are abundant, and the lithological characters are exactly like the rocks at the mouth of Cub Creek. I have drilled 16 ft. of these layers. I found this Fishing Creek section very interesting and would like very much to revisit the locality again sometime in company with you. It is 5 miles from Somerset.

Section opposite oil well at Cloyd's Landing about 9 miles below Burkesville, Cumberland Co., Ky.



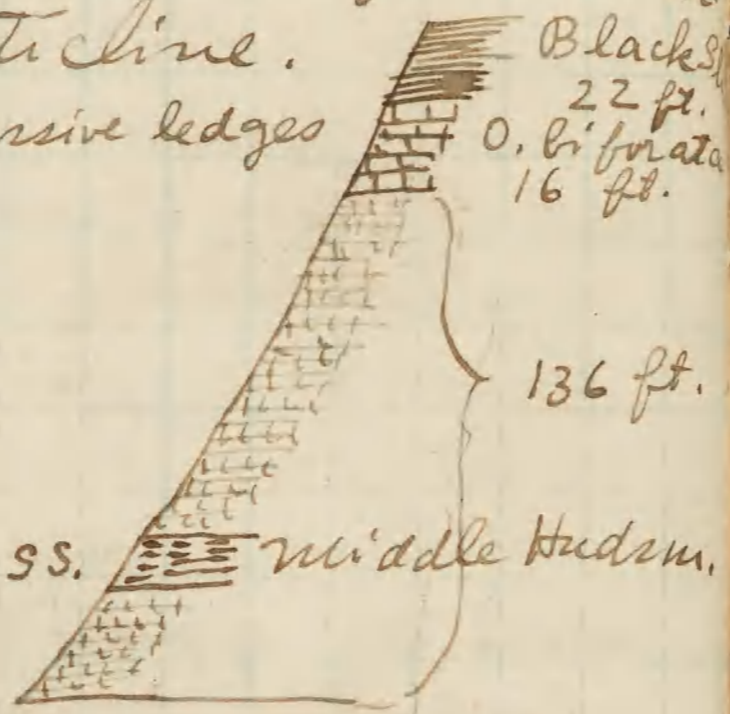
well bored 10 days before the fire was put out and flow was gotten under control. Well starts in fossiliferous Hudson, about 145 feet below base of the shale, and gets its oil at a depth of 440-450 feet below the surface - making the oil horizon for this section about 600 feet below the top of the Hudson when the full complement of Hudson beds are present. I suspect a thinning out of the Hudson beds

continues eastward from here, as the section of the Middle Hudson (Barred SS) at Martinsburg within 2 miles of the Tenn. line, would seem to indicate. This

would establish the oil horizon of this
 Cloyd's Landing well as Trenton, and it
 is approximately the same as the
 Wayne County wells which begin in
 the St. Louis or Waverly.

Martinsburg Ferry, Cumberland River,
 Maury Co. Ky. About 2 mi. from Tenn.
 line. Near apex of anticline.

massive ledges
 Black Sh.
 22 ft.
 O. bifurcata
 16 ft.



(Siliceous Mudstone of Linney) ss. Middle Hudson.
 Cumberland River

Most of the sections I made on the Cum-
 berland River were only general, as I was
 most concerned in getting distances from
 river bottoms below level of the Black Shale
 in the hills in order to make some calcu-
 lations as to depths of oil horizon or horizon
 below this driller's key rock. I traced the
 Crocus creek anticline some distance
 each way N+S of the river and found
 new ones farther down below Burkesville.

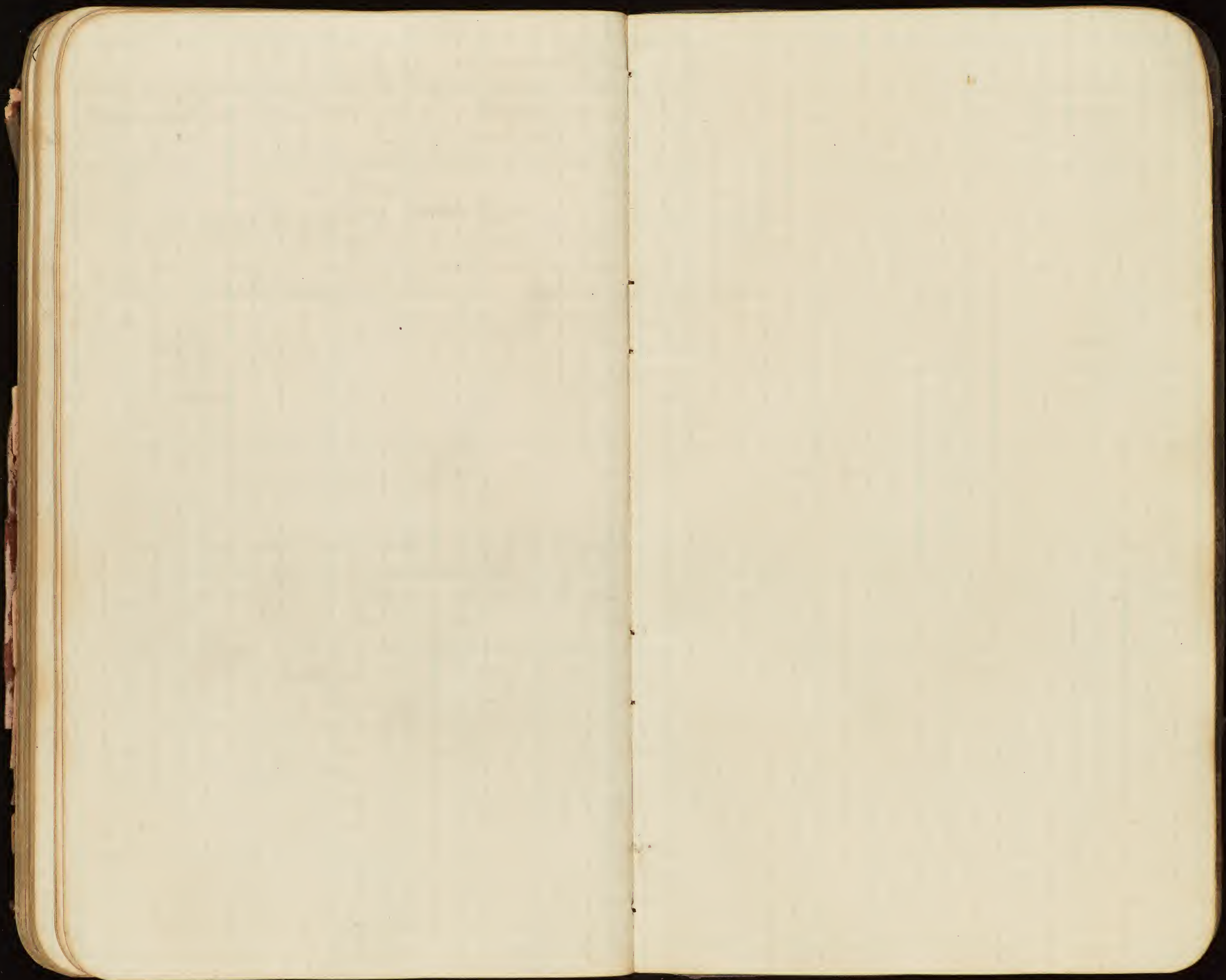
Devonian rests on
 50 ft above Heterospungia, Lynx p. 8
 22 ft " ? Praspoda Lynx p. 9
 10, 11

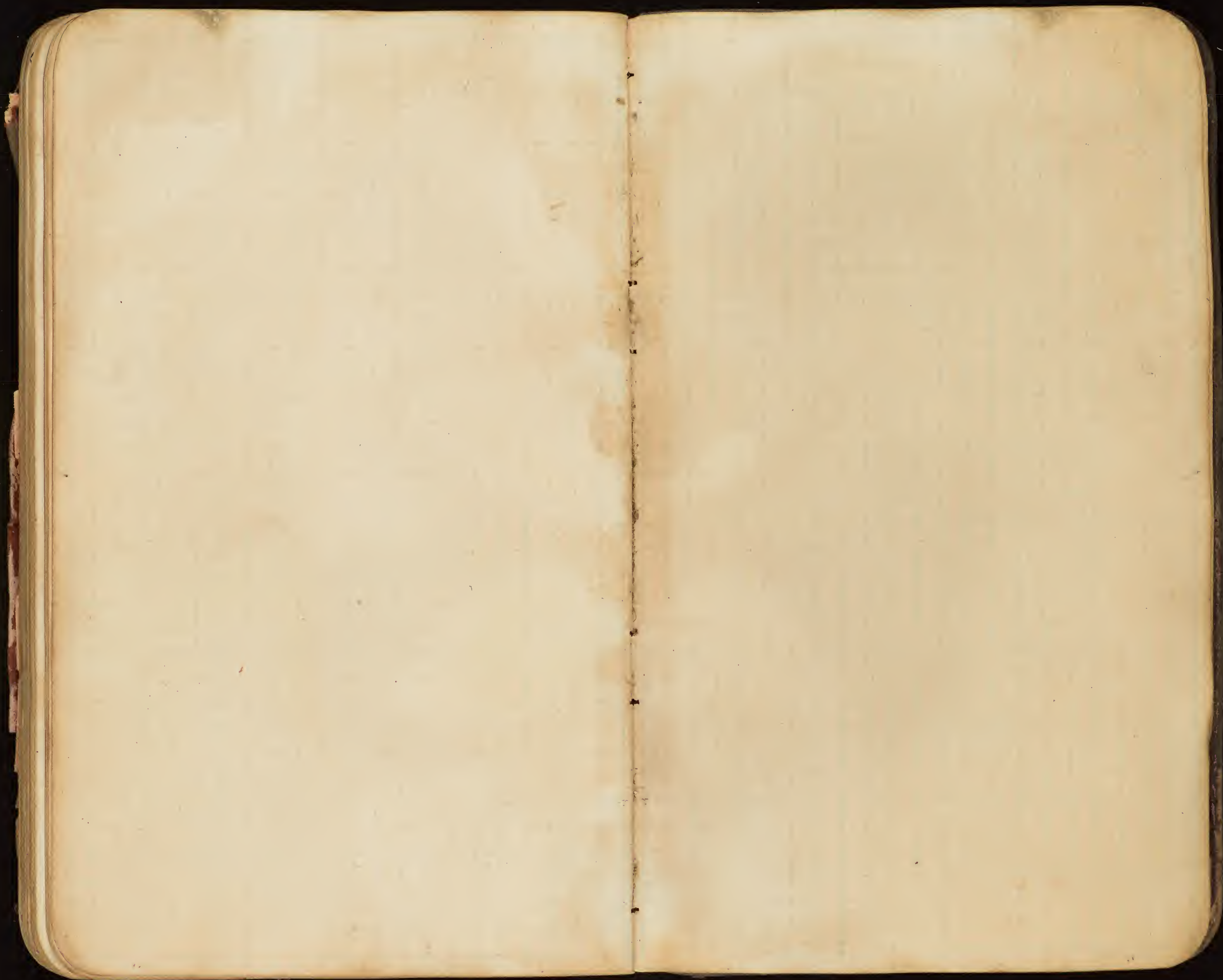
on Maysville p. 13

25 ft above Heterospungia? p. 14
 a lower bed,

on Maysville. p. 20

Richmond — p. 23
 37





Found in the west side.

Owner, Philip Moore Jr.

Digging by Walter Lindley.

4 miles down from Vancilburg to
mouth of Quicks Run. About 2 miles
up the run (on Ky. side) to farm of
Philip Moore. Lewis County.

Vol. 1	—	4. ⁰⁰	
2		4. ⁰⁰	
3	—	5. ⁰⁰	= 2 rd.
4	—	2. ⁵⁰	
5	Part II	2. ⁵⁰	

Geo. McDonald,

