

1903

#6

Watkins, Glen Quadrangle

Field notes — C. S. Bregun,

The collection, made on
the property of Cornell University

Return to H. S. Gifford

Dr. Brewer

1572
1545
1520
1483
1420
1340
1310
1180

*C. L. Brewer
Cornell University
Arb 1905*

Return to

HENRY S. WILLIAMS,
YALE UNIVERSITY,
NEW HAVEN, CONN.

ANY PERSON

who finds this book will confer a favor by pasting the following addressed label on the outside and depositing it in the nearest post office.

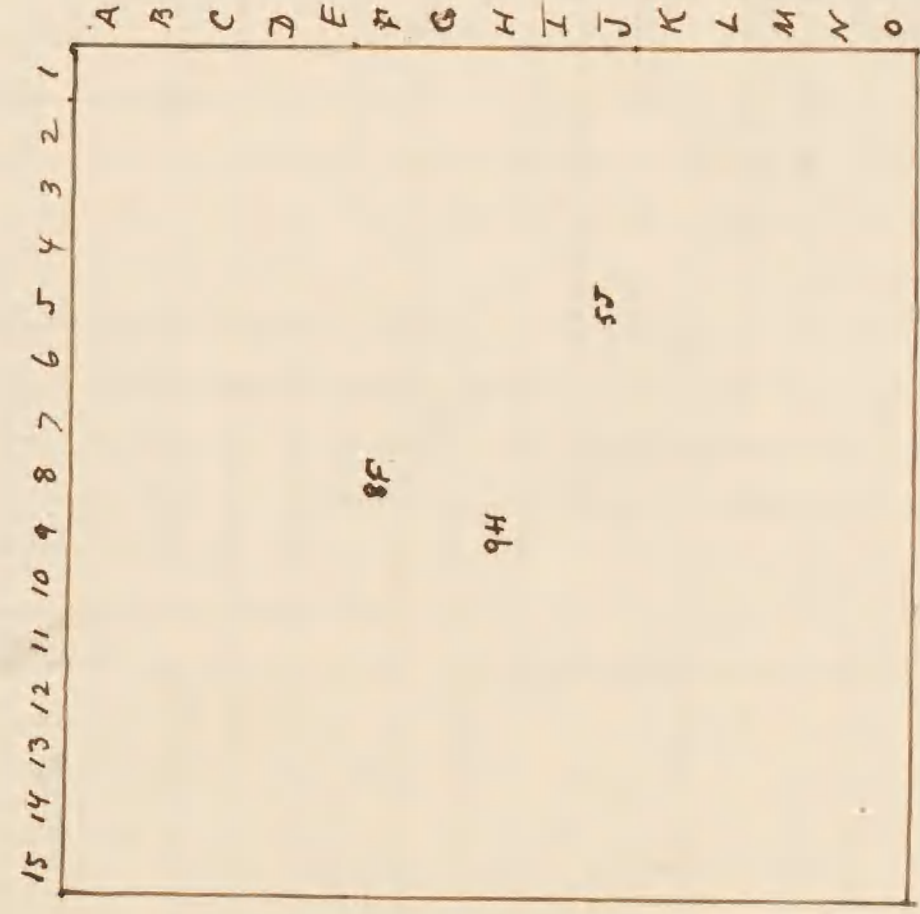
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To the Director of the
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Washington, D. C.

TO THE SOME EXTENT OF THE SAME
AND IN POSSIBLE THE SAME

Index to topographic maps.

- H. = Ottawa topographic sheet.
- Wt. = Watkins ..
- W. = Waverly
- El. = Elmira
- Dr. = Dryden




Each of these blocks
is 1 minute each way
Draw with pencil lines
across sheet at each
1 minute line, making
them fifteen spaces each
way across the sheet.

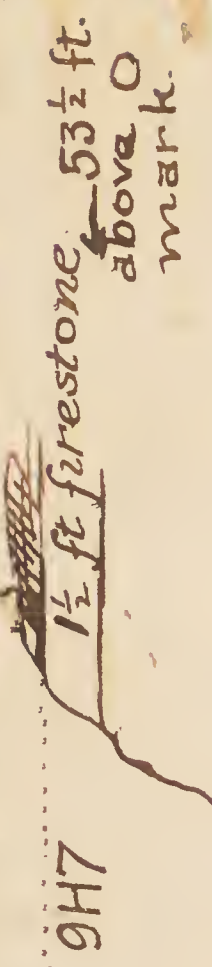
Designate each rock section examined by the map
index number & letter. Thus viz. Brookton is in D7.9.H. hence
a section beginning at Brookton will be marked D7.9.H. The
separate zones of this section should be marked 1.2.3.4 to from
below upward. Hence the lowest zone examined will be D7.9.H.1. The
next H2. The 1 minute block in code the section naturally continues across into
another square. Continue the serial number of the zone, as H3.4
H5 etc. But for every independent section in the 1 minute block,
give a separate number after the letter indicating the block
but as soon as you cross into a new block with independent
interior change to block letter, to correspond. The letter will change
depending from N to S with, & the block number passing from E to West.

Brookton Monday July 13, 1903.

2

1 At Vorhis' Lower Mill on 6 Mile Creek about 250 yds E. of Elm Tree House. Lower 3 feet of 9 ft. exposed of grayish shales and coarser beds below. Fossils quite common.

2 Upper portion of 9 ft. Beds very coarse. Fossils less numerous and in bands. 



Two Divisions = 3 Ft

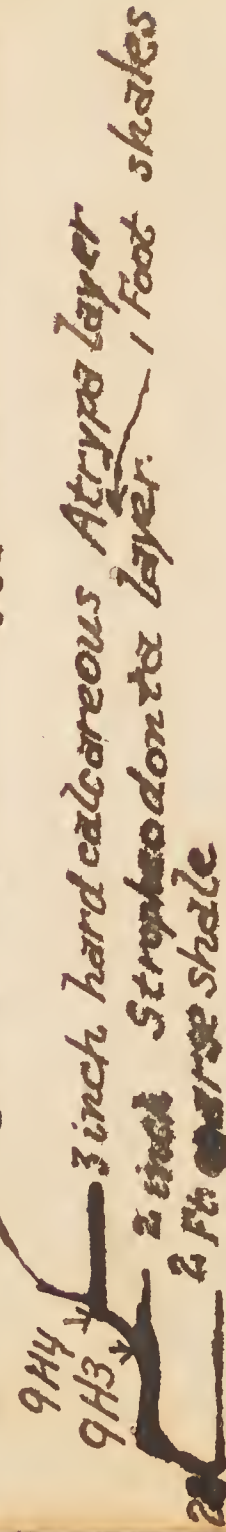
13 1/2 ft. very coarse beds of shale becoming finer above.

9 ft. sandstone & flags.


9H6

4 ft. coarser shales.

9H5 1/4 Ft. Shales flaggy & barren below



SECTION AT VORHIS UPPER MILL BETWEEN LOWER BRIDGE AND DAM July 14.

 O = Bridge in front of Elm Tree House. All additions given are with this as base. Dr. O.H.I. begins at O

Dyden quadrangle



(See beyond map on p. 15)

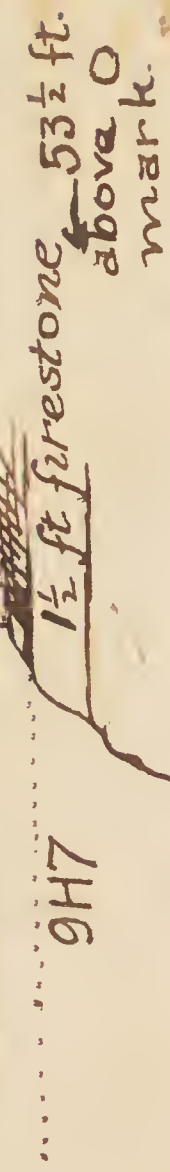
6 7 8 9 10

Brookton Monday July 13, 1903.

2

1. At Vorhis' Lower Mill on 6 Mile Creek about 250 yds. E. of Elm Tree House. Lower 3 feet of 9 ft. exposed of grayish shales and coarser beds below. Fossils quite common.

& Upper portion of 9 ft. Beds very coarse. Fossils less numerous and in bands.



13 1/2 ft. very coarse beds of finer shale becoming finer above.

Two Divisions = 3 Ft.

9ft sandstone & 9ft

CONVENTIONAL SIGNS



at O
 study
 add
 9H6
 9H7
 20
 SECT
 BRID

and the contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval varies according to the character of the area mapped; in a flat country it may be as small as 10 feet, in a mountainous region it may be 200 feet. Certain contours, usually every fifth one, are accompanied by numbers stating elevation above sea level. Many other heights, instrumentally determined,

about while on a steep slope it is near it. Thus a succession of these contour lines far apart on the map indicates a gentle slope; if close together, a steep slope; and if they run together in one line, as if each contour were vertically under the one above it, they indicate a cliff. In many parts of the country are depressions or hollows with no outlets. The contours of course surround these, just as they surround hills. Those small hollows known as sinks are usually indicated by hachures, or short dashes, on the inside of the curve. The contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval varies according to the character of the area mapped; in a flat country it may be as small as 10 feet, in a mountainous region it may be 200 feet. Certain contours, usually every fifth one, are accompanied by numbers stating elevation above sea level. Many other heights, instrumentally determined,

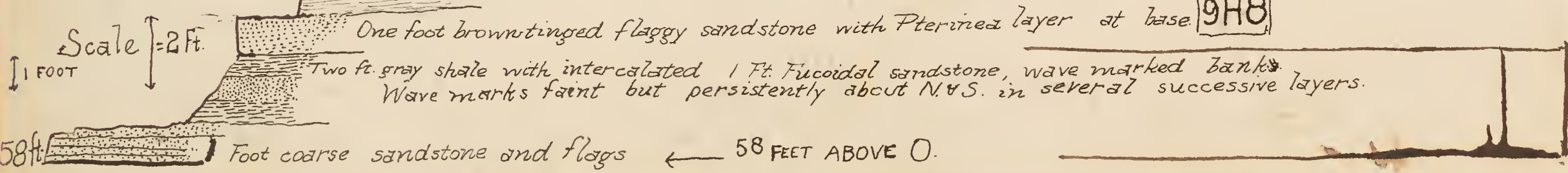
Boxes of fossils

- 20 = Dr 9H 1, 2, 3, 4, 25, 26.
- 21 = Dr 9H 8, 10, 21, 22, 23, 24, 27, 28.
- 22 = Dr 7I 1, 3, 5, 6, 7, 9, 9a, 10.
- 23 = Dr 7I 2, 4, 5. 9H 3, 5, 6, 32, 33, 34, 35, 36.
- 24 = Dr 9H 1, 2, 3, 5, 9, 11, 30, 31.
- 38 = 9H 7, 4, 2, 8, 21, 10, 11; WY 8, 6, 1, 6A, 1, 6B, 1.
- 39 = 9H 10, 11; WY 7, 10, 11, 2, 4, 5, 5, 10, 9A, 1.
- 40 = WY 7, 8, 2, 3, 4, 4, 5, 5, 5, 10, 9A, 1.
- 41 = WY 9A, 1, 7B 4, 4, 2, 3, 1, 10.
- 42 = WY 7, 8, 2, 4, 4, 5, 1, 10, 6, 8, 9A, 1.
- 43 = WY 6, 0, 1, 3, 4, 7, 10, 11.
- 38 = Lock 6, 2, 1; 7, 2, 1, 2; 8, 2, 1, 5, WY 7, 10, 1, 10, 2;
- 34 = WY 10, 1, 10, 2, 6A, 1, 6C, 2, 6B, 1.
- 35 = WY 6A, 1, 6C, 2, 6B, 1, 7B, 10, 1, 10, 2.
- 36 = WY 8C, 1, 6B, 1, 6C, 2, 6C, 1, 7B, 8, 6A, 1.
- 37 = WY 8C, 1, 7B, 7, 6B, 1, 6C, 2, 7B, 11.
- 44 = WY 9A, 1, 7B, 10, 3.
- 45 = WY 7B, 10, 3.
- 46 = WY 7B, 10, 3, 4, 4 1/2.
- 47 =
- 48 = WY 9, 8, 4, 9A, 1, 8, 1, etc.

49. WY 4J, 1, 4K, 1-8 | 53. 11, 11, 11, 2, 11, 8, 4, 15, 15, 17
 50. WY 4K, 10, 11, 15, 16, 17, 18, 19 | 54. 11, 11, 2, 11, 2, 11, 4, 15, 16, 17
 51. WY 4K, 10, 11, 14, 15, 16, 17, 18, 19 | 55 - 62 Lockwood WY 4K
 WY 4K 10, 11, 14, 15, 16, 17, 18

(see beyond map on p. 15)

SECTION AT DAN WHITE'S MILL just west of eastern boundary of Dr. 9 H. on 6 Mile Creek. July 15, 1903



10 Feet of flags and flaggy sandstones.

6 Feet of firestone exposed on north side of creek. There are several 1 inch or 2 inch ss. bands alternating with the firestone. On the south bank, just under the mill, the lower foot of firestone is at 68 1/2 or 69 ft. above O. It seems to be identical with the 1 1/2 ft. of firestone at the top of Vorhis Upper Mill Section.

- 10 inches thin, slaty shale with plant remains. 9H10
1 1/2 Feet gray shale with fossils Dr 9 H just under the mill. 9H9
4 inches to 1 Foot concretionary sandstone (gray)
1 Foot gray shale.
2 inches - 8 inches cross bedded lenticular sandstone.
Two feet grayish shales.
One foot brown tinged flaggy sandstone with Pterinea layer at base. 9H8

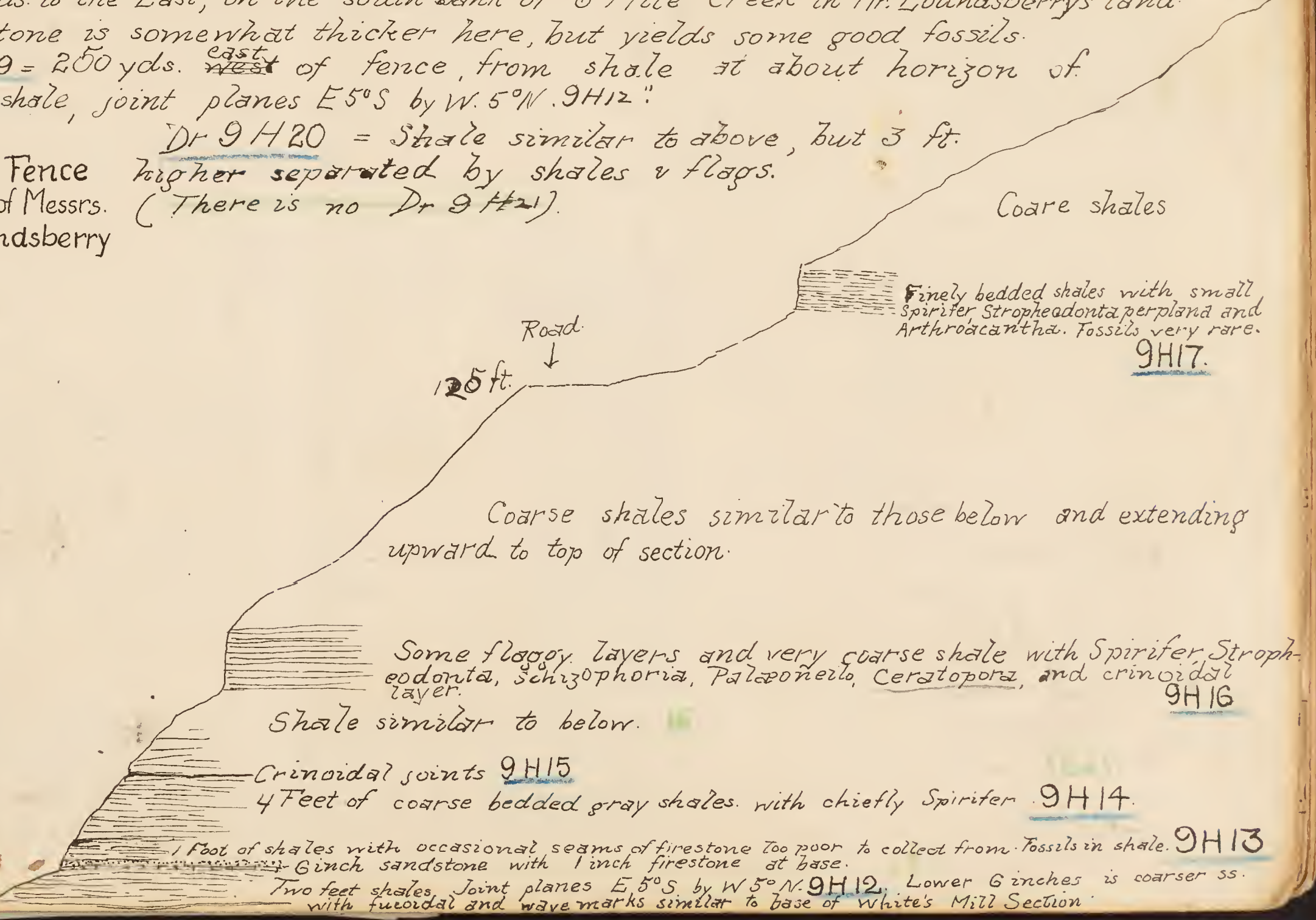
Two ft. gray shale with intercalated 1 Ft. Fucoidal sandstone, wave marked banks. Wave marks faint but persistently about N. & S. in several successive layers.

58 ft. 1 Foot coarse sandstone and flags ← 58 FEET ABOVE O.

marked Dr. 9 H 18. The layer, below, 6 inch sandstone with one inch firestone at base, crops out 100 yds. to the East, on the south bank of 6 Mile Creek in Mr. Loundsberry's land. The firestone is somewhat thicker here, but yields some good fossils. Dr. 9 H 19 = 250 yds. east of fence, from shale at about horizon of "Two feet shale, joint planes E 5° S by W. 5° N. 9H12"

Dr 9 H 20 = Shale similar to above, but 3 ft. higher separated by shales & flags. (There is no Dr 9 H 21). Section at Fence between land of Messrs. Snow & Loundsberry. Coarse shales

This section extends on the south bank of 6 Mile Cr. up the tiny stream bed (not shown on map) just west of fence. Section then extends across main road and then S.E. ward along the road shown on map in 8 H. Scale vertically, 1 square = 2 feet. Base of section at 93 feet above O. June 16, 1903



Finely bedded shales with small Spirifer, Stropheodonta perplana and Arthroacantha. Fossils very rare. 9H17.

Coarse shales similar to those below and extending upward to top of section.

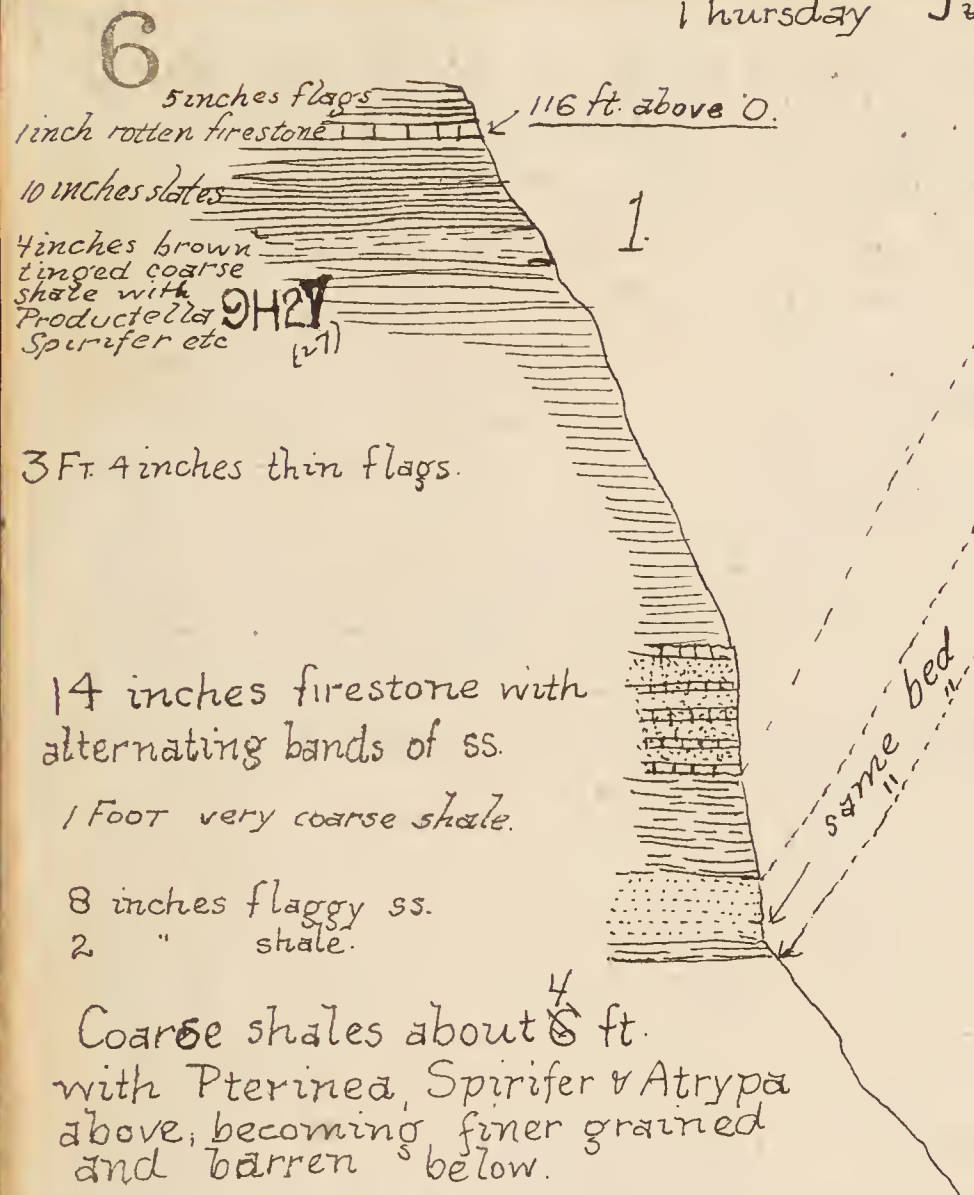
Some flaggy layers and very coarse shale with Spirifer, Stropheodonta, Schizophoria, Palaeonella, Ceratopora, and crinoidal layer. 9H16

Shale similar to below.

Crinoidal joints 9H15. 4 Feet of coarse bedded gray shales. with chiefly Spirifer. 9H14.

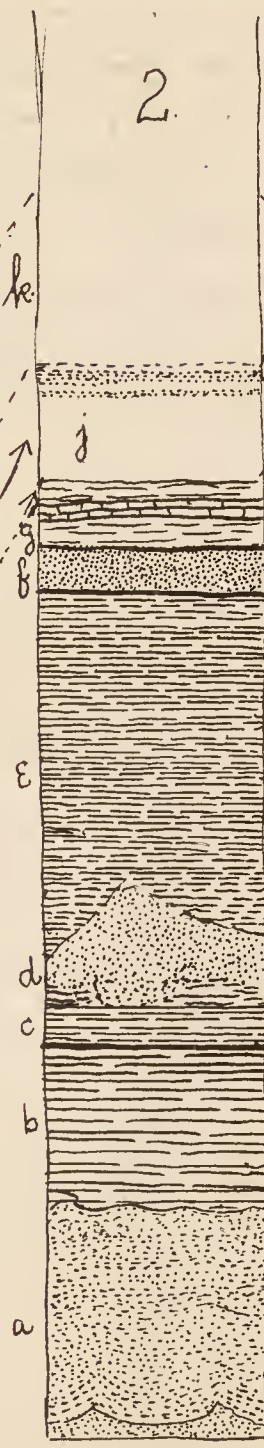
1 Foot of shales with occasional seams of firestone too poor to collect from. Fossils in shale. 9H13. 6 inch sandstone with 1 inch firestone at base. Two feet shales, joint planes E 5° S by W 5° N. 9H12. Lower 6 inches is coarser ss. with fucoidal and wave marks similar to base of White's Mill Section.

Thursday ^{July} June 16, 1903



SECTION ON WEST BANK G-MILE CREEK AT DAM OF MR. ANDERSON'S MILL (just below small island shown on map in BG.)

Scale 1" = 6 inches.



It will be observed that though Sect 2 is less than 50 ft. south of no. 1, there is a fall of at least 6 inches from 1 to 2.

- 1 foot very coarse shale.
- 8 inches flaggy sandstone.
- 2 inches shale 9H26
- 1 inch firestone 9H25
- 2 inch shale.
- 3 inch hard ss. 108 ft above 0.
- Two feet gray, brittle, thin bedded shales breaking into small fragments.
- 3-8 inches lenticular ss.
- 3 inches thin bedded gray shale.
- 1 foot very coarse shale or ss.
- 1/3" to 2 ft. lenticular thin bedded ss. deposited in what seem to be large wave depressions. One of these, which is in the nature of a filled channel, extends across the stream which cuts through it. It is 7 ft. from crest to crest 10 inches deep and extends E 30° S by W 60° N.

Section on west bank a couple of rods South of one to the left.

THE SAME AS AT POSSIBLE

Thursday, ^{July} June 16, 1903

The beds at Anderson's Mill were also studied about 100 ft. west of Sect. No. 2, on the south bank of the stream. ~~The section here is as follows.~~ The hard layer, bed f of Sect. 2., crops out here at 103 ft. 8 inches above 0. There is therefore a drop of ~~at~~ 4 1/2 ft. in going a little over 100 ft. Westward. From this I should judge that the dip is in the neighborhood of 275 or 300 ft. per mile, direction W. of S.W. Some fossils, Dr 9H24, were collected from the firestone, the same horizon as Dr 9H26, see Sect. 2, opposite page. The 14 inches of firestone of Sect. 1, are also well displayed here, though they are covered in Sect. 2. Some (2) indefinable fossils were found in the 2 ft. of brittle shale here (bed e of Sect. 2.). In the bend in the creek a few ft. south of the mill, ⁱⁿ the southeast corner some fossils were collected from the upper portion of the last named beds (the 2 ft. of shale) Dr 9H21. ~~Collections~~ These shales are less siliceous and brittle than usual, and fossils are fairly common especially Pterinea. The 1 inch firestone band also yielded fossils here Dr 9H23, as did the underlying 2 inches of shale. Dr 9H22.

Friday June 17 On the roadside in front of the mill (Anderson's), 2 1/2 ft. of gray shales crop out in the ditch on the south side of the road. Fossils Dr 9H28 are found here. 1/8 of a mile up the road ^{over} northeastwardly in 8 G, the same shale crops out about 25 ft. higher giving a dip of 200 ft. per mile S.W. A layer rich in crinoid joints is found in the middle at the last named outcrop, at the same horizon at which the fossils of Dr. 9H28 were found, but the other fossils of Dr. 9H have disappeared.

8

Friday ~~June~~ July 17, 1903.

At about the 1580 ft. contour line on the road, at the right hand 3rd. of Dr. 8 H near southern Boundary (see black spot on map), some blocky shales crop out in the road bed. In the middle of the western portion of 8 H, in the road bed in front of Hiram Vandermark's house, the same kind of rock crops out. *Ambocoelia umbonata* & *Productella* were found, though fossils even these are ^{very} rare.

Thirty ^{feet} lower down, some more shales & flags crop out in the road bed. The lowest flag exposed here contains Scolithoid markings. Dr. 9 H 31.

Dr. 9 H 30 = Over 100 ft. of very soft, fissile, friable shale with a few flaggy or sandy layer. The middle portion of the shales is very black and carbonaceous and contain *Protosalvinia* spore cases with an occasional *Styliola* (?). A single *Lingula*, an *Orbiculoidea* and a *Leiorhynchus* were found in the flags. It will be seen that with the exception of comminuted plant remains fossils in these Upper Portage shales are very scarce. Exposure in Dr. 9 H

Monday ^{July} ~~June~~ 20, 1903. A few plicated fragments of a *Panetka* or a *Spirifer* Dr. 9 H 32 were found in the shales above Dr. 9 H 31.

Thirty five feet higher up in the shales in front of Hiram Vandermark's house, some argillaceous shales were found between the blocky layers. These shales contain *Ambocoelia umbonata*, and a fauna of small lamellibranchs including 2 or 3 *Nuculas* (the commonest being *Nucula corbuliformis*), a *Grammysia*, *Glossites cf. subternis*, *Modiomorpha subalata* var. *Chemungensis* etc. = Dr. 9 H 33.

The next section studied begins about 40 ft. (\pm 25 ft.) lower, than Dr. 9 H 33 ^{in the woods} in a small brook almost due west from Vandermark's. The section is in the northern side of the ravine shown on the west steep side of the hill in Dr. 9 H. The lowest beds exposed are 15 feet of thin brown flags coarse shales and softer shales. The fauna of the softer shales is brachiopodal, basal "Chemung". The fossils Dr. 9 H 34 are *Spirifer*

cf. *Marcyi* and *Ambocoelia umbonata*. Twenty seven feet higher up are some two feet of very coarse shales and ss. containing a very rich "Lower Chemung" fauna. The shales break into large angular chunks. Fossils *Ambocoelia umbonata*, *Spirifer marcyi* (?), *S. mesacostalis*, *Leiorhynchus cf. mesacostalis*, very large *Atrypa reticularis*, *Schizophoria impressa*, 2 or 3 species *Productella*, a *Pleurotomaria* and a *Pterinopecten*. = Dr. 9 H 35. Twenty feet higher up, occurs 1 foot of barren flags, surmounted by 1 foot of very argillaceous shales, which weather into a yellowish white, stiff clay or almost putty. ^{in place???}

Tuesday July 21, 1903. On the north side of the road in upper right hand corner of 8 H some gray shales with very little flag occur from 1120 - 1220 ft. A.T. There is intercalated at 1125 ft. A.T. one foot of the argillaceous, fissile, iron stained shales characteristic of Upper Portage below Vandermark's on the hill road in 9 H. The beds are, I should judge, equivalent with the gray shales in the corner of the road of 9 H at 1080 ft. A.T. No fossils were observed.

In the eastern portion of 7 H, opposite the house, there crop out on the east bank of 6 Mile Creek at the spot marked in blue pencil, 10 feet of gray, soft shales, with a couple of 6" or 8" flaggy layers. The shales look very much as though they might contain fossils, but in a search of over 1 hour, none were observed. The horizon is 1125 to 1135 ft. A.T. Dip is very great, over 300 ft. per mile S.W.

Tuesday July 21, 1903. Section along road & stream in Dr 7 I running into 8 I.

1. At 1436 ft. A.T., a few inches of gray shales, coarse, with blue-brown iron stains, no fossils.
 2. From 1460 to 1466 ft. A.T. in front of Mr. Wm. H. Leonhards (in S.W. part of T C) there crop out on the highway some 6 feet of gray shales with brown & red iron stains. Much of these shales is blocky. In the blocks near the top a species of *Monotrypa* is quite common. The only other fossils observed are a couple of small *Modiomorphas*, a *Nucula*, and a small, pauciplicate *Deltysis*. The rock is very sparsely fossiliferous. The solid material of the *Monotrypa* is mostly weathered out, so that the blocky shale looks as though it contained many irregularly branching tubes. The fossils obtained above (in 2) are Dr 7 I 1. The dip is S. of W.
 3. Twenty feet higher up occurs a foot of barren flags. Joint planes N 6° W. by S. 6° E.
 4. Dr 7 I 2 & 3. At 32 ft. above the bridge, in front of Leonhards, occur 2 ft. of very coarse flaggy shales and sandstone in the lower part, Dr 7 C 2, of which a small *Orthis* is quite common, while in the upper part Dr 7 C 3, *Leiorhynchus* is the only fossil observed.
 5. Dr 7 I 4 to 9. — At forty feet above the board bridge in front of Leonhards, there begin at 1500 ft. A.T. an important series of outcrops in the bank of the stream. The lowest beds are coarse blocky shales and flags and contain a few *Strophodonta mucronata?*, *Orthis* and a *Palaeonilo* of *constricta* or *Bedfordensis*. Dr 7 C 4.
- Dr 7 I 5. This is a very important horizon on account of its rich fauna, and the first appearance of *Spirifer disjunctus*. The shales are coarsely bedded and break into angular large chunks, gray in color, with hardly any appreciable iron stain. Horizon 1502-1503 ft. A.T. chiefly in lower half. Fauna extremely rich in individuals and species, almost exclusively brachiopodal. One or more species of *Productella* are predominant while large *Atrypa reticularis*, *Schizophoria impressa*, *Leiorhynchus* (*Athyris?*), *Strophodonta mucronata?* are abundant. Quite common also is a small, extremely attenuate, multiplicate *Spirifer disjunctus*. *Clonotetes cf. lepidus* is quite common observable, but I do not remember having seen any *laurellibranchs*.
- Dr 7 I 6. 1503-1504. — *Leiorhynchus* very prominent. The forms are mostly smooth and resemble *Athyris* in some respects.

- Dr 7 I 7. 1504-1505 ft. A.T. *Leiorhynchus* still prominent.
- Dr 7 I 8. Two ft. further up. Coarse blocky shales. *Productella* etc.
- Dr 7 I 9a. One foot still higher up. Shales become sandier, with a little iron. The rich brachiopodal fauna has disappeared, and in its place occurs a crinoidal fauna. The crinoidal spines found resemble greatly the *Arthroacantha*.
- Dr 7 I 9. 1508-1520 ft. A.T. occur ^{on the roadside} twelve feet of argillaceous, iron stained shales similar to those of the barren Upper Portage below Hiram Vandermark's in 9 H, but the shales here break into blocks and contain a few fossils though the latter are by no means ~~very~~ common. The crinoid joints are occasionally met with continued up from below. Two or three specimens of *Productella* are met with as well as a couple of small *laurellibranchs*.
- Dr 7 I 10. At 1520 to 1530 ft. A.T. occur in the stream bed, two feet of friable, soft, iron stained shales with a fauna of the same *Spirifer disjunctus* as in Dr 7 I 5, and a small coarsely striate *Orthis*. Interspersed in these two feet are a few inches of the same (apparently) kind of rock in which a fauna of small *Nuculas* & *Palaeonilos* is quite well developed. The only brachiopod observed was a single tiny *Productella*. The *Spirifer* and *Orthis* re occur a few inches directly over the *laurellibranchs*.
- Dr 7 I 11. At 1532 to 1538 ft. A.T. are found 6 feet of coarse shales with very little flag, but becoming blocky above. A fragment of *Spirifer disjunctus* (somewhat larger than the small, attenuate forms of Dr 7 I 10) was found in the lower portion of the 6 ft., while in the upper portion a *Palaeonilo* and a couple of small *Nuculas* are found in the blocky shales.
- Dr 7 I 12. Beginning about 1590 ft. A.T. are 10 ft. of coarser shale usually blocky with some flags in the middle. Fossils chiefly *Strophodonta* at 1592 ft.
- Dr 7 I 13. At 1607 ft. A.T. is an extremely fossiliferous zone of *Strophodonta*, *Productella* and *Atrypa* in gray shales similar to 7 I 5.
- Dr 7 I 14. At about 1609 ft. are some shales in which *Clonotetes scitulus* predominates, though it is not very abundant. *Ceratopora dichotoma* also found here.
- Dr 7 I 15. About 1613 ft. A.T. shales with *Productella*, *Strophodonta* & *Ceratopora dichotoma*.

12

Friday July 24, 1903

The next work done is on the 5 minute quadrangle ^{ninth} west of Brookton. A section was worked along the stream shown flowing along the ~~eastern~~ southern boundary of 11 H. The lowest outcrop is with the junction of the small branch beginning at 1370 ft. and running up with 11 C. There are exposed from 1370 to 1382 ft. A.T., twelve feet of soft gray shales with some blocky iron stained layers, mostly barren. A few *Leiorhynchus* (almost smooth & large) occur at 1377 ft. A.T. Toward the top some hard layers crop out, and at the top is a 5 inch hard ss. band. Fossils Dr 11 C. (? labelled Dr 11 H.?)

Section 11 H. JOHNSTON'S HOLLOW. see p 93.

This section begins at 1435 ft. A.T. and runs along the most northern shoot of the stream above mentioned, running entirely in 11 H and having its source at Mr. J. J. Johnston's. The lowest beds are blocky shaly ss. capped by thin flags. total 2 feet barren.

1440-1446 ft. A.T. gray blocky shales similar to Dr # 11 C. but barren and capped by 1 ft. hard coarse gray ss.

1446-1457 A.T. There continue up to 1457 ft. alternating coarse beds of very coarse shale, flags & ss. capped by 2 ft. of flaggy ss. From 1459 to 1471 beds are covered.

1470 to 1476 A.T. 6 ft. of flaggy coarse sh. with finer shaly partings. A single fossil *Ambocoelia* was found here. Dr 11 H. 1 a.

1484-1490. At 1484 where the creek makes the first sharp bend to the right begins another series of outcrops of the blocky shales with a few harder layers similar to 1470-1476 ft. A.T. There is a zone of *Chonetes scitulus* at 1485, *Ambocoelia* at 1487. Dr 11 H. 2. While one or two *Chonetes* and *Ambocoelias* may be found up to 1490 ft. A.T. but these two forms are not observed together here. The "zones" contain only few fossils. 1493 ft. There begins here an important series of outcrops. The first 1 1/2 ft. are the common grayish shales stained usually only on the surface, but in a few places also interiorly. Three or four specimens Dr 11 H. 3 were found; a small "*Orthis*"; an *Ambocoelia*,

JOHNSTON'S HOLLOW

and an almost plane *Palaeonchilus* cf. *sulcatina*. There is a 4 inch capping of flags and then occur a few ft. more of similar shales in which only one *Chonetes scitulus* has been found. (Dr 11 H. 3.)

13

Beginning at 1507 ft. A.T. is a fall and cliff of 23 ft. The rocks especially the upper portion are best exposed in the north bank where there is a somewhat dangerously overhanging cliff. The rocks are much jointed, rather coarse, very blocky shales, which are arranged in two tiers with a dividing line between. *Ambocoelia gregarius?* is very abundant while *Chonetes scitulus*, *Schizophoria impressa*, *Orthothetes chemungensis* etc. have also been seen. These rocks are very important and will be discussed in next day's work. = the lower *Tropidoleptus* zone. Dr 11 H. 4

The next higher rocks studied crop out at 1604 A.T. at the corner of the roads in S.W. part of Dr 11 H, consisting of one foot of olive colored, blue stained shales exactly similar to those in front of Hiram Vandemark's house from which the *Ambocoelia* and *Mucula corbuliformis* fauna was obtained. No fossils were obtained here nor in the ensuing hard, blocky, coarse, red stained shale (1 inch) nor in the overlying gray shale.

Dr 11 H. 5. On the south of the e. & w. road in S.W. part of Dr 11 H occur some 25 ft. of beds from 1605 to 1630 A.T. which directly overlie the beds last mentioned. There are exposed about 9 1/2 ft. of flags and flaggy shales overlain by 15 ft. of shales with a little flag toward the top. Only two small fossils resembling a *Gosseletia* (but very small) were obtained.

Saturday July 25, 1903

The section studied next extends through 11 C into the S.E. corner of 12 C. On the road running S.W. in 11 C at 1300 A.T. are found in the N.W. side of road a foot of olive shales capped by 6 inches of thin brown flags with 6 inches intervening of gray iron stained shales. Some fossils 11 C. 2 are found in the iron stained shales. *Ambocoelia murchisoni* fairly common; a specimen of

14 *Pleurotomaria cf. capillaria*, also one *Delthyris mesacostalis nonmucronate* but very lamellose. In Dr 11 I 2 ^{some where}

In the creek bed bank, between 1250 & 1300 A.T. are found 20 ft. of argillaceous shales and flags exactly similar to the Upper Portage below Hiram Vandermark's and even covered with the same growth of lichen. No fossils found but the "declination" is $W 30^{\circ} S$ 50 ft. per mile.

Dr 11 I 3 At 1375 A.T. occurs a very hard and thick firestone with many *Orthis*, *Spirifers* and *Productellas*. This outcrop is on the east side of the branch running n. v. s. in s. e. corner of 12 I, and with zone next to be mentioned is really in 12 I.

Dr 11 I 4. This is the lower *Tropidoleptus* zone (see page 13, Dr 11 H 4) cropping out as a cliff on the north west side of the stream opposite 11 I 3, but the lower part of which is covered by a talus exactly as at 11 H 4. The single bedding plane which divides the 23 ft. of shales into 2 tiers or "beds" is here evident, while a short distance to the south where the beds form the stream bottom, the bedding plane causes two falls over the shales. *Ambocoelia* here occurs in small clusters, as at 11 H 4 while *Chonetes scitulus* is also found in the same relationship as at the latter locality. *Orthothetes chemungensis*, *Schizophoria impressa* and *Atrypa reticularis* occur in the same relationship as at 11 H 4, while the rock itself is the same blocky, coarse, slightly iron tinged shales. There can be no doubt therefore that Dr 11 I 4 is the same as Dr 11 H 4, but the latter is 105 ft. higher than Dr 11 I 4. This declination combined with that of the argillaceous shales above mentioned furnish data from which the true dip can be computed. Among the fossils collected from Dr 11 I 4 but not noticed in the field in Dr 11 H 4, *Tropidoleptus carinatus* is most important. There is also a large annular finely (transversely) striate *Orthoceras*, and a Discinoid brachiopod in which the upper valve is very capuloid (more so than in *Craniella hamiltoniae*) and the lower valve of which is flat and fits into the upper.

see page 90

Snyder 2nd

11 12 13 14 15



Base at Brookton (see before map p 3)

14 Pleurotomaria cf. capillaria, also one Delthyris mesacostalis nonmucronate but very lamellose. In Dr 11 I 2 ^{in places}

In the creek bed bank, between 1250 & 1300 A.T. as and flags exactly similar to the Upper Portage below H with the same growth of lichen. No fossils found in 50 ft. per mile.

Dr 11 I 3 At 1375 A.T. occurs a very hard and thick Spirifers and Productellas. This outcrop is on the east in s.e. corner of 12 I, and with zone next to be near Dr 11 I 4. This is the lower Tropicoleptus zone (see page 1)

cliff on the ~~west~~ west side of the stream opposite, which is covered by a talus exactly as at 11 H 4. divides the 23 ft. of shales into 2 tiers or beds short distance to the south where the beds form bedding plane causes two falls over the shales. small clusters ^{at} at 11 H 4 while Chonetes scitulus is ship as at the latter locality. Orthothetes chemungensis Atrypa reticularis occur in the same relationship itself is the same blocky, coarse, slightly iron & is 105 ft. higher than Dr 11 I 4. This declination argillaceous shales above mentioned furnish data to be computed. Among the fossils collected from Dr 11 I 4 in Dr 11 H 4. Tropicoleptus carinatus is most important. lar finely (transversely) striate Orthoceras, and a D the upper valve is very capuloid (more so than the lower valve of which is flat and fits into the upper.

September, 1899.

THE DIRECTOR,

United States Geological Survey,

Washington, D. C.

- 63. WY 4K 39 41 4J 2, 3J 4.
- 64. WY 3J 14, 4K 39, 43.
- 65. " 3J 1, 2, 4, 4J 2, 3, 4K 39, 42, 43
- 66. " 5J 1, 3J 1, 2, 4, 4J 2.
- 67. " 4K 39, 43-3J 1, 4.
- 68. " 5J 1, 2.
- 69. " 3J 1, 3, 4.
- 70. " 5J 1, 2. 4J 2.

- 71. Ith. 10N 1
- 72. " " " " " "
- 73. " " " " " "
- 74. " " " " " "
- 75. " " " " " "
- 76. " " " " " "
- 77. " " " " " "
- 78. Ith. 12M 1-Tincl.

- 79-82. - Ith. 12M 8, 9, 13-16, x. 0.7 m
- 83. WY 9N 12. 10M 12. v
- 84. WY 8O 00 - 00.4. v
- 85. WY 8O 1-4. 10M 1-5. ✓
- 86. WY 10M 1-5 -
- 87. WY 9N 2. -

- 88. WY 6N 9. 9. 8. 6. 11. Nb 11
- 89. WY 6N 8-9
- 90. WY 6N 4-8
- 91. WY 6N x (conglomerate.)
- 92. WY 6N x Nb 50. 5. 51.
- 93. WY 6N 50. 5. 5
- 94. WY 6N 50. 5. 5
- 95. WY 6N 8. 5. 15. x

Chemung

Base at Brookton (see before page 13)

Monday July 27, 1903.

On the east side of the road running north and south in the upper (northern) part of 12d a couple of feet of olive gray soft shales crop out in the roadside at 1480 A.T. An ambocoelia and a small erect Orthoceras were the only fossils observed though not collected.

Further north in front of Geo. Griffin's house at 1545 A.T. there crops out a firestone in which fossils are very abundant and well preserved. Productellas are very abundant while one or two specimens of Spirifer mercyi, and a Pterinea were found (Dr 12, I 1.) 1540 A.T.

This winds up work at Brookton see page 79 -

WATKINS QUADRANGLE (Wk.) Rock Stream Section. 10B.

The lowest beds observed are basal Portage about 50 ft. above the Genesee. There is a gorge extending back from the shore road over 100 ft. higher, interrupted by a fall of about 60 ft. The lowest 100 ft. are gray shales mostly argillaceous and very friable with a few ss. bands, flags and coarser beds about equally distributed. No fossils were found except peculiar worm tracks resembling in some places a double chain, in other places being merely a flattened or cylindrical "juvencidal" impression between 1/6 & 1/8 of an inch wide. About half way up the fall occur a few ft. of stained friable shales capped by a 1 ft. layer of yellowish red stained shales. Another similar or 1 ft. layer occurs 6 ft. higher up at about 525 ft. (estimated). Above the iron stained shales for nearly 300 ft. the rocks become more arenaceous or flaggier, with almost none of the friable shale ^{found} below the big fall. Yet in the 550 ft. (nearly) to the base of upper Portage from the Genesee no beds are found ^{at all} similar to these yellowish stained shales. What is more, the same stained shales (exactly the same horizon) are found in Big Stream at Glenora, in Saw Mill Creek about Peach Orchard, in the creek 1/3 of a mile south of Peach Orchard, and similar shales at what is probably the

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TOPOGRAPHIC SHEET

STATE OF NEW YORK
CAMPBELL, W. ADAMS
STATE ENGINEER AND SURVEYOR

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DESO

The United States Geological Survey is a topographic map of the United States work has been in progress since 1882, at one-fifth of the area of the country, in Alaska, has been mapped. The maps are widely scattered, nearly every State represented, as shown on the program accompanying each annual report of the U. S. Geological Survey.

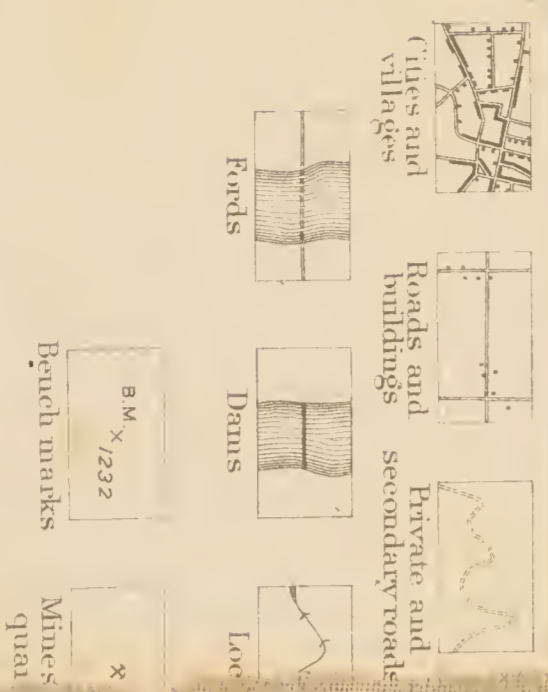
This great map is being published in sheets of convenient size, which are bounded by parallels and meridians. The four-corner points of land corresponding to an angle called a *quadrangle*. The sheets are approximately the same size: the paper dimensions are 20 by 14 1/2 inches; the map occupies 14 1/2 by 11 1/2 inches and 11 1/2 by 16 inches.

The scale of the map is 1:250,000, or about four miles to one inch. A few special maps of larger scales are made of limited areas in mining districts. The sheets on the largest scale cover 15' of latitude by 15' of longitude; those on intermediate scale, 30' of latitude by 15' of longitude; and those on the smallest scale, by 1° of longitude.

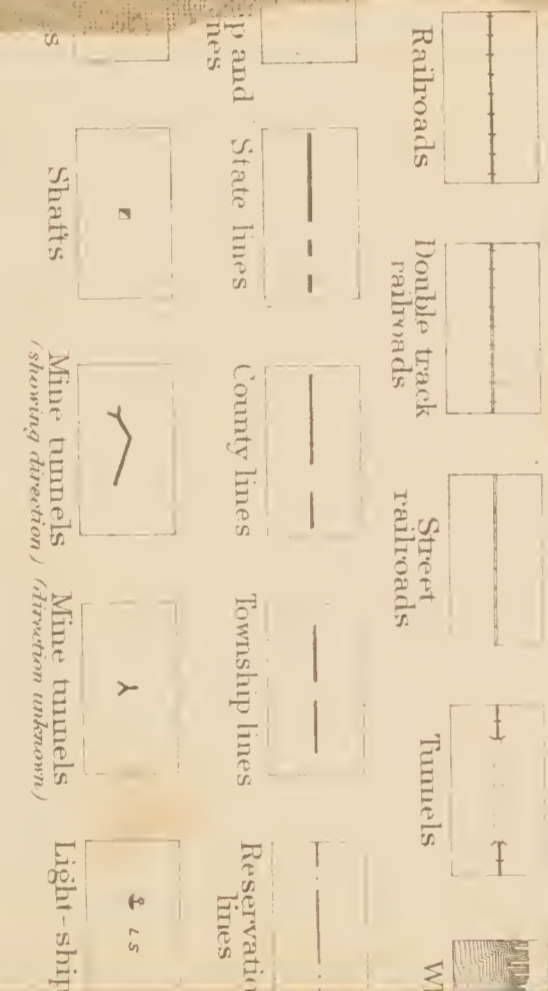
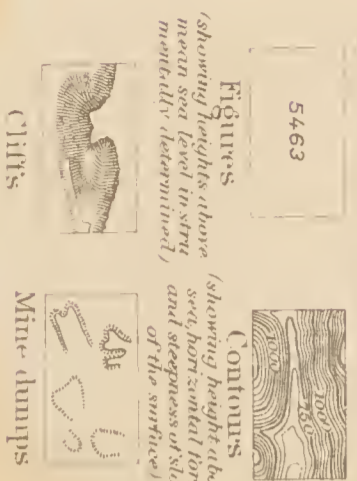
The features shown on this map are classified in three groups: (1) *primary*, including seas, lakes, ponds, rivers, streams, canals, swamps, etc.; (2) *secondary*, including mountains, hills, valleys, cliffs, etc.; (3) *tertiary*, including works of man, such as towns, cities, roads, railroads, boundaries, etc. The conventional signs used for these features are grouped below.

All water features are shown in blue, smaller streams and canals in full blue lines,

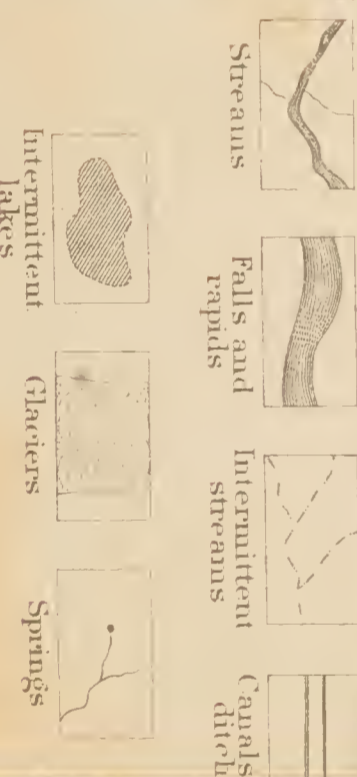
U. S. G. S.



RELIEF (printed in brown)



WATER (printed in blue)



U. S. G. S.

18 same horizon are found in Watkins Glen. WK10B1 Above these iron stained shales, as has been said the rocks are coarse and at 580 ft. A.T. occurs a hard calcareous juristone with a very peculiar lithological aspect and fauna. There is a form resembling *Chonetes agani var. aurifera* which may easily be mistaken for *Strophodontia muricata*. Two or three other species of *Chonetes* are present together with some minute *Spisifer*, small *Orthis*, some *Terebratuloids*, minute *Pteropods*, carbonized *Bryozoa* (freshwater?), and some clumps of wood. The comparatively large pieces of woody matter, the carbonized *Stictopora*, the presence of the *Orthis*, and the strikingly peculiar lithology and method of preservation of the fossils, leads to the conclusion that these rocks were deposited in fresh or brackish water. This zone is best exposed on the south bank of Rock Stream, between 80 & 85 ft. below the railroad bridge of the Northern Central and is labelled Wk 10B1, WK 10B2 and 3. Fifteen feet above 10B1 on the north side of the creek occur some gritty shales in a cliff of sandier beds. A few specimens of *Pterochæmia fragilis* are found in the shales at 603 ft. A.T. (WK 10B3). There are also found here many small circular iron stains, which look as though they might be of organic origin. Between 10B1 and 3 there are mostly thin flags containing in the less gritty places the characteristic bi-mould form rocks 10B2. 10B4 = 10B1. Further up the creek at 640 A.T. there occur some 5" above the creek bed some impure, calcareous, hard sandstone or arenaceous shales; composed in some places almost exclusively of broken fragments of a calcified *Ceratopora* of Jackson, with a few calcified sponges, nodal sponges, and plates. A diligent search revealed the presence of a couple of specimens of *Reticularia laevis*, also a smooth, very gibbous

Leptoceras Paraceras Bera Egle... Wk 10B5 = Wk 11B 10a Wk 10B6 = 12B Wk 12B

UNITED STATES GEOLOGICAL SURVEY

The number in each case being in proximity to the point to which an are shown in black, in which also is printed. Boundaries, city, land-grant, reservation, shown by broken lines of different kinds. Cities are indicated by black squares. Houses by small black squares. Roads by fine double lines (full for the main roads, dotted for the interior ones), trails by dotted lines, and railroads by full black lines. Other cultural features are indicated by various symbols.

The topographic atlas is published in sheets of a principal town or city. The sheets are numbered in the order of their publication. The price is two cents each. The map is the base on which the mineral resources of a district are shown. The topographic atlas is published in sheets of a principal town or city. The sheets are numbered in the order of their publication. The price is two cents each. The map is the base on which the mineral resources of a district are shown.

THE DIRECTOR, United States Geological Survey, Washington, D. C. U. S. G. S.

same horizon are found in Watkins Glen:

WK10B1 Above these iron stained shales, as has been said the rocks are coarser and at 580 ft. A.T. occurs a hard calcareous firestone with a very peculiar lithological aspect and fauna. There is a form resembling *Chonetes logani* var. *aurora* which may ~~possibly~~ be mistaken for *Stropheodonta mucronata*. Two or three other species of *Chonetes* are present, together with some minute *Spirifers*, small *Ostracods*, some *Terebratuloids*, minute *Pteropods*, carbonized *Bryozoa* (Freshwater?), and some clumps of wood. The comparatively large pieces of woody matter, the carbonized *Stictopora*, the presence of the *Ostracods*, and the strikingly peculiar lithology and method of preservation of the fossils leads to the conclusion that these rocks were deposited in fresh or brackish water. This zone is best exposed on the south bank of Rock Stream, between 80 & 85 ft. below the railroad bridge of the Northern Central and is labelled Wk 10B1.

WK10B2 and 3. Fifteen feet above 10B1 in the north side of the creek occur some gritty shales in a cliff of sandier beds. A few specimens of *Pterochaemia fragilis* are found in the shales at 603 ft. A.T. (Wk 10B3). There are also found here many small circular iron stains, which look as though they might be of organic origin. Between 10B1 and 3 there are mostly thin flags containing in the less gritty places the characteristic bi-moniliform tracks 10B2.

10B4. = 10B1/d Further up the creek at 640 A.T. there occur some 5" above the creek bed some impure, calcareous, hard sandstones or aren. shales; composed in some places almost exclusively of broken fragments of a calcified *Ceratopora* of *Jacksoni*, with a few calcified erinoidal columns and plates. A diligent search revealed the presence of a couple of specimens of *Reticularia laevis*, also a smooth, very gibbous

19
Leptodesma?, a *Cyrtina* *Hawiltonensis*, and a couple of small *Paracardivids*. Large plant or woody fragments, generally pyritized are also found here. The rock when worn smooth by the creek across the *Ceratopora*, affords a superficial resemblance to a poplery. Wk 10B4. Eight feet above this *Spirifer laevis* zone, another small *Paracardivium* was found, while no fossils were found again up to 830 A.T.

The rocks up to 800 A.T. continue to be coarse sandstone or flaggy beds and no fossils were found. At 800 and up to 900 A.T. there are 100 ft. of thin, somewhat arenaceous shales, with a few flaggy layers in the lower portion. In some cases at about 810 A.T. the latter are very thin almost papery and are deposited along irregular wave lumps.

Wk. 10 B5
= Wk. 11 B
1a

Wk 10B5. = 11B/1a At 830 A.T. in the friable gray shales, fossils may almost be said to be common. *Pterochaemia fragilis* and a small *Pararea* are predominant, with one or two specimens of *Goniatites complanatus*, a small *Orthoceras*, and plant remains, with a single *Styliolina fissurella*, and a fragment of a *Buchiola retrostriata*. This fauna is again found at 875 A.T. (Wk 10B6). The intervening rocks where exposed are gray fissile shales. Where these shales are a little more arenaceous or rough, a few *Limbicardia* and *Parareas* are found, while in the smooth places, the common track is revealed by an occasional specimen.

Wk 10B6
= 12B/1a

= Wk 12B/1b. Wk 10B7. At 900 ft. A.T. (approximately) is a bed with *Buchiola retrostriata*. This is the last appearance of the gray fissile shales, with some buff colored somewhat iron stained, arenaceous shales. Above this the rocks change off into the characteristic Upper Portage

Wk. 10B6 = Wk. 12B/1a

20 (and Oneonta?) soft, pure, argillaceous shales, gray or olive in color but very much ferrostained externally. There are as usual occasional flaggy or hard bands. No fossils were observed. These shales continue predominant for 500 ft. after which they gradually disappear.

SECTION UP SAW MILL CREEK AND CREEK 1/3 MILE SOUTH OF SAW MILL CREEK.

Wk 9A1. The section begins in basal Portage. A few fossils were found at about 465 A.T. consisting of a single *Limulicardium*, a *Chonetes scitulus* and a seaweed with fruit. The rocks are gray shales, in some places a little arenaceous, and with a few harder slaty or flaggy layers. Where the beds are thin laminated shales the bryonuliform tracks are quite common but no other fossils were found. About 20 feet above Wk 9A1 these tracks are fairly abundant and a few (Wk 9A2) were collected. At about 520 (± 10 ft.) A.T. is the a one foot layer of yellow stained shales (the same as those found in Rock Stream, Glenora, and found in the creek south of Rock Stream, Saw Mill Creek (see Wk 9A16). This layer in Saw Mill Creek caps a 20 ft. fall which is too inaccessible to ascend. At 767 A.T. in Saw Mill Creek are a few fossils of large forms of *Limulicardium* and a specimen or two of a form of *Conocardium*. These were the only fossils observed up to 820 A.T. but the section was not worked from 520 to 760 A.T. For the section see the stream (Smith Cr.) south of Saw Mill Creek.

Smith Cr. In the latter section a single *Goniatite* was found at 475 ft. A.T. At 495 ft. A.T. is found the *Plumalina* zone. The rocks are gray shales, argillaceous in many places, but somewhat arenaceous with a few coarse layers. The *Plumalina* zone is in slightly arenaceous gray shales. *Plumalinas* are quite common and a single *Leiorhynchus* was the only other fossil obtained. At 506 A.T. a single
 # = 9A3 = 9A1c. / # = 9A4 = 9A1d.

9A5 = 9A1E
Chonetes scitulus was found. At 525 A.T. is the layer of yellow stained shales seen in Rock Stream, Big Stream and in Saw Mill Creek. A cluster of *Goniatites* was found in a somewhat harder layer in the ^{stained} shales which crop out 3/4 up the first big almost perpendicular fall. Wk 9A4. Wk 9A6 = 9A1f

At 553 A.T. occurs above some shales and below some flags, a 1" to 2" firestone layer full of crinoid joints. Other fossils recognized were *Atrypa reticularis*, *Beratopora* cf. *Jacksoni*, *Stictopora Neechi*, *Productellas?*, *Septaria rhomboidalis*, *Stropheodonta mucronata* etc. Wk 9A5. 553 A.T. = Wk 9A8 = Wk 8A

In the next ten feet of flaggy shales some *Beratoporas* are the only fossils found, but 26 ft. above Wk 9A8 occurs another firestone, 8 inches thick. This second firestone is the same at 579-580 A.T. as that on Rock Stream at 588 A.T. see Wk 10B1, but in Rock Stream this band is from 2 to 6 inches thick with some flaggy layers below and a hard ss. band above. At the creek south of Saw Mill Creek (Smith's Creek) the fossiliferous band of Wk 10B1 bears the same aspect as at the latter place but on Smith's Creek there are some soft shales and a fossiliferous band below the "freshwater band". In these shales and lower band *Atrypa reticularis*, large & well preserved, *Schizophoria impressa*, *Spirifer* sp., small *Productellas* and a few larger ones, *Pladochonus* sp., etc. are found. Wk 9A9.

At 627 A.T. a single specimen of a *Modiomorpha* was found in a slaty shaly ss. Wk 8A at 627 = Wk 8A 2d

The *Spirifer laevis* zone was found at 632 A.T. in its typical expression. The *Beratopora* is still very abundant and on weathering presents the same porphyritic appearance as in Rock Stream. *Reticularia laevis* is here well preserved with both valves in conjunction and some specimens showing the spires. The species is relatively more abundant than at Rock Stream. = Wk 8A 2e

Above

see page 23-24

22 Above the *Spirifer laevis* zone the rocks are contorted into several small but sharp anticlines and synclines. No fossils were observed in 25 feet.

The section was then continued in Saw Mill Creek under the Lehigh "Bridge" at 820 A.T. on the east side. The fossils here are *Limulicardium fragile*, small *Pararca*, *Paracardium*, *Bellerophon maera* etc. The fossils are in gray soft, fissile shales in most places slaty but containing a few fossils where less laminated = 7A1 = 7A1a = 7A1b 7A2

Five and one half feet higher up at 825 = occurs a similar fauna in similar beds in which *Pterochaema fragila* predominates. Between these the rocks are laminar and in many places covered with *Trinacrinid* worm tracks. Half a foot higher up at 826 to 827 A.T. are some more similar rocks containing seaweeds. 7A3 = 7A1c

No more fossils were collected. Above 900 as in Rock Stream the rocks become red fissile unstained shales gray or olive in color internally and stained red on the surface. No fossils were found. On the under side of the hard bands *Trinacrinid* markings are quite common and a few worm tracks are found in the shales where the latter are gray. These shales are found at least as high as 1550 ft.

In Ov. 40 on the road running east and west are outcrops of hard micaceous, lenticular sandstone or flaggy bands. Between these bands are argillaceous shales stained yellow and gray. Most of the shale bands from 1690 to 1810 A.T. are covered. At 1752 A.T. are found some crinoid joints in a brown band. At 1780 a few more fossils were found, one a *Leptodesma*. Up to 1810 the rocks are the common argillaceous shales with a few thin harder bands. At 1800 on the East side of the hill Dr. Kiddle has found some *Chemung*

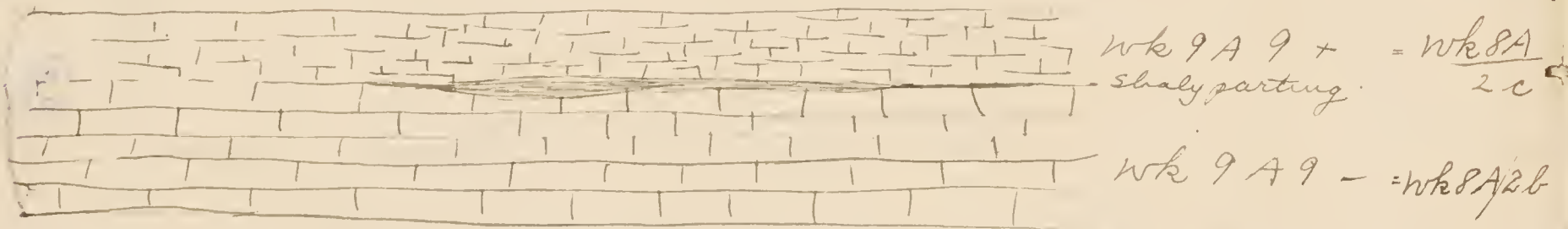
23 fossils but the only fossil trace of *Chemung* is in a thin sandstone band which has a vertical cleavage and columnar structure. The same kind of beds are probably found below *Hiram Vandermark's* at Brookton but are covered.

East of Hall's Corners on the west side of the lake on the road running e.w. in Wk 13 E the same beds that crop out from 1690 to 1780 in the Ord quadrangle crop out here at 1520 to 1610 in the road side. A *Leptodesma*, a few crinoid joints and the same peculiar *Trinacrinid* markings are found in both places and the rock is the same cropping out under the same conditions. There is thus seen to be a declination of 170 ft. in going S.W. 10 miles. Yet between Rock Stream and Smith's Creek there is a declination of about 8 ft. per mile a little north of east.

In the creek running north and south in Wk 14 E, there is an exposure of about 35 ft. from 1520 to 1555 A.T. The rocks are mostly flags and argillaceous shales. Some *Leptodesmas* were found in a flaggy layer eight feet below the road.

From (Wk. 9A9). 26 feet above Wk. 9A8 there occurs at 579-580 feet a firestone 18 inches thick. In some places this firestone is composed of one band, but in other places the firestone is composed of two bands the upper one 4 or 5 inches thick separated from the lower one by a 1/2-1 inch parting of calcareous shale or shaly limestone. This upper band contains the same fauna and is of the same lithology as the Wk 10 B1. The latter is on the west side of the lake at 588 ft. A.T. which is 8 feet higher than Wk 9A9 (579-580 A.T.). The lower limestone band of Wk 9A9 is slightly argillaceous, composed of crinoid joints with *Atrypa reticularis*, good sized *Strophodontia micronota* (*interstitialis*), *Schizophoria*, *Producta* etc.

24 The upper limestone band of Wk 9A9 differs from the lower in that its crinoid joints are comminuted as seems also to be the case with the other fossils for only the smaller shells of minute *Chonetes*, *Ostracods* etc. are visible. The upper zone of Wk 9A9 has been labelled Wk 9A9+ = Wk 8A2c and the lower 9A9- = Wk 8A2b. The following section shows the relations of the two.



↑ Note. Where there is no shaly parting between 9A9- and 9A9+, - that is where the limestone seems to be one continuous layer the upper part partakes of the character of 9A9+ and the lower part of 9A9-. There is however somewhat of a transition from the lower band to the upper, but this transition is so gradual as to make both 9A9+ and 9A9- seem to be one continuous layer. The shaly parting where present contains *Atrypa reticularis* very commonly. Wk. 9A9+ is no doubt the same bed continued across the lake as 10B1

ere crop out a very hard band of gray sandstone with some calcareous material and iron. Near the surface this band is colored a deep brown by the iron. The thickness varies from 4" to 8", the lower portion of the rock having been deposited in wave depressions. In these small basins as it were, fossils are very numerous. In the lowest inch there are great numbers of small *deltoid* *Geratopora*. Just above the *Geratopora*, the rock is full of *Productella*, *Orthis impressa*, *Spirifer marcyi*, *Leiorhynchus mesacostalis*, white a single *modiomorphoid* *Leptodesma* was seen. The upper 2/3 of the sandstone band are barren, and where the band is thinner, at the wave crests, no fossils are found. This band shows a dip of 60 ft. per mile a few degrees east of north. Above this band, and below the next higher one, there are some blocky shales, 50 ft. thick at the s.w. end of the outcrop, but in going about 100 ft. n.e. these shales increase over 1 ft. in thickness. The higher bands are mostly barren. The upper portion of the outcrop is less fossiliferous than the lower. In a few places there are clusters of *Leiorhynchus mesacostalis*, but the *Lammellose* form of *Deltoides* is predominant throughout the upper portion of the cliff. Fossils from the hard band at 110 ft. A.T., are labelled 7B4. 6. In the bed of the creek at 1180 to 1190 ft. A.T., are some blocky shales with a hard band at 1182 and some hard bands in the upper portion. Just below the lower hard band, for 1 ft. fossils are numerous. There is a band of *Productella lachrymosa*, *Schizophoria impressa*, with some *Spirifer marcyi* and *Leiorhynchus mesacostalis*. A couple of inches higher, but still below the hard band, are found some immense specimens of *Spirifer marcyi* 3" to 4" wide, and a

Wanandys quarry
Section up Swartwood road from 7B to 9C. Aug. 18 to 25th., 1903

WY 7^B
12^{la}
1. Opposite the house of Jno. Woolever in the roadside,
12 ft. of gray and olive, iron stained arenaceous shales. Two fossils
one of *Spirifer mesacostalis* ^{were} found in talus. 7B1. 1065 to 1077 ft. A.T.

2. The upper portion of these beds continues in the creek
just west of the second bridge, below the small falls of two feet.

Where exposed in the bank of the stream, the shales are blocky and
contain a comparatively rich fauna of *Rhipidomella vanuxemi?*, *Leiorhynchus mesacostalis*, *Productella lachrymosa*, *Chonetes scitulus*,
Schizopora impressa, *Ambocoelia umbonata*, *Spirifer marcyi*, *Lingula complanata*, *Pterinea chemungensis*, *Orthis chemungensis*, *Camero-
toechia sappho*, etc. (7B2.) = $\frac{WY\ 7\ B}{16}$ 1075 to 1079 ft. A.T.

3. A 6" hard sandstone band forms a small 2ft. fall over
7A2. The shales similar to 7A1 continue 15 ft. above the sandstone
band, but are poor in fossils. (7B2½) $\frac{WY\ 7\ B}{1c}$

4. 100 yds. to the s.w., there crop out in the roadside
about 85 ft. of similar shales, with a fauna like 7A2 characterized
by *Leiorhynchus mesacostalis* and *Productella lachrymosa*; but in
which no *Chonetes* was seen. *Spirifer mesacostalis* and *Sp. marcyi*
are quite common in some bands. There are three or four 6" or 8"
bands of sandstone with many smaller bands of more arenaceous shale.
In some of the latter fossils are common. There is a dip of
50 ft. per mile a few degrees east of north. These beds are from
1090 to 1175 ft. A.T. 7B3.

5. About 15 ft. above the base of this cliff, at 1105 ft. A.T.,

there crops out a very hard band of gray sandstone with some calcareous material and iron. Near the surface this band is colored a deep brown by the iron. The thickness varies from 4" to 8", the lower portion of the rock having been deposited in wave depressions. In these small basins as it were, fossils are very numerous. In the lowest inch there are great numbers of a small dichotomose *Ceratopora*. Just above the *Ceratoporas*, the rock is full of *Productella*, *Orthis impressa*, *Spirifer marcyi*, *Leiorhynchus mesacostalis*, while a single modiomorphoid *Leptodesma* was seen. The upper 2/3 of the sandstone band are barren, and where the band is thinner, at the wave crests, no fossils are found. This band shows a dip of 60 ft. per mile a few degrees east of north. Above this band, and below the next higher one, there are some blocky shales, 5 or 6 ft. thick at the s.w. end of the outcrop, but in going about 100 ft. n.e. these shales increase over 1 ft. in thickness. The higher bands are mostly barren. The upper portion of the outcrop is less fossiliferous than the lower. In a few places there are clusters of *Leiorhynchus mesacostalis*, but the lamellose form of *Delthyris mesacostalis* is predominant throughout the upper portion of the cliff. Fossils from the hard band at 1105 ft. A.T., are labelled 7B4.

6. In the bed of the creek at 1180 to 1190 ft. A.T., are some blocky shales with a hard band at 1182 and some hard bands in the upper portion. Just below the lower hard band, for 1 ft. fossils are numerous. There is a band of *Productella lachrymosa*, *Schizophoria impressa*, with some *Spirifer marcyi* and *Leiorhynchus mesacostalis*. A couple of inches higher, but still below the hard band, are found some immense specimens of *Spirifer marcyi* 3" to 4" wide, and a

large *Pterinea chemungensis*, together with a few specimens of *Ceratopora dichotoma*. These fossils are 7B4.5 at 1181ft. A.T.

7. Still further west in the north bank of the creek, at from 1195ft. A.T. to 1203ft. A.T., are some more blocky shales containing at 1195ft., a rich fauna of large and well developed specimens of *Schizophoria impressa*, *Sc. tica*, and very lamellose specimens of *Delthyris mesacostalis*. Several individuals of a species of *Palaeoneilo* are also found here, together with a few *Productellas*; but *Leiorhynchus mesacostalis* seems to have disappeared, and *Atrypa aspera* makes its appearance in 7B4.5 and continues up into the *Tropidoleptus* zone where it reaches the acme of its development. The fauna of 1195ft. A.T., is labelled 7B7. About 5ft.

above 7B7, is found a calcareous zone (7B8) filled with *Schizophoria impressa* and *Atrypa aspera*. In this zone, as in the two lower ones in which *Atrypa aspera* is found, this species is smaller and more delicate than in the *Tropidoleptus* zone. Immediately beneath 7B8 is a 1" band of a hard ss. which breaks with a vertical cleavage and seems to have a columnar structure, somewhat resembling modern basalt. Similar bands are met with throughout the basal Chemung, commonly about 1" in thickness but varying to some bands having a thickness of 4", seldom, if ever, more. These bands are characteristic of the Chemung, being absent in the Portage and lower beds. At Brookton, immediately above the *Ambocoelia-Nucula* fauna in front of Hiram Vandermark's, there is a 3" band of this ss. and 50 ft. lower down there is a 1" band, the intervening 50ft. being covered. This band then, might be made the base of the Chemung in this region. At Peach Orchard also, what is possibly the same

the same band may be used to demarcate the lower limits of the Chemung.

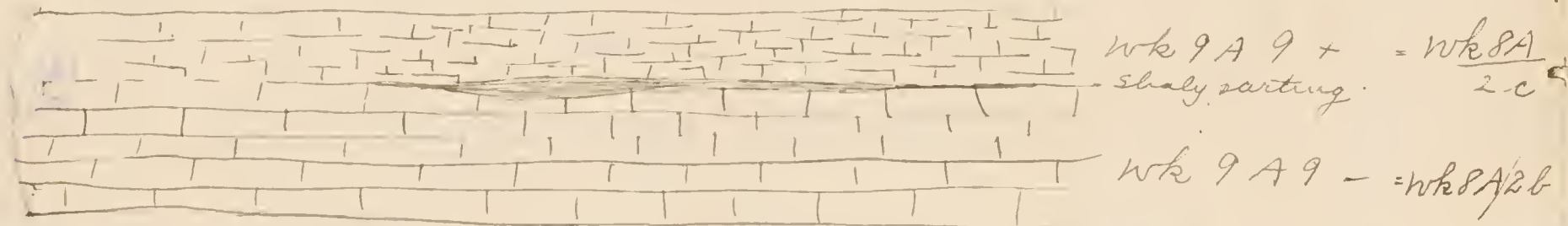
8. Some distance west of 7B7&8, on the south side of the road, there crop out between 1245 & 1215 some 30 ft. of arenaceous beds with little if any blocky shales; but with a small amount of laminated shales and flags. No fossils were found except in one of the harder layers at 1235ft. A.T. The fossils here are *Schizophoria impressa*, *Productella lachrymosa*, and a bulbous or pyriform crinoid, some calyces and joints of which have been found (7B5). 100 yds. s.w. in the bank of the stream, at 1228ft. A.T., the same bed is found with also *Spirifer disjunctus velmarcyi*. This shows a declination of about 125ft. per mile, a few degrees w. of S. Taking into consideration the dip of 7B3 & 7B4, there is seen to be an anticline, with an axis directed E. 10 S by W. 10 N., approximately, and having the greater pitch southerly.

9. At 1229ft. A.T., in the creek is a brown flaggy layer (7B6) with *Ambocoelias*, *Orthis impressa*, *Spirifer nesacostalis*, and many *Leptodesmas*; but apparently not in place. The label is probably 7B5.5.

10. Above 7B5, there are several more small outcrops of arenaceous beds, but *Schizophoria impressa* seems to be the only fossil met with.

11. At 1610ft. A.T., the *Tropidoleptus* zone crops out on the south side of the road. This zone consists of 3 or 4 2" to 4" hard sandstone bands, the middle 1 or 2 inches of which is in each band composed of a calcareous mass of shells. Large forms of *Atrypa aspera* and *Schizophoria impressa* are predominant, but *Camarotoechias* &

The upper limestone band of wk 9A9 differs from the lower in that its crinoid joints are comminuted as seems also to be the case with the other fossils for only the smaller shells of minute Chonetes, Ostracods etc. are visible. The upper zone of wk 9A9 has been labelled wk 9A9+ = wk 8A2c and the lower 9A9- = wk 8A2b. The following section shows the relations of the two.



↑ Note. Where there is no shaly parting between 9A9- and 9A9+, - that is where the limestone seems to be one continuous layer the upper part partakes of the character of 9A9+ and the lower part of 9A9-. There is however somewhat of a transition from the lower band to the upper, but this transition is so gradual as to make both 9A9+ and 9A9- seem to be one continuous layer. The shaly parting where present contains *Atrypa reticularis* very commonly. wk 9A9+ is no doubt the same bed continued across the lake as 10B1

Productellas are also found. ⁽⁶⁰⁾ Tropicidoleptus carinatus is by far the most important, even if not the most numerous, species of brachiopod present. Among the Pelycypods, a large Cypricardella resembling mature forms of *C. bellastratus* (the length being nearly twice the height), is quite common. A few Leptodesmas are also found as well as an erect Aviculo(?) pecten. Gastropods are fairly common, the genera being Pleurotomaria, Euomphalis, Aclisina, Loxonema, and Murchisonia. No corals, crinoids, trilobites, or cephalopods were met with; nor was Spirifer disjunctus seen among the Brachiopoda; but among the latter the same capuloid Orbiculoidea which was met with in the lower Tropicidoleptus zone at Brookton, is again seen here fairly common. This zone is 7B10.

12. Immediately above the Tropicidoleptus zone, is found a 1 ft. band of shale in the lower part of which, Chonetes scitulus and Ambocoelia umbonata are very abundant. Leptodesmas are also quite abundant. This zone (7B11), is the highest from which any fossils have been obtained. *in the Swartwood hollow*

(WY. 6C1)..... On the road in the n.w. corner of 6C, is a hard, jointed, 6" band of ss. at 1014 ft. A.T., covered by 18" of brown iron stained (blue) shales. Stropheodonta cayuta is very common in the shales together with a small Orthid, probably Dalmanella leonensis, the only fossils observed.

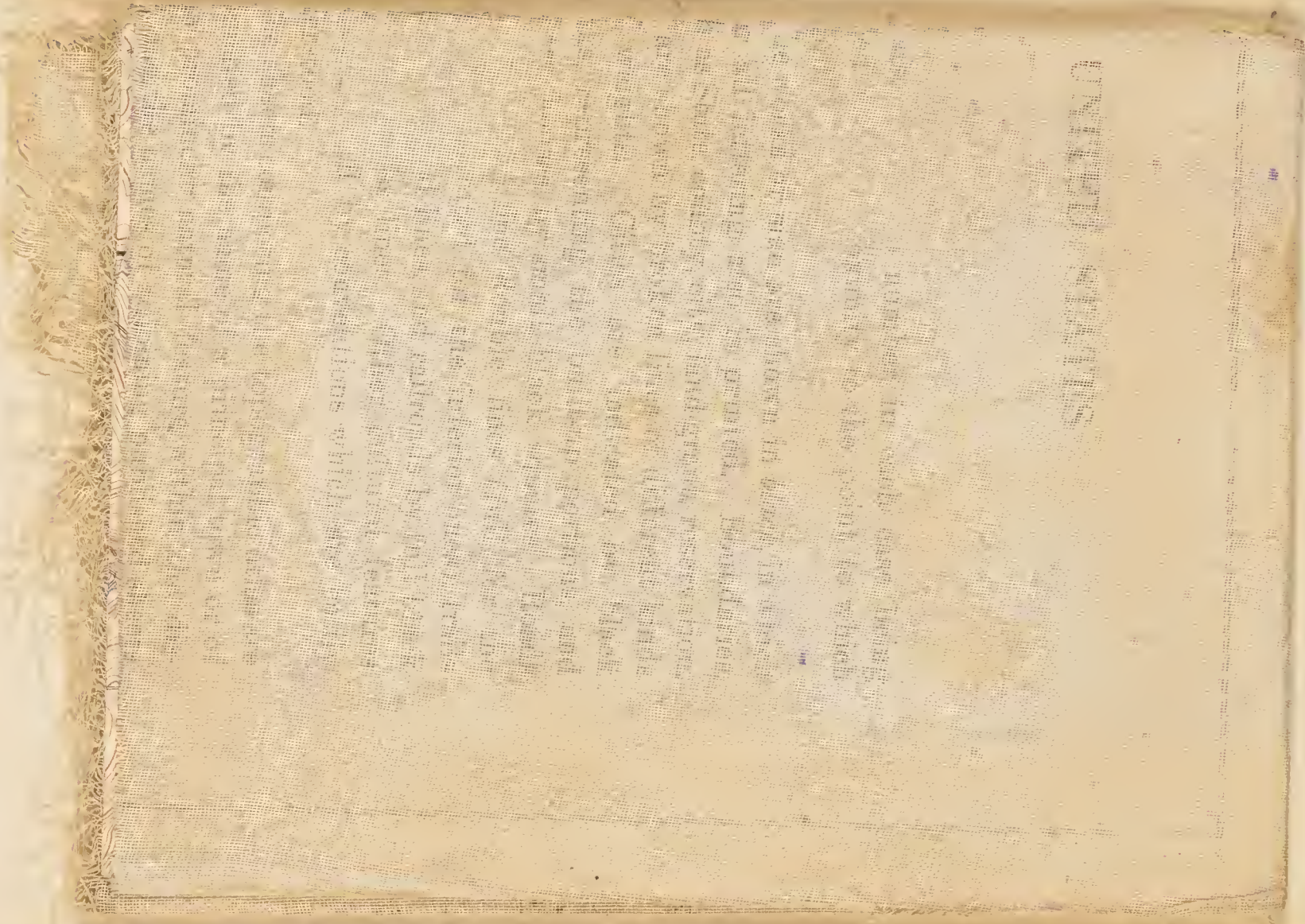
At 1025 to 1031 ft. A.T. are exposed on the railroad bank. These beds are barren, and probably just below 7B1. The dip is quite heavy, being fully 100 ft. per mile, direction about 15° W. of N.

(over)

(6)

(WY. 7C1).....In the middle part of northern 7C, on the south bank of the north branch of the stream, are 10ft. of blocky shales between 1235ft. & 1245ft. A.T. There is a rich fauna of *Productella lachrymosa*, *Schizophoria impressa*, *Spirifer mesacostalis*, and crinoid joints; a fauna similar to 7B7. Above these beds are some soft, argillaceous barren shales, olive gray or brown in color, and not blocky.

On the south west side of the valley, there are no more outcrops of the *Tropidoleptus* zone (except see WY 901)



Productellas are also found. *Tropidoleptus carinatus* is by far the most important, even if not the most numerous, species of brachiopod present. Among the Pelycypods, a large *Cypricardella* resembling mature forms of *C. bellastratas* (the length being nearly twice the height), is quite common. A few *Leptodesmas* are also found as well as an erect *Aviculo(?)pecten*. Gastropods are fairly common, the genera being *Pleurotomaria*, *Euomphalis*, *Aclisina*, *Loxonema*, and *Murchisonia*. No corals, crinoids, trilobites, or cephalopods were met with; nor was *Spirifer disjunctus* seen among the Brachiopoda; but among the latter the same capuloid *Orbiculoidea* which was common in the lower *Tropidoleptus* zone at Brockton, is again seen.

(6)

(WY. 701).....In the middle part of northern 7C, on the south bank of the north branch of the stream, are 10ft. of blocky shales between 1235ft. & 1245ft. A.T. There is a rich fauna of *Productella lachrymosa*, *Schizophoria impressa*, *Spirifer mesacostalis*, and crinoid joints; a fauna similar to 7B7. Above these beds are some soft, argillaceous barren shales, olive gray or brown in color, and not blocky.



28 ^{WY 7B²} In the Swartwood Creek above WY 7B² in the hard sandstone band. This sandstone band varies from two inches to 15 inches in thickness. In the thicker portion of this sandstone band *Productella lachrymosa* etc. are very abundant in the lower part of the band. These fossils are WY 7B².

Detailed collections were made from the *Tropidoleptus* zone at Swartwood. WY 7B 10.1. This is just under 7B¹ and is a three inch hard sandstone band which does not weather into rotten rock. *Spirifer granulatus* and *Cypricardella bellastriata* are the commonest fossils. *Schizophoria impressa* though quite common is less so than in the lower bands. *Tropidoleptus carinatus* is present in the lower part of this band to which the *Orthis* are almost restricted. *Atrypa laspera* is absent. A very large *Hyodionorpha cf. myteloides* was present as were some *Pterinea*, *Leptodesmas*, etc.

WY 7B 10.2 is the next lower band. It is between 2½ and 3 inches thick. On the upper and lower sides there is a thin hard band varying from 0 to ½ inch thick and enclosing the middle portion which where exposed weathers into a rotten rock composed of *Schizophoria impressa* & *Atrypa aspera* etc.

WY 7B 10.3 this is the lower half of the zone about 6" to 8" thick.

WY 9B1. This is the *Ambocoelia* zone. Its best outcrop is in front of the house occupied by John Vanetten in the roadside at 1770 A.T. The same band crops out in the roadside in front of the house occupied by Huck at 1737 A.T., showing a descent of 33 feet. This shows a dip N.W. very heavy. The house occupied by Geo. Vanetten is on the road running about E. & W. while Huck's residence is to the N.W. on the road running N. & S.; but as the *Tropidoleptus* zone

(see WY 9A1) is higher at Huck's than at Swartwood, this shows that this heavy dip is only local. The *Ambocoelia* band contains great nos. of *Ambocoelia* and a few *Strophodonts cayuta* together with a few *Spirifers*.

WY 9A1. This is the coral zone in the S.W. corner of 9A at 1692 A.T. It crops out in the fields on the N.E. side of the road going down to the E.C.N. railroad trestle. Corals are quite common. There is the usual rich brachiopod fauna forming a "shell rock" as the farmers call it.

WY 6B1 Near the boundary between 6A and 6B at 1561 A.T. there crops out in the roadside the *Tropidoleptus* zone which is WY 6B¹. The rock is a very hard coralline ss. above which is the usual rotten rock. *Atrypa aspera* is as usual the commonest species together with *Productella lachrymosa* & *Schizophoria impressa*, *Strophonella caelata*, while among the lamellibranchs several specimens of *Schizodus chemungensis* were found, also *Leptodesmas*, *Lyriopecten* and a large *Pterinea chemungensis* covered by an anuloporia growth. The coral of the coralline ss. is of the *Cyathophylloid* type and is found also in the rotten rock. *Tropidoleptus carinatus* was observed in the ss.

WY 6A1 On the roadside in the N.E. part of 6A at 1558 A.T. the same zone is found though only 3 feet lower than 6B1.

Ith. 6L1 In the western part of 6L at 1760 A.T. some *Leptodesmas* and *Spirifer mesacostalis* were found. Rocks are gray ~~soft~~ ^{coarse} shales with soft blocky red stained shales along roadside.

Ith. 7L1 In the center of Ith. 7L at 1810 A.T. a firestone with *Atrypa reticularis*

30 and aspera, *Productella lachrymosa*, *Schizophoria impressa* etc.

Itk 7L2. On the road running north and south in Itk 7L2 at 1855-68 red blocky shales and hard layers similar to 6L1 but with a fauna characterized by *Bamarotocchia contracta* and *duplicata*, *Leiorhynchus mesacostalis*, *Delthyris* cf. *Batakillensis*, *Leptodesmas* and an *Orbiculoidea*. The N.Y. State Geol. Survey people collected from this locality in the road bed and road side.

Itk 8L1. Hard blue stained and gray beds with a sparse fauna of *Leptodesmas*, *Ambocoelia* etc. at an horizon probably just under 7L2; or not more than 25 ft. beneath. Similar rocks crop out at the road corner s.e. of center of 7L at 1755. 1850 also at the road crossing just n. of 7L2 at 1830 A.T. and on the road in the s.w. corner of Itk 8L at 1800 A.T. The outcrop of Itk 8L1 is at 1840 A.T. on the road running e.w. and extending for over 15 ft. down the road east of the road corner.

Itk 10N1 The next rocks to be studied are in Itk 10M and 10N. In front of the house at 1930 on the road running n.w. in southern 10N, some slabs of rock from the *Ambocoelia* zone (see Wy 181) were found while below this some distance was seen the white ss. with *Stroph. cayuta* (see ^{Wy 7C2} ~~7C2~~) No collecting was done here, but on the road at 1795 ft. A.T. is found a thick firestone containing the same fauna and occurring at the same relative horizon as ~~Itk 8L1~~ Wy 8B1.

Wy 8C1. This is a firestone band occurring in the roadside at 1745 A.T. on the road running west in 8C. The commonest fossils are *Delthyris mesacostalis* and *Ambocoelia*.

31 Wy 7C2. - This consists of a ^{very light gray} whitish argillaceous ss. varying to an arenaceous shale on weathering and intermingled with some yellow stained coarse shales. The fossils were collected from the dump pile thrown up in digging a well on the south side of the e.w. road about 40 ft. west of the road corner just e. of the boundary between 7B & 8B. The horizon is at ~~1855 A.T.~~ 1670 A.T. Fossils chiefly *Strophodonta cayuta*, also some lamellibranchs *Pterinea chemungensis*, *Mytilarca chemungensis*, etc.

Wy 9a X. This was a slab of *Leptodesmas* and other lamellibranchs in a sandstone found free but evidently connected with the coral band Wy 9A1.

LOCKWOOD.

Wy. 4J1. One quarter of a mile north of Lockwood there extends northward for several hundred yards on the west side of the High Valley RR., a cliff from 10 to 40 ft. high. The rocks consist of gray, pure and red stained shales and hard bands with a few more or less even bedded sandstone ledges, the latter mostly barren. The rocks contain few fossils and the fauna is about homogenous throughout. *Ambocoelia umbonata* is the commonest fossil seen while an *Orbiculoidea* and fragments of *Spirifer* were also found. Quite a few small lamellibranchs were found here also. About 10 ft. above the tracks a few inches above a ss. band is a layer of small crinoidal joints. These fossils are mis-labelled 4M1.

? (H.S.W. this is in 4J not 4J) ver.

32

The next section to be studied was in Wy 4 K. The road running across this section up the ravine exposed on its southerly side a more or less continuous cliff in some places over 125 ft. high, but usually not much more than thirty. Similar cliffs are found on the north bank of the creek. As the road has a constant up grade in some places rather sharp most of the section may be studied by walking along the road.

The lowest rocks crop out at the base of a 20 foot cliff along the road opposite the house of Mr Woolver at 938 A.T. (The fossils Wy 4 K 1-10 were mislabelled 4N etc.)

Wy 4 K 1. (4N 1). The lowest five feet of the cliff are blocky coarse shales and flaggy beds. Fossils rare. A couple of *Ambocoelias*, a *Productella*, a *Deltapora*, *is. missacostalis* and a few fragments of *Lamellibranchs*. Fucoidal markings quite common in the flaggy layers.

Wy 4 K 2. (4N 2). Wy 4 K 2 is a 3 foot layer of similar rock just above 4 K 1. *Ceratopora dichotoma* is found here, especially in two or three rich crinoidal seams which contain in addition, *Spirifer marcyi* & *Schizophoria impressa*.

Wy 4 K 3 (4N 3) The twelve feet of blocky shales above 4 K 2 contain a few small *Lamellibranchs*.

Wy 4 K 3.1. This outcrop is again seen in the north bank of the creek about 100 yds. to the west. The rocks are just above 4 N 2 and are from the same horizon as Wy 4 K 3. A tentaculite was found in both 4 K 3 and 3.1

The section is next continued on the road side where there is a 25 ft. cliff from 955 to 980.

33

Wy 4 K 4 (Wy 4 N 4) This is the lower 5 ft. of the cliff, the consisting as does the upper portion of gray and iron stained shales which display a very blocky appearance. Small *Lamellibranchs* were found here as also in 4 K 5.

Wy 4 K 5. This is the upper part of the cliff, consisting of 20 ft. of shales.

Wy 4 K 6 In the bank of the stream at 985 ft. occurs one foot of brown flags a foot above which are a few inches of soft shales overlain by the usual blocky shales. In these soft shales are some *Atrypa spinosa*? while in a couple of inches of flaggy coarse shales just above are some small *Ceratoporas*? with a seam of *Strophodonta* (& *Orthothetes*).

Wy 4 K 7. From 995 to 1002 A.T. are some blocky shales with 6 inches of flags. (The term flag is used here to designate a sandstone which breaks up into laminae in this section usually about 1 inch thick. The sandstone is too coarse grained and soft for a true flag). There are in the shales a few small *Lamellibranchs* (*Palaeoneilos*, *Nuculas*, a *Pterinea chemungensis*, etc.) a *Modiomorpha subalata* var. *chemungensis* was seen but not collected. A couple of *Brachiopods* were collected (*Strophodonta* and *Schizophoria*). The outcrop is in the road bank. Above these beds there are a couple of ft. of hard sandstone bands which are barren (1002-1004 A.T.)

Twenty inches below this sandstone band fossils are most common and a few, Wy 4 K 7.1 (Wy 4 N 7.1) were collected from this horizon in the bank of the creek.

Wy 4 K 8 (Wy 4 N 8) Blocky shales and harder beds met with in the creek bank and roadside just above, 1004 to 1010. A *Grammysia* was found here.

WY. 4 K 9. (WY 4 N 9) This is a coralline band just below some thick sandstone bands. It is exposed in the roadside at 1010 A.T. The corals are of the Monotrypelloid group like those in front of Leuhards at Brookton (see Dr T.C. 1). *Atrypa aspera* (sp. *sp. spinosa?*) is very common and among the lamellibranchs, a few rather small specimens of *Mytilarca* were found.

WY. 4 K 10. From 1010 to 1024 A.T. there are exposed in the creek ^{group} bed and in the road, 14 feet of light gray peculiar rocks lithologically exactly similar to WY 7 C 1. When fresh the rock is massive, barely perceptibly bedded, and revealing upon careful search a few, slightly harder 3" or 4" bands; it is in the main a ^{mass} ~~mass~~ ^{mass} of comparatively soft ~~shaly~~ argillaceous sandstone. When exposed for any length of time the rock breaks up into tiny fragments perhaps half an inch long, the harder bands remaining ^{almost} untouched. There is a slight yellowish tinge in a few of these bands. Fossils are fairly common throughout, but especially so in certain seams or large clusters. *Spirifer disjunctus* makes its first appearance here together with some Cephalopods of which some fragments of *Orthoceras* and a large *Cyrtoceras* were found. *Pterinea chemungensis* is quite common. *Mytilarca* is also found as are many *Muculas*, *Palaeonolas*, *Modiomorphas* etc. As has been said the rocks are prominent for being the first horizon here at which *Spirifer disjunctus* is found. A single Cyathophylloid coral was found. *Orthothetes*, a few specimens of which have been seen in lower beds, is here very common and *Atrypa spinosa* begins to show.

WY 4 K 11. This is a seam ~~(not calc. band)~~ of *Orthothetes chemungensis* with a few corals (rugose). A peculiar *Spirifer* makes its appearance here. It is covered all over both on the ribs and on the median fold and sinus with fine radiating striae. This seam is at 1023 A.T. and does not differ lithologically from 10 or 12.

WY 4 K 12. From WY 4 K 11 there is found in ascending another foot and a half of the light gray before coming to a 15 inch ledge of "flaggy" light colored sandstone. Few fossils in shales.

WY 4 K 13 } From 1424 to 25 is a foot of light cream colored sand-
WY. 4 K 14 } stone which breaks up into layers 1" to 4" thick. Above and separated by a shaly parting is a 7" or 8" band of similarly colored sandstone with two very thin firestone layers about 4 inches apart. *Orthothetes* is very common in each of the seams.

WY. 4 K 15 } Above the sandstone band with 13 and 14, is a
WY. 4 K 16 } recurrence of the light gray argillaceous ss. - beds for ~~2~~ 9". Three ^{thin} seams of firestone are found in these 9 inches. There is a peculiarity in these seams in that their thicknesses vary so that while in one place the lowest band may be thickest, in another the middle or the upper band may have the greatest thickness. In an extent of over 100 ft., each band was seen to be uninterrupted. But WY 4 K 13 and 14 are each interrupted so that in some sections of the band neither is present. As is the case in the lower

36 bands, *Orthothetes* is the commonest species. *Spirifer disjunctus* is also present.

WY 4K18. This is a slightly harder band in the shales at 1027 A.T. The band is only two inches thick but is filled with a ramifying, dichotomous coral which in appearance resembles *Aulopora* but which in manner of growth is like *Beratopora*.

WY 4K19. Just above WY 4K19 is a half inch of impure shales stained brownish yellow and containing almost in abundance *Atrypa spinosa* - some specimens of which show large curved spines on the anterior margin. These shales continue for two feet more, when there appears a seam

WY 4K20 of micronate *Stropheodontas*

WY 4K21 $1\frac{1}{2}$ ft. higher occurs ^{shale} sandstone band with *Atrypa spinosa*, *Spirifer disjunctus*, *Pterinea* etc.

WY 4K22. The shales up to 1045 A.T. where there is a thick sandstone band two feet thick. Interspersed in WY 4K22 are some ss. bands, one of which varies in a very short distance from 2 inches to 10 inches thick. The fossils *Atrypas* mainly are found in the shales.

WY 4K23. Shale one foot thick above the sandstone band.

WY 4K24. At 1047 occurs a one inch seam of firestone of 37 firestone composed of *Beratoporas* among which are a few rugose corals and a couple of *Mowtryelloids*. A couple of inches higher up are a few more *Beratoporas*.

WY 4K25. Six inches of shales with a few *Pterineas*. Fossils rare.

WY 4K26. An impure blocky layer 6 inches thick consisting of soft gray shales intermingled with brown stained coarser shale *Atrypa spinosa*, *Gamarotoechias*, *Ambocoelias*. Fossils in clusters.

WY 4K27. A shale 1 foot thick containing a few rugose corals and large *Pterineas*.

WY 4K28. Shales up to 1053 A.T. Fossils very rare. A few lamelli branches found just above 27.

WY 4K29. Shales two feet thick up to 1055 A.T. Fossils rather abundant, more especially so in a few seams: *Atrypas* etc.

WY 4K30. This is a coral band two or three inches thick but thinning out in a few places. The corals are all of a type similar to *Cystiphyllum*, probably identical with that genus. They are found in great profusion for the most part forming large mats consisting of horizontally twisting long stems from which short erect branches spring.

38 WY 4K 31. For the next 20 inches of shale there are three or four distinct coral bands (*Cystiphyllum* and *Hadrophyllum*) while an occasional coral is found in the intervening shale.

WY 4K 31.5 ^{or 1}. This is the topmost coral band at about 1055' + 20" A.T.

WY 4K 32. The shales and sandy bands up to 1071 where there is an 8 inch ss. band and another a foot higher up. Fossils are absent from the ss. but a few fossils *Productellas* & *Lamellibranchs* are found in the shales.

WY 4K 33. This is 8 feet of the ^{light} gray argillaceous ss. which like the lower rock weathers into a softer arenaceous shale. Fossils are here very common especially in seams. *Atrypa spinosa*, *Productellas* *Strophodontas* are common and in the upper part just beneath WY 4K 34, *Schizophoria* becomes prominent in some of the seams.

WY 4K 34. Nearly two ft. of ^{very} hard gray sandstone weathering with a slight yellow brown stain externally. There are a couple of seams of *Productella* & *Schizophoria*, while a *Pleurotonassa* is quite common together with two or three other forms of *Gastropods*. One of the latter is like *Lorouema* but has a thickened ^{inner} lip like those found at East Berne in the Hamilton. In blasting in the creek bed at 1082 to 1084* A.T. just below the ~~pl~~ board bridge leading up to Mr. Odell's, in this

* according to the map this would be about

sandstone Mr. Frank Monroe found some hard ^{white} calcite nuggets bearing 39 lead[?] ore and iron pyrites. A careful search revealed a couple of these "nuggets" some brown in color, and one of them filling a gastropod cast, from which it is natural to presume that the white calcite (which in a few places is brown) is ^{the} chemically altered couch of the *Gastropods*.

WY 4K 35 - Twenty-two feet of coarse blocky shales with a little gritty flag and some thin sandstone bands. Fossils disposed mostly in seams of which *Schizophoria* is very common in most bands. *Spirifer dijunctus* displays here its greatest diversity and development shown in the Miller's Run section, though it is not at all abundant. 1084 to 1106 A.T. best outcrop on private road leading up to Mr. Odell's, though also exposed on the public highway and further west in the creek bed.

WY 4K 36. From 1011 to 1015^{1/2} are some blocky shales and sandstones with some seams bearing *Schizophorias* and a couple of *Delthyris mesacostalis*. Fossils mostly in thin flaggy or slaty bands. Above this there is another 8 inch sandstone band above which there is

WY 4K 37. This is a 6 inch band of sandstone all except the lower one and upper two inches of which is a firestone. *Schizophoria impressa* and *Atrypa aspera* are very abundant. *Pterineas* are quite common and some small but very robust *Rhipidomellas* are found. *Spirifers* or *Ambocoelias* are absent, so that on the whole the

40 Fauna is similar to the brachiopodal element of the Swartwood Tropicidoleptus zone or to the coral zone of this neighborhood though no corals were found on Miller's Run.

WY 4K 38. ... coarse beds ...

WY 4K 31. ...

WY 40, 41, 42, (43, 44?) ...

WY..4J.2. On the hill road going in a southerly direction in the south-west portion of WY.4J, there is found a series of sandstones, flags and coarse shale, bleached white externally, and capped by the Tropicidoleptus zone at 1330 A.T. This zone presents here the same appearance when weathered as in other places; but the outcrop here differs from all other outcrops in that at Lockwood, Tropicidoleptus carinatus is the most abundant species, being present in all stages of size and development. Chonetes scitulus vel coronatus and Spirifer granulosis are very common, and Cypricardella bellastriata is also found here. Gastropoda are also very evident; but Schizophoria impressa and Atrypa aspera which were so very abundant at this horizon at Swartwood are here altogether absent or are very rare. For further notes on this horizon, see WY.3J4.

... WY.3J1 This section was studied along the road running up the hill from Lockwood in an easterly direction into WY.3J. The lowest beds are shown in the ditch in the north side of the road at about 1320 A.T. The rocks are more or less flaggy and very arenaceous, mostly barren but at 1324 A.T. is a three inch band of firestone composed almost exclusively of Atrypa aspera.

WY...3J2 This is a shaly band about six feet higher than 1.
WY...3J3

1324 A.T.

WY.3J3..... This is a somewhat harder band at 1335A.T.
 W Y 3 J 4... ..THIS IS THE TROPIDOLEPTUS ZONE . CROPPING OUT
 AT 1345A.T. THIS ZONE IS SIX INCHES THICK THE LOWER THREE INCH
 ES OF WHICH IS FIRESTONE .As at WY.3J2, Tropidoleptus carinatus
 is very prominent, though here it shares the honor of being the
 commonest species with Spirifer granulosis. Clonetes scitulus is
 also quite abundant; BUT SCHIZOPHORIAS AND ATRYPAS ARE ALMOST
 ALTOGETHER ABSENT; though it will be noticed that the latter is
 very much in evidence in the bed twenty feet below. THIS IS A
 VERY GOOD EXAMPLE OF THE GENERAL LAW LAID DOWN BY PROF. H.S.
 WILLIAMS THAT TWO FAUNAS THAT ARE AT ONE PLACE DISTINCT MAY IN
 A DIFFERENT LOCALITY BE UNITED INTO A SINGLE FAUNA

WY.5K3...THE SPECIMENS were mislabelled 3J3, 4J3, and 5J1. The
 rocks crop out in the roadbed in the northern part of 5K , at
 1462-1465 FT. T. There are several thin Ambocoelia bands, occur-
 ing in a rather hard sandstone colored chocolate brown and buff
 in alternating thin streaks .
 WY.5K4... Mislabelled 5J1 . Ambocoelia band occurring in front of
 the house at 1585A.T.

The section studied extends up the ravine beginning in the
 s.w. corner of block ITH.12 M, and running n.e. through 11M and
 10M to the top of IRISH HILL. This ravine is variously known
 as MONKEY RUN and as WILLIAM'S BROOK. In the lower portions of
 the section, outcrops are found along the roadbank and in the
 creek, but most of the section is to be studied in the creek.

1...The lowest rocks exposed are in a cut behind the house
 of Mr. Varzyle; there are eight feet (1442-1450) of shales
 with a few thin hard bands. The shales vary in color from gray
 through olive and brown to a dark color. Iron is present in
 appreciable quantities, and produces an external red and yellow
 stain. Where not dissolved, the iron is in the form of small,
 yellowish "twinkling stars", but where slightly ~~where~~ ex-
 posed these crystals deliquesce into small yellow circles one/
 eighth of an inch wide. These circles have been observed through-
 out the chert group. Where decomposition has proceeded fur-
 ther, the rock is covered with an iridescent metallic lustre
 varying from green to golden, and which has produced among the

Cayutans an embryonic gold fever, these rocks hardly differ from the usual upper Portage shales.

this is probably 12M10
 2... ITH. 12M1... At 1168 in the roadside, occurs a 14 ft. layer of impure blue-stained columnar sandstone, containing in a few places a thin seam stained brown, and bearing *Amboecocelias*, *Stropheodonta*, and *Productellas*, -all very small. One and a half feet of shale below, are barren. A single small *Stropheodonta* and a *Schizophoria* (ITH. 12M1.1) were found in the overlying shales.
= 2 ft. 12M.1d

3... Further along the road, there are from 1178-1188, ten feet of the same kind of beds as crop out behind the house of Mr. VanZyle. The shales here are overlain by a couple of feet of jointed flags tinged brown in color. No fossils.

4... The next rocks exposed for study are in the creek bank at 1210 A.T., near an old log chute. The rocks are a continuation of the argillaceous beds with with some more and thicker sandy or flaggy layers, mostly gray and gritty. Six

feet are exposed, -1210-1216. No fossils.

5... ITH. 12M¹⁹(2)... At the old log chute, from 1210 to 1235 A.T. are fifteen feet of shales and dark arenaceous beds. The shales are mostly gray, faintly olive, and are hardly at all iron-stained, but a little more arenaceous than those below. A couple of orthids.

6... ITH. 12M^{12 u. 1h}(5)... In the creek bed and in the road bank, there crop out from 1240 to 1250 ten feet of gray arenaceous and some pure shales, and a few flaggy beds. But there is little trace of iron stain, and that confined to some thin streaks. Fossils are found in a couple of small seams. *Schizophoria impressa* and *Dalmanella lecnensis* are commonest. A few specimens of *Stropheodonta* and of *Atrypa aspera* were also found.

7... ITH. 12M¹²(4)... This is a very hard concretinary sandstone varying every two to four feet from nothing to four inches in thickness. The fauna is almost the same as that of the next lower beds. This horizon is at 1250 FT. A.T.

8... ITH. 12M¹⁵(5)... Mostly slaty or arenaceous hard bands with very little shale. Fossils same as in lower beds found in sha-

ly partings and on under side of the harder bands.

^{12M6}
9...ITH. 12M6^{1k}...THIS IS AN EXTREMELY HARD, GRITTY, SAND NEARLY one foot thick, and gray in color. It contains on the under side a three inch hard "non-weathering" calcareous band full of *Productella lachrymosa* and *Spirifer cf. granulosis*. *Orthothetes cheungensis*, *Atrypa aspera*, *Chonetes* and *Stropheodontas* were also present.... In the main portion of the sandstone band, a small single *Productella* was seen, and a *Stromatoporoïd* coral resembling *Centrostroma* was found, -ITH. 12M6.

10...Above this sandstone band, are eleven feet of thin-bedded dark purplish gray slates, about $\frac{1}{2}$ " thick, and usually with a little bit of mica. (1166-1177).

11...1177-1180...Gray arenaceous shale. No fossils.

12...At 1280 is a 3" band of more or less columnar sandstone covered with three inches of gray shale, which is in turn capped by

13...ITH. 12M7^{1k}...This is a 2 $\frac{1}{2}$ " layer of somewhat harder gray, arenaceous shale, containing abundantly *Dalmanella lecnensis* and *Schizophorias*, AND CONTAINING THE FIRST SPECIMENS OF SP. DISJUNCT-

US met with in the section. Some small lamellibranchs, the only ones met with in the section's lower few hundred feet are here found also. Another feature of these beds is that they contain many fragments of *Pleurotomaria cf. capillaria*.

14? 1280-1282...Two feet red stained shales (externally).

15. 1282-1285...Columnar ss. and very impure & coarse shale.

16. 1285-1294. Red shales.

17. 1294-1315. Rather arenaceous gray shale alternating with 2"-3" columnar bands.

18. 1315-1335...Dark gray, friable slaty shale, with eight inches red shale up to 1317, above which the slaty beds continue up to 1335. In the upper part a little red shale enters. Also in the upper ten to fifteen feet, there are several columnar sandstone bands, which form small cascades.

1335
1142
193

ITH.12M1.3-1.6 incl. This series of outcrops begins at 1152 A.T. on the south side of the creek, opposite the house of Mr. Vanzyle

(12M1a) ITH.12 M 1.3.-... 1152-1155, opposite Vanzyle's. Some coarse shales containing a few Schizophorias, principally *S. impressaticeps*.

ITH.12 M 1.4... Above these are three or four feet of flaggy and columnar beds. In one flaggy layer a few small specimens of *Schizophoria impressa* were found.

ITH.12 M1.5... On the road going up to Mr. Vanzyle's yard on the south side of the creek at 1170 ft. A.T. Small *Stropheodonta*s and *Ambocoelias* in a coarse, impure, gray shale which is capped by a very hard 2" layer of chocolate colored sandstone

(12M1b) ITH.12M1.6... AT 1182 A.T., is a very fossiliferous seam of flaggy sandstone containing great numbers of fragments of *Stropheodontas*, *Chonetes*, *Dalmanellas*, and a specimen of a *Spirifer*, and a couple of *Atrypa aspera*

The upper beds of ~~12M1.4~~ ITH.12M1.4 display a dip a few degrees north of east.

The lowest rocks in the section are found in the cut on the Erie Railroad, at the curve about one third of a mile south of east of the bridge across the Chemung River. Altogether there is a section over two hundred yards long, and varying in height from ten to thirty feet. The line of outcrop extends in a northwest line, and exposes a dip of five feet to four rails, or exactly two hundred feet to the mile. *N.W. (N.W)*

1. Eleven feet of light gray, friable, slightly arenaceous shales, with very little iron, but in some places stained by percolating waters with a yellow and in other places with a lavender stain. Barren except for an occasional seam containing a couple of Schizophorias. An important find in these shales consists of a bulbular nodule found in situ, and which is apparently a rolled boulder of Waterlime. These beds are WY. 8000. and overly a fifteen inch layer of sandstone.

2. Four feet of friable, gray shale, alternating with 1" to 3" sandstone bands, which are more prominent and numerous in the lower two feet.

3. Two feet of drab gray ss., breaking up where very long exposed into thin $\frac{1}{4}$ " to $\frac{1}{8}$ " slates or flags, which are smooth, horizontally grained very even and barren.

4. Three and one half feet of gray, fissile, arenaceous shales with one or two hard bands.

5. WY. 8000. 1... About three and a half or four feet of extremely hard gray sandstone, usually brown mottled, and in bands from 12" to 16" in thickness. In the lower portion of the middle thick band is a layer of rugose corals intermingled with a few brachiopods, and the same small ramose Ceratopora as found at Miller Run. The upper portion of this middle

thick band contains this Ceratopora in predominance, though a couple of rugose corals are also found. Among the brachiopoda are Atrypa aspera, Spirifer disjunctus, Schizophoria tioga, while a single Pterinea chemungensis and a couple of small Modiomorphoid lamellibranchs were also found. In the uppermost portion of this band are many Planolites? tubes, but most of these seem to be vertical. The middle twenty inches of the sandstone are the most fossiliferous.

6. WY. 8000. 2... 5 $\frac{1}{2}$ feet of very friable shale mostly pure and barren but a little more arenaceous and fossiliferous in the upper portion and containing a single Spirifer, a couple of Productellas, and a small Modiomorphoid, together with a Nucula.

7. WY. 8000. 3... Two feet of gray sandstone in lower hard ten inch layer of which is a two inch Ceratopora seam.

8. WY. 8000. 4... Twelve feet of very coarse gray shales with a few 2" hard bands, the upper few feet becoming almost sandstone and very blocky. Fossils are very scarce, a couple of Schizophorias, Stropheodontas, Nuculas, and Pterineas.

Just above the highest of these beds and to the northwest along the railroad embankment is a more or less famous spring issuing from the rocks, and which was known even among the Indians. It was used up to a few years ago as a watering trough and is called Fulk's Spring. There is a stream of water two inches thick and which has never been known to have dried up. The rocks around this spring were not studied very well, but no very fossiliferous seams are present. There is an interval of 15

Chemung

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or twenty feet between the top of WY.80 004 and the lowest beds of the section WY.80 1-4.

WY.8 0 1-4. This is a series of outcrops made in a cutting on the northeast side of the road, and about four hundred yards south of east of the Erie rr. bridge. The line of outcrop is less than a hundred yards long, and extends in a northwest direction, the same as the rr. cut. Though the middle of the section in discussion is nearly four hundred yards from where the lowest ss. band of the railroad cut goes under, the same dip of Two hundred feet per mile n.w. is maintained.

WY.8 0 1...Three feet of impure, coarse, blue stained shales, with some thin slates. Fossils are very rare, consisting of a few small crinoid joints, and a couple of small lamellibranchs (Grammysias). These beds are from 799-802 ft. A.T., and are capped by a three inch columnar sandstone band, which is overlain by nearly a foot of papery slates.

WY. 8 0 2...802-813 A.T. Eleven feet of gray in a few places blue stained, thin, slaty flags, or flaggy sandstone, with some very coarse, arenaceous shale. Fossils are still very scarce, showing a couple of Productellas and a fragment of Spirifer disjunctus and of Pterinea chemungensis. A small slab of Orthotheses slid down from above shows that this horizon is probably the same as that containing Spirifer disjunctus at Lockwood (see WY. 4 K 9). At Chemung this horizon is capped by a ss. band varying from two to seven inches in thickness.

WY. 8 0 3...813-823 A.T. Ten feet of gray arenaceous beds with a few thin streaks of yellow ironstain the same as at Lockwood, and ten inches thick. At Chemung at this outcrop, the cut has been exposed for a

long time so that the rock has weathered into small fragments, weather- therefor in the same way as what are supposed to be the same beds at Lockwood. Another proof that the beds are the same is that they are both capped by a sandstone band seven to ten inches thick, and there are also a few slightly harder bands the same as at Lockwood. Orthotheses chemungensis, is very abundant especially in a few seams while Pterinea chemungensis is also quite common. One or two specimens of Schizophoria impressa and a couple of small lamellibranchs were also observed. WY 8 0 3.1 is a fossiliferous seam five feet from the top of the preceding. It contains crinoid joints, Pterineas, and spinose Atrypas, but apparently no Orthotheses. Stropheodonta was also seen as was also a Grammysia found erect with both valves in conjunction, and the anterior end pointing upward.

WY.804...Between WY 803 and WY.804 are three to four feet of sandstone with some interbedded shales. There is a more or less persistent ss. band fifteen inches thick and near the top, the same as at Lockwood. WY 804 is a firestone two inches thick and full of Orthotheses chemungensis with a few specimens of Pterinea and of Schizophoria. Fossils are also fairly abundant just above this band (827 A.T.), and also below and include the same striate Spirifer as found at Lockwood. There can be no doubt as to the identity of these beds with the Orthotheses zone at Miller Run WY.4K9-18; but at the latter place these beds are just about two hundred feet higher barometrically than at Chemung which is nearly five miles to the southwest. The nature of the outcrop at Chemung does not permit of the same detailed study as at Miller Run. Among the other fossils seen just above the firestone are Productellas, while some Stictoporoid bryozoa are seen in the firestone.

P.S. to WY 801-4... About a foot above the 15" ss. band there was observed the same small Ceratopora as seen at Lockwood. It occurs in an intermittent seam from which no specimens were collected... In the very arenaceous shale for a couple of feet above the Orthothetes firestone fossils are somewhat scarce and include only a few small lamellibranchs and a couple of small Atrypas.

Mr. Baldwin whose name is to be frequently mentioned in these notes lives in the most n.w. house in block WY.80. It is off the main road, but as is shown on the map, it is approached by a sideroad (see WY.9N50.1). Just west of and below Baldwin's, beginning at a small ravine shown on the map, there is an escarpment or line of cliffs over a mile long and in some places as much as 125 feet in height. Owing to a rather heavy dip of nearly two hundred feet to the mile s.w., the complete section cannot be studied in one place, but can be restored from a number of small sections made along the road. The third section thus studied is WY.9Noo. It is a cut into the drift covered base of the cliff less than a hundred yards north of west of the tobacco shed of Mr. Rieber, and is distant from the lowest ss. band of the Erie rr. cut, 3200 feet.

WY.9N oo.1...808-810 A.T.... A little over two ft. of SS. with a couple of specimens of Schizo. impressa and of Atrypa spinosa vel aspera.

WY.9N oo.2... Two and one half feet of slaty arenaceous shales with a few fossils about the same as last.

WY.9N oo.3... 18" of hard ss. with a fossiliferous seam at the top containing some Pterineas, Glossites, Leptodesmas, & Schiz. tioga.

WY.9N oo.4... Up to 817 $\frac{1}{2}$ A.T., there are some very blocky & arenaceous shales or rather argillaceous ss. Fossils are very common and include about the same fauna as in the preceding.

WY.9N oo.5 ..7" hard SS. with couple specimens of Schiz. Tioga.

WY.9N oo.6..818-826A.T. 8ft. slaty gray beds. Few fossils.

WY.9N oo.7...7ft. SS., the lower half disposed in eight or nine 3"-6" bands, and the upper portion in a couple of thick bands. A single seam containing crinoid joints was found.

WY.9N oo.8.. Up to 843A.T. there are ten feet of very friable shales in some places a little more arenaceous and with a few fossils. A couple of Ambocoelias, Spirifer disjunctus, Pterinea chemungensis, Atrypa aspera, and a Leptodesma were found.

The next section studied is two hundred feet N.W. of WY.9N oo, and above a talus base, exposes the following section,-

1. 834 $\frac{1}{2}$ -836A.T.... 1 $\frac{1}{2}$ ft. of $\frac{1}{2}$ " slates.

2. WY.9N1...836-838A.T. Two feet of very blocky and fossiliferous shales containing Atrypas, Schizophorias, Stropheodontas, Spirifer disjunctus and some lamellibranchs. These shales are capped by a very hard ss. band twenty inches thick and usually breaking up into irregular, vertical, uneven slabs. There were observed a few specimens of Schizophoria, and some Productellas, together with a few calcified fragments containing lead? ore.

WY.9N 1.1...840-840 $\frac{1}{2}$ A.T.... 6" blocky fossiliferous rather arenaceous and containing the same fauna as that of WY.9N1

for WY.9N2 see after WY.9N15

WY.9N 3 ... 10ft. of slaty ss. and some shales, mostly blocky containing some fossils, -Atrypas etc.

WY9N4 ... 1½ft. arenaceous and calcareous shales in some places almost approaching firestones in character. Atrypas are the commonest fossils. Immediately overlying these shales is a very hard ss. layer exactly similar to the sandstone layer overlying WY.9N1. except that the layer here is a little thicker than the former, being 2½ft. thick. The collection from WY.9N3 & 4 were made at a point further along the road, while from the overlying sandstone from the overlying no fossils were collected.

WY.9N5 This is at the point at which the ss. band above spoken of meets the road, and includes twelve feet of arenaceous shales and thin bedded flags, containing a few Schizophorias, Atrypas and some Pterineas. There are also two or three 5" ss. bands in this rock.

WY.9N6... A foot of arenaceous beds overlain by an 8" ss. band. The rock is similar in all respects to WY.9N4.

WY.9N7... Seventeen feet of flaggy beds with a little coarse shale and containing a few Schizophorias and some Pterineas

WY.9N8... 1½ft. of thinly and cross bedded ss. containing a fossiliferous seam in the middle. There are found in these beds as in the underlying also, many plant fragments some of them quite large. Intermingled with these plant remains are found Spirifer disjunctus, Schizophoria tloga, Atrypa aspera vel spinosa, and some Pterineas

The next rocks studied are in the upper part of the cliffs. The rocks are all thick sandstones for at least fifteen feet, and form the upper and most prominent portion of the cliffs along the "Upper Narrows". As has been said the rock is a hard gray sandstone weathering into beds two feet thick and more with an occasional slightly softer band. A very prominent and remarkable feature of these rocks is their vertical jointing and cleavage which breaks up the face of the cliff into nearly vertical slabs of shingles.

Between the lowest of the rocks in the upper portion of the cliffs and WY.9N8 there is an interval of a couple of feet of very arenaceous shale and thin sandstone bands containing a few Productellas and several species of Pterinea, which were not collected.

WY9N 8.5... This consists of a few fossils found in the ss. three or four feet above the base of the upper portion of the cliffs and one foot below WY9N 9, and therefore forty feet above the road. Fossils are Stropheodonta, Spirifer disjunctus, Atrypa aspera.

WY.9N9... A four inch firestone band forty-one feet above the road and containing Atrypa aspera, Spirifer disjunctus, Productellas, Delthyris, and Stropheodontas. Either this or the firestone band WY.9N11 is equivalent to the Atrypa aspera band found twenty feet below the Tropicoleptus zone at Lockwood on the east side of the valley.

WY.9N10 ... This is a thin firestone seam three and a half feet above WY.9N9. Its fauna differs from the latter in the apparent addition of Pterineas, Ambocoelias, and Schizophorias. In WY.9N10.1, the sandstone immediately above the preceding, the fauna consists of a few Pterineas,

Ambocoelias, and a Glossites.

6 WY.9N11...This is a four to five inch firestone band a little over five feet above WY.9N9. The fauna is the same as WY.9N10.

WY.9N11.1...This is the fifteen inches of sandstone between WY.9N11 and 12, from which sandstone a few specimens have been obtained. W

8 WY.9N12...This is a two inch firestone fifteen inches above the WY.9N11.

WY.9N13...Another thin firestone between the former and the next following.

70² WY.9N14...A thin firestone a trifle over nine feet higher than 9N9. This last firestone is within one foot of the top of the hard sandstone portion of the cliffs, the summit of which is formed by

71² WY.9N15...Twenty feet of blocky, very coarse shales in a few places containing a few fossils.

(WY.9N, 100) Above these beds is a sandstone band apparently with a firestone below and which is probably the Tropicidoleptus zone of the east side of the valley at Lockwood, and also WY.9N2 ✓

WY.9N2...Between the two lead bearing sandstone bands where both or either of them is exposed there was no trace of any seam with Tropicidoleptus. About midway between the collecting places of WY.9N1 and of WY.9N3 & 4 there are a few ledges of ss. cropping out of a drift slope. Some bands can be traced horizontally for over fifty feet and one of these bands is a firestone containing Tropicidoleptus carinatus, Spirifer cf. granulosis, Cypricardella bellistriata etc. The outcrop is immediately west of the old road running up into the quarries and if the bed

are in place they must be between the two lead bearing sandstones, but a very careful search has failed to reveal the presence between these two bands at any point of the Tropicidoleptus zone. The only way in which it is possible to account for the presence of this zone at this place is to admit a supposition of a fairly large landslide, which seems to be the most feasible explanation, and is highly probable judging from a cursory examination of the character of the cliffs at this point.

At the top of the hill there are some outcrop- in a quarry opened up by Mr. Baldwin to obtain firestone, several layers of which are exposed in a five foot cut 1443-1448 A.T.

WY.9N50.1...6" very arenaceous & blocky shale or arenaceous ss. gray to light olive in color & with a few blue spots. One Delthyris found

WY.9N 50.2...3" flaggy, hard gray ss. with a few very thin seams of small crinoid joints. On the upper face are found a couple Productellias Delthyris, Orthis and a NUCULITES.


WY.9N50.3...4-6" coarse blocky shales, mostly olive colored. Fossils rather scarce except in a seam near the top and include large Stropheodontas and Leptodesmas. = 9N/1 xx

WY.9N50.4...6-8" very hard ss. fine grained and gray in color, containing an occasional cluster of large Stropheodontas. = 9N/1 yy

WY.9N50.5...This is the firestone to obtain which the quarry was opened. It is usually 6-7" thick, but is interrupted in one or two places for a couple of feet. In most places there are from two to four band with ss. partings, but they often run into one seam 8" thick. Further north in the same quarry the beds overlying have been uncovered for 6' yy.

or 7 feet. They are arenaceous, concretionary shales but were not examined very closely for fossils which seem to be scarce.

The quarry WY. 9N50 etc. is on the west side of Narrow Mountain between the knolls marked 1706 and 1559 A.T. It is approached by a fairly well kept but narrow road (not shown on the map) which is a continuation of the side road shown.

Further east on the flattened portion of the hill between these two knolls, and thirty feet higher than the preceding, there is another firestone quarry at 1475 A.T. The quarry is flat from the floor of which the men have removed tremendous slabs of the firestone which contains almost entirely only *Stropheodonta perplana* var. *nervosa*. This quarry is on that portion of the hill nearest the middle knoll. *9N51 = 9N* 
row.

1475 = 33 - 1475,

THE CONGLOMERATE.

Nowhere in the vicinity of Chemung does the conglomerate come up to the surface, though many specimens of the rock may be found at almost any point below a more or less definite horizon at that point. This horizon may be approximated by a study of the boulders lying in the fields, or along the road, or even in the stone walls. By far the best place to study the conglomerate in this way is along the stone wall between the lands of Mr. Manning and those of Mr. Baldwin. This wall extends in a north west southeast direction down the front of Narrow Mountain ranging from 1145-1425 A.T. From the base of the wall up to 1265 A.T. there are many specimens found; but above that level not a single fragment of the conglomerate was observed either in the wall or in the adjoining fields. Judging from the relative positions of an outcrop and the boulders therefrom in other portions of the Waverly quadrangle, it is safe to assume that the conglomerate may be found at this place at 1265 A.T. plus or minus 10 ft.

In appearance the rock is an apparently light colored ss., 7-8" thick and containing three to five seams of pebbles, though in most specimens these seams have run together, and the pebbles seem to have lost all appearance of having ever been deposited in seams or in layers. The fossils are mostly *Amboc elias*, though many other forms are also found, chiefly *Spirifers*, *Stropheodontas*, *Orthids*, etc. Some boulders of the conglomerate contained only one or two small pebbles per six inches square.

Another place to study the conglomerate is along the road turning southwestwardly in block WY.9M, just east of the branch road running north at 1400 A.T. The specimens were not found in situ, but occur in two courses in the road from 1350 - 1365 and from 1385 - 1392. No specimens were found higher up. The road here and further west also is very hilly and whatever soil there was has almost all been washed away, leaving the road full of boulders. The conglomerate here is very peculiar in that it consists almost entirely of small white pebbles with usually no imbedding matrix whatever. Fossils of course, are not easily found. On the other hand in the higher series of boulders there was observed a slab 4" thick & 1ft. square with only a few large 1/2" pebbles. In the lower series there are a couple of slabs 2ft. square and over 6" thick and with hardly any imbedding matrix. Some of the pebbles are as much as 1" thick. At 1340, in the road just west of the house shown in WY.9M at 1360 are found a few very little worn specimens of the conglomerate, while an occasional more or less worn specimen is found all the way down into the valley of the Chemung.

SE

in two feet these shale / tioga of sm. phoriplica (B) stainous (C) shale solid Ambocc Schizoc (D) few or very rare (E) fairly (impressed) contains lachrym PREVALEN SOFT LIN

(A) is 1

Orthoceras
1023
925
87

Lompkins County, W.V.

April 20, 1907 C.C.B.

Faint handwritten notes and bleed-through from the reverse side of the page.

Orthotriches Zone (Heavy S.S.)
 Lockwood. Elev. 1045 above base 87
 Chemung. " " 87.

928
87

1025-
 958

 87

706 9A9

579 A.T.

Lower part of Section
west face of
Bald Mountain

$\frac{4}{5}$ of a mile N. of
White Church

Tompkins County,

N.Y.

April 20, 1907 C.L.B.

1309 H.T. — (1) one foot laminated straticulate sandstone, in shells or even laminae $\frac{1}{2}$ inch to $\frac{3}{4}$ " thick. Barren

1315-1318. — (2a). 3 ft. light gray laminated straticulate shelly sandstone. Laminae or shells of ss. generally $\frac{1}{2}$ " to $\frac{3}{4}$ " thick. a couple of laminae - al 2 or 3 inches thick. Barren

1318-1319 $\frac{1}{2}$. (2b) 17 inches very coarse argillaceous sandstone similar to (2a) but "blocky" - breaking into angular chunks - & not straticulate, nor laminated
Fossils. (2b). 1318-9 A.T.

Ambocoelia O
Spirifer marcyi R
Delthyris O
Chonetes setigerus O
Camarotoechia orbicularis O
Productella cf. spinulicosta R.

1319 $\frac{1}{2}$ -1320. (2c) 7 inches gray, laminated, straticulate sandstone; apparently cross-bedded and breaking into shells 1 inch to 3 inches thick tapering to nothing.

1320-1320 $\frac{2}{3}$. (2d). 8 inches blocky
very coarse arenaceous beds
similar to 2b.

1320 $\frac{2}{3}$ -1325. (2E). 50 inches of lam-
inated, straticulated sandstone
in thick shells, 1"-2" thick in
lower quarter; thinner shells
only $\frac{3}{8}$ "- $\frac{3}{4}$ " in middle. In the
middle occurs a fossiliferous
seam containing (2E : 1323 A.T.).

Crinoid joints very common
Tentaculites (? Crinoid spines) very common
Delthyris very common
Ambocoelia "
Camarotoechia orbicularis occasional.

(3a)
1335-1341. 6 feet of laminated
straticulate sandstone in
thick shells.

1341-1345. (3b). 4 feet of soft shales,
rather friable; color dark
olive gray to light gray. Very
fossiliferous (3b. 1341-1345).

Delthyris C
Spirifer marcyi C
Ambocoelia C
Tentaculites C
Crinoid stems C
Atrypa reticularis O
Chonetes setigerus C
Cyrtina hamiltonensis R

that the upper $1\frac{1}{2}$ feet of the 6 ft. of
3E are pure coarse sandstones
breaking in even shells $1\frac{1}{2}$ " to
3" thick, below which the
shells gradually become less
even, more angular and
blocky and in the lower part the
rock is a blocky very coarse,
arenaceous shale or shaly fragment-
ary sandstone.

1357-1358. 3 f. 1 foot of extremely
coarse sandstone breaking into
large blocks or angular chunks
Fossils in a seam near the
top 3 F: 1358 A. T.

Atrypa reticularis C.

Spirifer marcyi O

Deltthyris O

Pleurotomaria (*Gyroma*) sp. R.

1358-1359. (39) 1 foot of light gray sand-
stone breaking into shells
 $1\frac{1}{2}$ to 3" thick. Barren.

Schizophoria impressa R
Camarotoechia cf. contracta. R.

Lyriopecten sp. nov? R

Palaeoneilo sp R.

Modiomorpha cf. subalata. R

etc. Pleurotomaria (Gyroma) sp. R

Actinopteria cf. emiliana Fresh. R

1345. (3b²) a very fossiliferous
coarse, tough ^{impure} sandstone seam at
extreme top of 3b and immedi-
ately in contact with (3c).
characterized by Orthoceras (large).

Orthoceras sp. C

Ambocoelia C

Delthyris C

Tentaculites C

Chonetes setigerus C

Spirifer marcyi O

Camarotoechia cf. contracta O

1345-1347. (3c) 2 feet of laminated
sandstone in shells.

1347-1351. (3d). 4 feet of soft friable
shales with very little sand.
Fossils labelled (3). mostly
from a coarser layer in middle

Spirifer marcyi O

Delthyris — C

Tentaculites C

Productella spirulicosta O.

1351-1357. (3e) For 6 feet the rocks
gradually become sandier
& more sandier above 3d so

Another place to study the conglomerate is along the road turning southwestwardly in block WY.9M, just east of the branch road running north at 1400 A.T. The specimens were not found in situ, but occur in two courses in the road from 1350 - 1365 and from 1385 - 1392. No specimens were found higher up. The road here and further west also is very hilly and whatever soil there was has almost all been washed away, leaving the road full of boulders. The conglomerate here is very peculiar in that it consists almost entirely of small white pebbles with usually no imbedding matrix whatever. Fossils of course, are not easily found. On the other hand in the higher series of boulders there was observed a slab 4" thick & 1ft. square with only a few large 1" pebbles. In the lower series there are a couple of slabs 2ft. square and over 6" thick and with hardly any imbedding matrix. Some of the pebbles are as much as 1" thick. At 1340, in the road just west of the house shown in WY.9M at 1360 are found a few very little worn specimens of the conglomerate, while an occasional more or less worn specimen is found all the way down into the valley of the Chemung.

SECTION ALONG CHEMUNG RIVER AT PORICK'S GLEN west of ELMIRA.

(A) 25 feet of flags and rather soft gray shales. Flags predominating in lower half especially toward top of lower half. Flags in this portion two to five inches thick but thinner in upper half. Highest six or seven feet are gray shales with hardly any flag. Some of the shale layers in these 25 feet are very friable and iron-stained. FOSSILS in arenaceous shales mostly in seams, - Ambocoelia gregaria quite abundant; Dalmanella tioga (medium to fairly large) quite abundant, - also one or two specimens of smaller D. tioga - D. leonensis. Also a seam of Productella's. Schizophoria impressa fairly common. A couple of Atrypa aspera rather multiplicate.

(B) About six feet of gray and olive-gray soft friable shale, iron-stained externally. No flags but occasional spots of rather more arenaceous shale. Fossils, small Lingula's fairly common.

(C) Eight or ten feet of six-inch flags with partings of stained shale similar to (B); also a little gray shale. At base is a foot of solid flaggy layers immediately overlying (B). Fossils same as in (A), - Ambocoelia gregaria & Dalmanella tioga very common especially in seams. Schizophoria impressa rare; Productella sp., occasional.

(D) 20-25 feet of gray slightly arenaceous, rather soft shales with a few one-inch or 2-inch harder layers especially in lower part. Fossils very rare, none observed.

(E) About 15 or 20 feet of very coarse, blocky arenaceous beds. Fossils fairly common. Lower part contains Atrypa aspera very common; Schizophoria impressa very common; Productella lachrymosa occasional. The upper part contains, - Dalmanella tioga common; Sch. impressa occasional, Productella lachrymosa occasional.

NOTE IN THESE UPPER BEDS THE ABSENCE OF AMBOCOELIA. ALSO THE PREVALENCE OF ORTHIDS THROUGHOUT ALL THE FOSSILIFEROUS BEDS EXCEPT THE SOFT LINGULA SHALES.

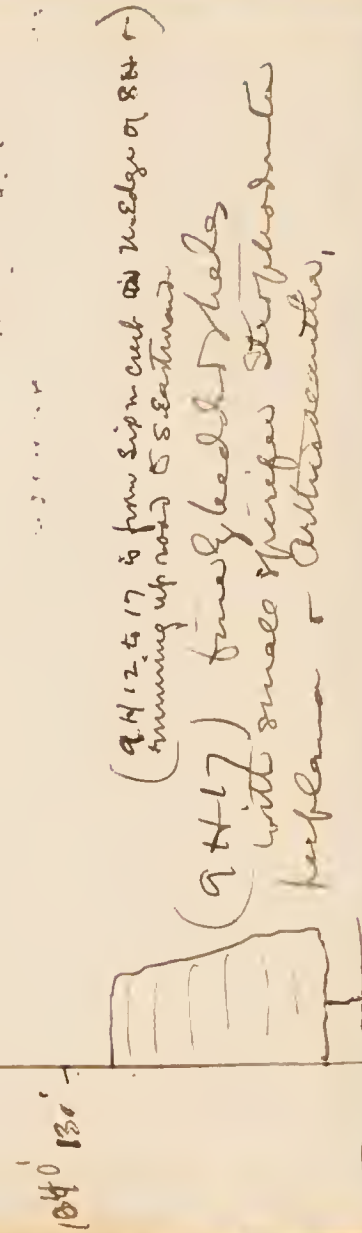
Dip of rocks upstream (northwest).

(A) is lowest rocks; (E), highest.

C. L. Breger, Sept. 17, 1905.

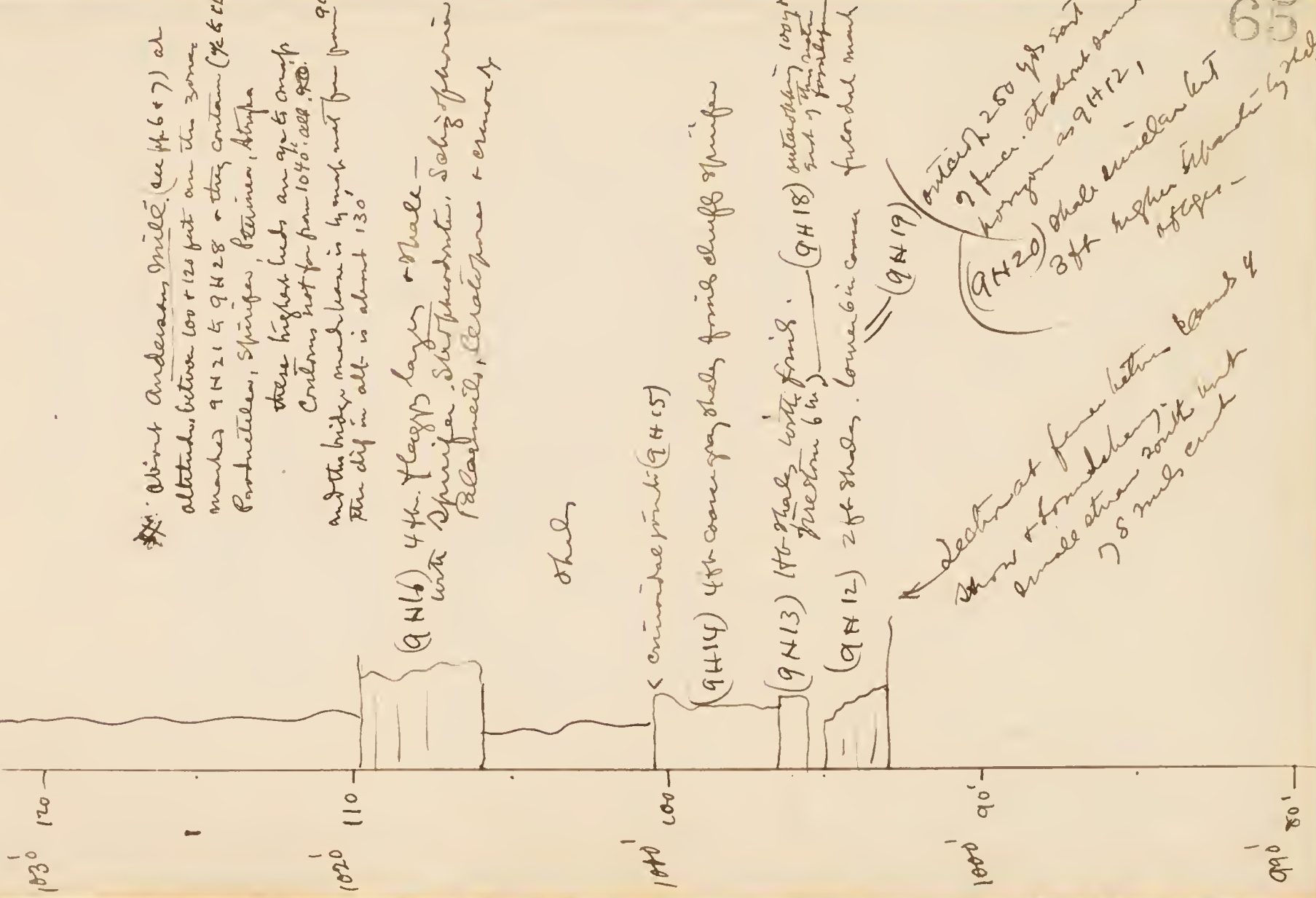
Sections along six mile creek near + in Brotherton.

(contour on scale of 1 ft to eq.)



(QH12, 17 to from top of creek on ridge of 844 ft) running up road to S. Eastward

(QH17) finely bedded shales with small spirifer Steptopodonta, brachiopods + Artinskianella



* Point Anderson Mill (see H. 6 + 7) at altitude, between 100 + 120 feet on the zone marked QH21 + QH28 + they contain (QH16) brachiopods, Spirifer, Steptopodonta, Schizophoria these higher beds are 90 to 100 ft. Crinoids not far from 1040. all. 910 and the beds much lower in height with few crinoids. The dip in alt. is about 130'

(QH16) 4th. Flaggy layer + shale with Spirifer, Steptopodonta, Schizophoria, Palaeonites, Ceratopora + crinoid

shales

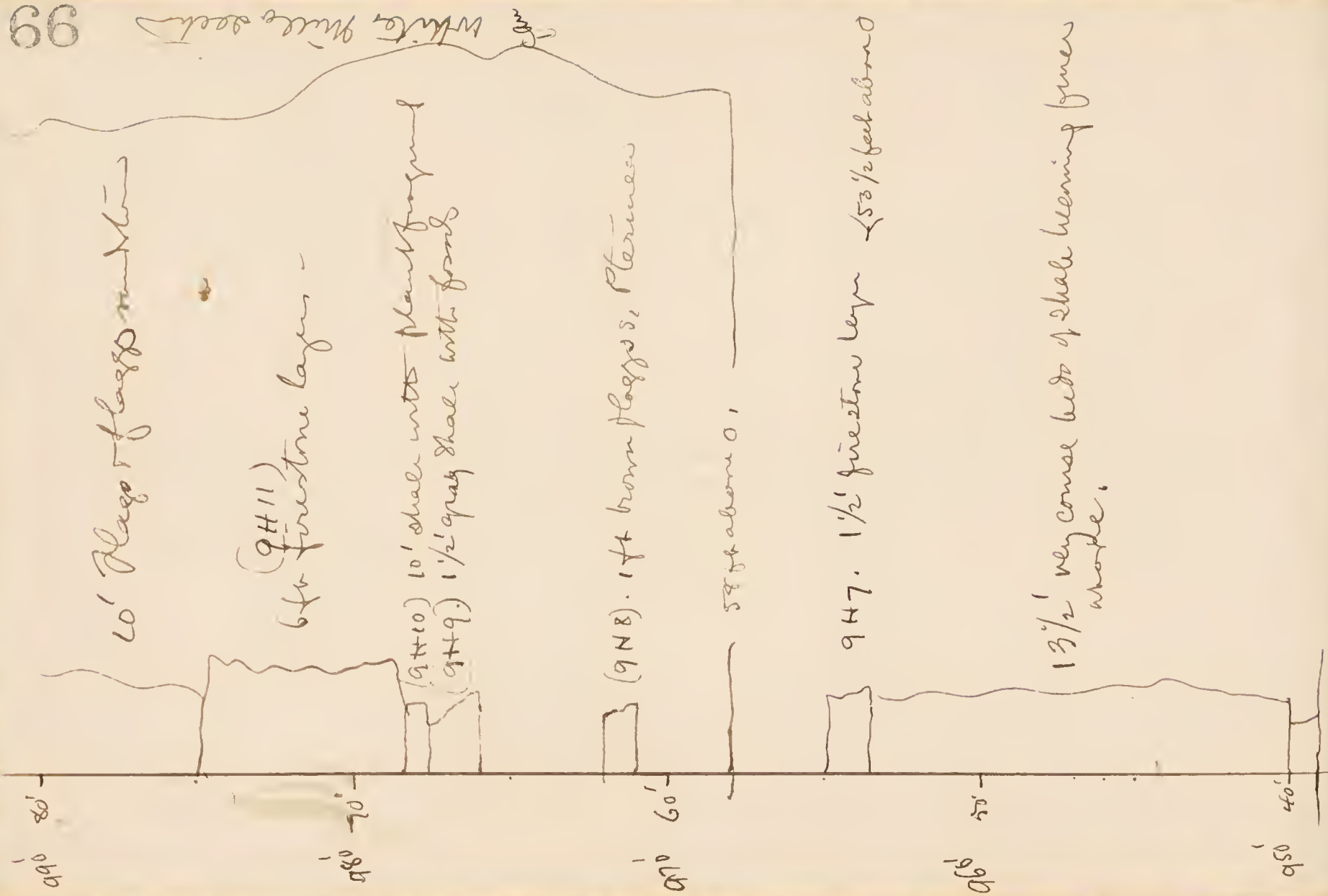
< crinoid fossils (QH15)

(QH14) 4th coarse grey shales, fine chuff of spirifer

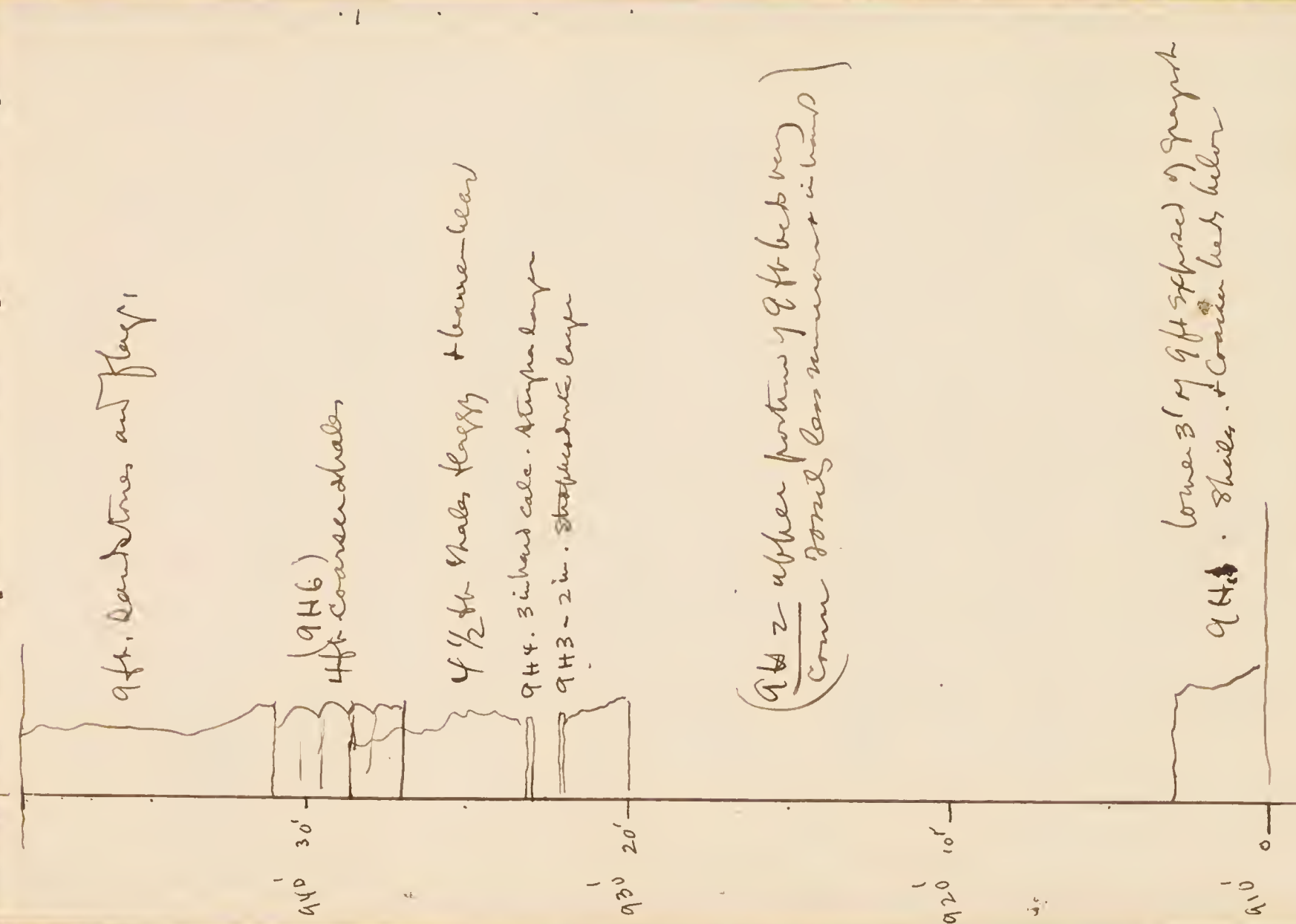
(QH13) 1st-2nd shales with fossils (Weston 6 in.) (QH18) outcrops 100 yds east of this section

(QH12) 2nd shales. Lower 6 in. same fossiliferous material (QH19)

section at face between points 4 show + fossils (small area south west 75 mls. creek) (QH20) shale similar but higher than 1st + 2nd



White mica seen



(see page 2)

1500'

1400' .

St 1193 → 1375' → *Ponaria* with *Orth*
 in S² corner *Sphynx*
Orthocentrus

Ponaria *Orthocentrus*
Orthocentrus *Orthocentrus*
 [St 1294] *Orthocentrus*
 [St 1294] *Orthocentrus*
 [St 1294] *Orthocentrus*

1300' → 1192' ← *Ponaria* with *Orth*
Orthocentrus *Orthocentrus*
 (Res. 114)

1600' - St 1145

1500' - St 1143 - *Orthocentrus* *Orthocentrus*
 St 1144 - *Orthocentrus* *Orthocentrus*
 St 1141a - *Orthocentrus* *Orthocentrus*
 (a small *Orthocentrus*)

1400' - St 1141
 1370'

List of Field No's. from the Chemung Section, with their Equivalent labels in the C.U. Geol. Museum, representing the successive zones in the Section

Field.	Cornell Collection
Wy 9N 00.1	Wv. 9N 1 a
00.2	b
00.3	c
00.4	d
00.5	e
00.6	f
00.7	g
00.8	h
Wy 9N 1	i
1.1	i' or j.
2 (= 9N16)	a a f
3	k
4	l
5	m
6	n
7	o
8	p
8.5	q
9	r
10	s
10.1	t
11.	u
11.1	v
12	w

Field	Cornell Univ.
Wy 9N 13	Wv. 9N 1 x
14	14
15	13
16=2	a a

Wy 80 00	Wv. 80 1 a	
00.1	b	} Erie Rv. Cut.
00.2	c	
00.3	d	
00.4	e	
80 1	f	
2	g	
3	h	
4	i	

Wy. 10M 1	Wv. 10M a
1	a
2	b
3	c
4	d
5	e

= missing.

Dr 9N 1 =	Dr 9H 910' 910'
Dr 9H 12 =	Dr 8H 1055-1040'
Dr 9H 20 =	Dr 8H 1'
Dr 9H 21 =	Dr 8G 1a
Dr 9H 30 =	Dr 9H 1a
Dr 9H 32 =	Dr 8Hk 2a = Dr 8H 2a
Dr 9H 34 =	Dr 9H 3a
Dr 9H 35 =	Dr 8H 26. = (Dr 8H) 1a
Dr 79 1 =	(Dr 7D) 1a
Dr 79 15 =	(Dr 7D) 10
Dr 129 1 =	Dr 129 1a
Dr 11Na =	Dr 11N 16.
Dr 119 2 =	Dr 11 1a

Wy. 7B1
 2
 2 1/2
 3
 4
 4 1/2
 7
 8
 5
 5 1/2
 10
 10.3
 10.2
 10.1
 11

=
 =
 =
 =
 =
 =
 =
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 =
 =
 =
 =
 =
 =
 =

Wv. 7B1 a
 / b
 / c
 / d
 / e
 / f
 / g
 / h
 / i
 / j
 / k

Wy. 6B1 = Wv. 6B1 a
 Wy. 8C1 = Wv. 8C1 a
 Wy. 9A1 = " 9A1 a
 Wy. 9B1 = " 9B1 a
 Wy. 9Ax = " 9Ax
 Wy. 7C1 = " 7C2 a (in gorge)
 " 7C1 = " 7C1 a (in road)
 " 7C2 = " 7C2 b

LOCKWOOD

COLLECTIONS

Field Label	C.U. Label	Field Label	C.U. Label
Wy 4M1	= Wv. 4J1a	Wy 4K35	= Wv. 4K100
" 4N1=K1	= 4K1a	" 36	= " " " PP
" 4N2=K2	= 4K1b	" 37	= " " " QQ
" 3=K3	= 4K1c	" 38	= " " " RR
" 3.1=K3.1	= 4K1c'	" 39	= " " " SS
" 4=K4	= 4K1d	" 40	= " " " TT
" 5=K5	= "	" 41	= " " " UU
" 6=K6	= "	" 42	= " " " VV
" 7.1=K7.1	= "	" 43'	= " " " WW
" 7=K7	= "	Wy 3J1	= Wv. 3J1a
" 8=K8	= "	" 2	= " " b
" 9=K9	= "	" 3	= " " c
" 4K10	= Wv. 4K10	" 4	= " " d
" " "	=	4J2	= Wv. 4J2a
" " "	=	4J3	= Wv. 4J3a
" " "	=	Conglomerate	= 5K1a
" " "	=		= 5K1b

CAYUTA (Ithaca Q'd.

Field Label	C.U. Label
Ith. 12M1.3	= Ith. 12M1 a
Ith. 12M1.4	= #
" 1	= #
" 1.1	= #
" 1.5	= #
" 1.6	= #
" 2	= #
" 3	= #
" 4	= #
" 5	= #
" 6	= #
" 7	= #
" 8	= #
" x	= #
Ith. 10N1	= Ith. 10N1 a
" 9M1	= 9M1a
" 8L1	= 8L1a
" 7L1	= 7L1a
" 2	= " b
" 3	= " c
Ith. 6L1	= 6L1a

missing

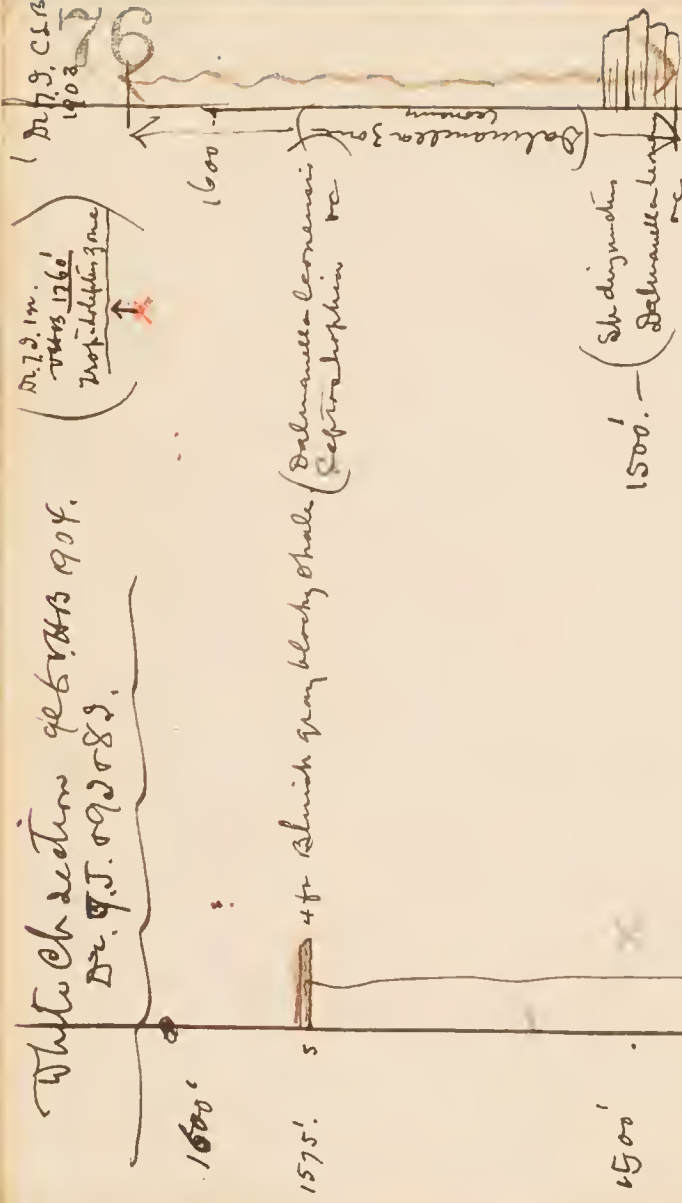
BROOKTON COLLECTIONS (Dryden Q'd) 74

Field Label C.U. Label

Dr. 9 H 1 = Dr. 9 H 1 a
 " 2 = " " b
 " 3 = " " c
 " 4 = " " d
 " 5 = " " e
 " 6 = " " f
 " 7 = " " g
 " 7a = " " h
 " 8 = " " i
 " 9 = " " j
 " 10 = " " k
 " 11 = " " l
 " 12 = Dr. 8 H 1 a
 " 13 = " " d
 " 14 = " " e
 " 15 = " " g
 " 16 = " " h
 " 17 = " " #
 " 18 = " " b
 " 19 = " " c
 " 20 = " " f
 " 21 = Dr. 8 G 1 a
 " 22 = " " b
 " 23 = " " c
 " 24 = " " d
 " 25 = " " e
 " 26 = " " f
 " 27 = " " g
 " 28 = " " h
 " 29 = " " i
 " 30 = Dr. 9 H 2 a
 " 31 = " " b
 " 32 = Dr. 8 H 2 a
 " 33 = " " b
 " 34 = Dr. 9 H 3 a
 " 35 = " " b

Dr. 7 d 1 = Dr. 7 d 1 a
 " 2 = " " b
 " 3 = " " c
 " 4 = " " d
 " 5 = " " e
 " 6 = " " f
 " 7 = " " g
 " 7a = " " h
 " 9 = " " i
 " 10 = " " j
 " 11 = " " k
 " 12 = " " l
 " 13 = " " m
 " 14 = " " n
 " 15 = " " o

White Ch section 966. 1883 1904.
Dr. J. J. 1883.



1400' 8 ft ss Plenitonia
 Umbroca etc
 Schizophoria

1300' (210') Lingule + Chonala

1200' at 1222-27 White blocky shale (Lingular)

1575' 4 ft bluish gray blocky shale (Dalmanella leonensis, Septidolites etc.)

1500' - (Spiridolites, Dalmanella etc.)

1520' Bluish gray shale, 100' (Spiridolites, Rhynchonella, Schizophoria, Leptostoma etc.)

Aug 8. 1905. Directions to Cat B for determining acanthopora horizon in Dryden quad.

From sections given above on p 76 it appears that the Dalmanella leonensis zone extends for a hundred feet or so from a little below 1500' to a little above 1600' in the section collected from by you in Dr. J. J. in 1903.

The section made by Bennett at White Church shows the lowest Dal. leonensis at 1575'. It is important to know whether this is the actual lowest appearance of it - also if possible catch in this section the Sp. drymondii zone occurring associated with the Dalmanella.

In block 71 at his zone in Banette found Spiridolites. This is as near you 70 that it may be regarded at a continuation of your section. It is important to know approximately the distance in feet between the top of the Dalmanella zone and the Spiridolites zone.

In the White Church section at p 79. Banette section Spiridolites occurs but not decidedly different from those in the higher zone. It is important to ascertain the exact altitude again of this zone - and exact distance up to the base of the occurrence of Dalmanella leonensis in that section.

Then with this set of data before you you are to the section you made in 1903 (see map p 15) in Dr 11 + 12 H + D. and determine with precision the exact altitudes + equivalent of the several zones with those further east. Try your best to determine on the altitude of RR station = at Broken 961. It is important to know the Dalmanella zone + determine approximately its base + top if possible, + if possible find the Sp. drymondii fossils. W. J. J.

Record dips accurately whenever seen with clinometer + find all fossils in this book, and at the time of making them in the field, with date.

Corrected elevations of page 79, see p. 82.

59, 1905. WHITE CHURCH GULLY.

1152-1155. roadside. 3 feet. laminated light gray sandstone, slightly micaceous. Barren. Layers 2-4 inches thick. Each subdivided into 1/4 inch layers.

1156. In roadbed. Doubtfully in place. 6 inches. Laminated sandstone, similar to preceding. Serpilyuchus muscovata occasional.

Ambocoelia preparata common. Vertical Burrows. 8J1a

Probably not in place. It is reasonably certain that this band is the same as S1/a² 1180-90. 10 feet of hard flaggy layers with some interweaving less hard arenaceous beds. Most of the beds breaking with vertical angles. Exposed in roadbed, roadside and forming 3 or 4 small falls in the creek. These beds especially the flaggy layers are exactly similar to the bed containing the

fauna of J1a

1188. One of the flaggy beds 6 inches thick contains a few fossils 8J1a². Ambocoelia, Serpilyuchus, Productella, Comarotoechia, and is evidently the same as S1/a. Both are "persistent."

1195-1197. 2 feet arenaceous beds with one or 2 flaggy layers

1197-1200. 3 feet same kind as preceding. In the creek at 1199, a few Ambocoelia. Dr. 8J1b

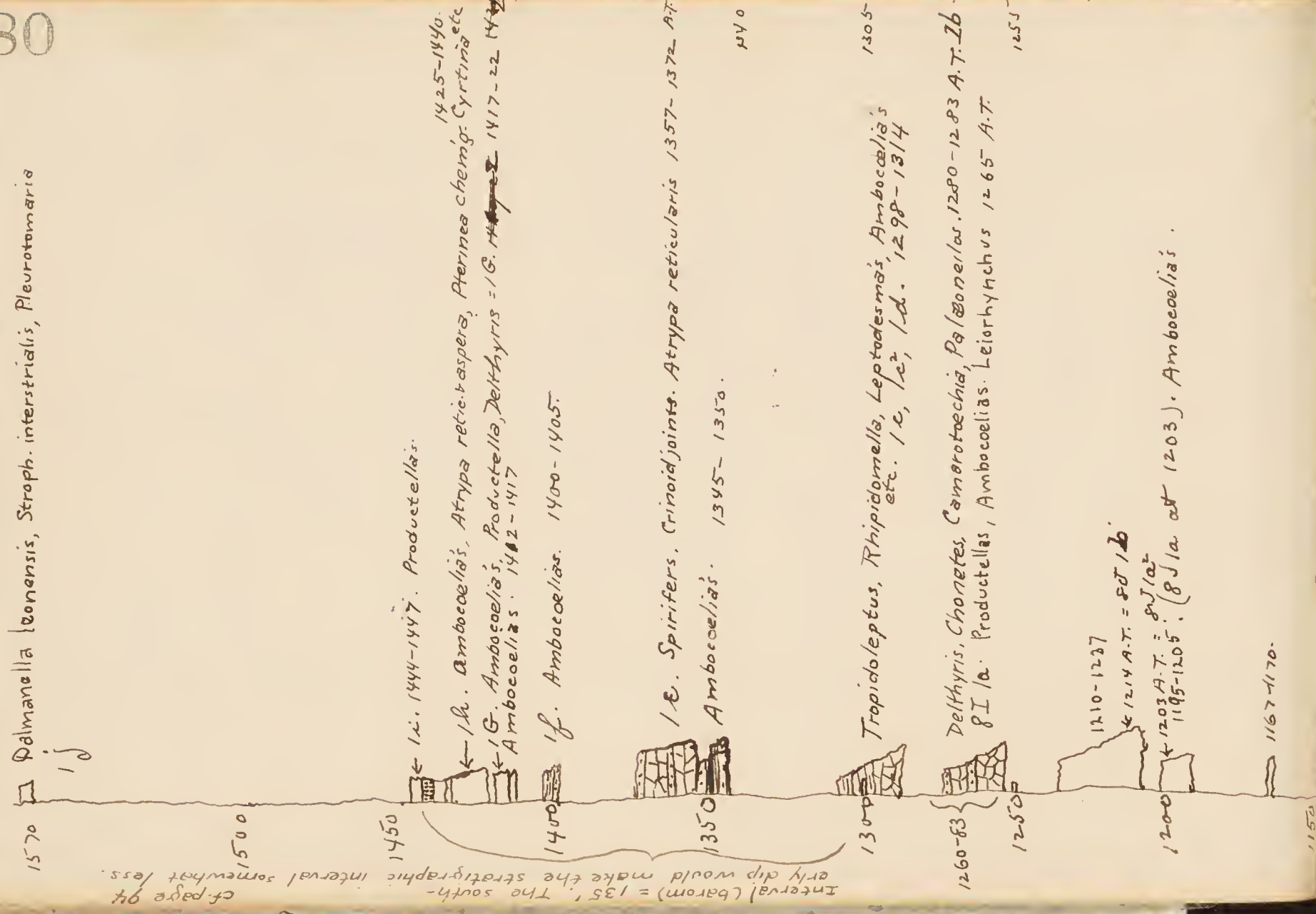
1200-1220. occasional outcrops flaggy & sandy beds. 1222. A 6 inch flaggy layer overlying 15 inches of soft shales which are weathering into a residual clay.

1240. Bridge at 1260 on map. ^{= 1255 - sup 82} next page (1270) Intermittent outcrops flaggy layers and blocky arenaceous beds. Some ^{sub} surface layers

1250. in bed of creek. blocky shale. Some Productella. S1/1a. In the flaggy layers a couple of Ambocoelia & a Serpilyuchus fragment were observed. latter were not collected

1265-1268. in creek. Blocky arenaceous beds and thin 1 inch to 1 1/2 or 2 inch hard ss. layers. Fauna S1/1b quite profuse. Beds forming a fall. Pelthyris(?), Chonetes, Comarotoechia, Calceonites.

Section up White Church Hollow.



cf. page 94
Interval (barom) = 135'. The south-
ery dip would make the stratigraphic interval somewhat less.

1270. After luncheon at the preceding station a return to the bridge at 1240 (1260 on the map) showed the latter to be at 1270 per barometer 40 feet above this bridge is a small bridge (not shown on the map) where a small tiny stream drains into the creek (stream not shown on map). About two feet of blocky arenaceous shales are exposed. These are very fossiliferous containing most abundantly *Cambrocoelia gregaria* and *Leptodesmas*. Some specimens of *Tropidoleptus carinatus* occur as well as *Delthyria* (?) *Mesicosstahia spirifer warcyi*, *Schizophoria*, *Rhipidomella*. This fauna is 8I/c and is about 12 feet above 1b. The same beds crop out in the bed of the creek under the bridge shown on the map at 1300 ft. A.T. = 8I/c. Top of second bridge = 1300 A.T.

8I/d. Ex 5 feet above the second bridge there is a 12 inch flaggy zone capped by 4 1/2 ft. of blocky arenaceous beds. The flaggy zone contains some *Ambocoelias* (not collected). The blocky beds contain *Ambocoelias* and some *Tropidoleptus*, *Chonetes*, *Leptodesmas*. The *Ambocoelias*, *Leptodesmas* & *Tropidoleptus* of 8D/1c, 1c, and 1d thus range through at least 15 feet. The fossils throughout these 15 feet are about evenly distributed (not in seams) ~~4~~ 47-50 ft. above the 2nd bridge. 4 to 5 ft. gray & some brown even textured flaggy beds containing a few *Ambocoelias* (in creek) 49-57 ft. above the 2nd bridge. 15 feet of blocky beds with some flaggy layers. Fossil *Spirifer gemmatus* (*Delthyria*?) and some crinoid joints extending throughout the blocky beds. Also some large *Spirifer* sp. *granulosus*, *ambocoelias reticularis*. = 8I/e (in creek) 85-90 ft. above the 2nd bridge. 2 feet of flaggy and blocky beds overlain by 3 feet of shaly *Ambocoelias* in lower part of blocky & flaggy beds and in shale parting; a few specimens

B3 = 11H = b, c, d
 11d 2a, 11d 1 b, c
 12d 4a, a', a'', a''', a', b
 12d 3a, 3x
 12d 2a, b, c

Corrected elevations: White Church

The bridge shown the map just below 1260 was originally indicated by the barometer is at 1240, and all the elevations given on page 79 are on this basis. The ~~real~~ elevation of the bridge was subsequently indicated as 1270, after a rapid walk up from the base. Taking the average, 1255, this is also the elevation per the map which is doubtlessly correct. This bridge is i. 1255 - A.T., and 15 feet will have to be added to all the elevations given on page 79.

Dr. S I 1c, c' = 1293 - 1295

d = 1305 - 1310

The elevations below the second and third bridge were obtained by eye leveling. The figures after 1d to just above 1f are 15 feet too low, and ~~that~~ should no longer be 42-57, 85-90, 92-97 feet above the 2d bridge are 10 feet higher, so that the highest of these was shown at 112 feet above the bridge, which plus 5 feet to the 2d bridge, give an interval of 117 feet ~~between~~ between the second and third bridges. According to the map the interval is 130 feet. The elevations should read marked 7 inches less than at 135 feet.

42-57 = 1366 - 1381

85-90 = 1415 - 1429

92-97 = 1425 - 1430

also in the shale Sd 11f. Ambocoelias in 92-97 feet above the 2nd bridge. Ambocoelias in 5 feet of flags and blocky beds mostly the latter. These beds are 5 feet below in the roadside 5 feet below the bridge marked on the map at 1435 (No Collections) At the third bridge marked at 1435-1440 on the map there are 4 or 5 feet of floggy & blocky beds similar to the preceding and just above them. Ambocoelias are very common in some of the floggy beds, less common in others & rare in the blocky shales beds. A Productella & Spirifer fragment were seen in the blocky beds. (No Collections) # above the 3rd bridge are 15 feet of flags, blocky beds & some shales. An occasional Ambocoelia. Dip 2°, N. 45° E. (Dip not true?) In the upper part are several seams of scattered solitary crinoid joints with also a *Finesella*, *Atrypa reticularis*, *Atrypa aspera*, *Pternia*, *Chemungensis*. Sd 1f

18-22 ft. above the 3rd bridge are over 4 feet of massive sandstones, floggy beds & a little blocky beds. There are at least two individual beds over a foot thick. On a closer examination these are seen to be compact aggregations into more than normally massive beds of large angular pieces adherent similar to the blocky shales, the sandstone is broken up and not a massive homogeneous band. *Psarodes* crinoid joints.

22-25' above the bridge. 3 feet blocky shales with *Productella* = Sd 1f. 1570-1574. 4 feet 1570. *Dalmanella*. Sd 1f. ~~last~~ shales with a 6 inches floggy beds base. Latter contains *D. leonensis*, *Strophodonta mucronata* etc.

several seams of scattered, solitary conoidal joints occur. A seam of Ambocoelias was collected = 1g.

Aug. 10, 1905.

Brookston

80

On the hill road along the northwest spur of Bald Mountain, passing upward from 914 into 814.

1070-1076. 6 feet of gray-arenaceous, laminated arenaceous shales. No fossils exposed at the curve in the road in 914. 1115-1300. 185 feet of friable shales, thin slaty layers and a few flaggy beds. The shales vary from purely argillaceous to slightly arenaceous, are very fissile, breaking into thin sheets $\frac{1}{16}$ of an inch or less thick. They are dark gray in color, some light gray & some almost black, but take a reddish stain externally. The slaty layers are arenaceous beds $\frac{1}{4}$ to $\frac{5}{8}$ of an inch thick and predominate in the upper third of the section. The flaggy beds are gritty sandstones mostly 7 or 8 inches thick but one 2 or 3 occasional 7 or 8 inches thick. Fossils rare (see Dr. 91430, ~~1903~~ Collections of 1903, page 8).

Up to 1370 A.F. there are some more outcrops.

The rocks are mostly shales & thin arenaceous beds & thin flaggy seams. The shales are as a general rule more arenaceous & less fissile than those below though a few feet of the latter occur. Shales also lighter in color. The house of Mr. H. Vandermark was per barometer 1435 ft. A.F.

A trail was made into the wooded gully west of Mr. Vandermark's with the intention of obtaining more accurate information as to the altitude of Dr. 91434 & 35 (Collections of 1903, page 8 & 9). I was however unable to re-locate the outcrops.

In the roadbed on the road running N. x S. in the south east quarter of Dr. 814, there are at 1760-1767, about 7 or 8 feet of flaggy sandstones. The rock is coarse, uneven textured, but in the lower part contains many fossils chiefly among

which are *Seligophoria nigrescens*, *Dalmanella tioga*, *Pelthyria mexicotalis*, *Amocoelia umbonata*, *Chonetes*, *Proodontella*, *Spirifer marcyi*? = Dr. 814/2a.

Dr. 814
2a

see p. 76.

Aug. 11, 1905. In the gully running along the boundary between Dr. 1171 & Dr. 1135. Barometer at road crossing entrance to gully 1135 map elevation

Barometer \therefore about 30 feet low.

[1370 - 1382]

1. 1340-1350 (Barometer). 10 feet blocky arenaceous shales and flags. Shales concretionary in structure, light gray in color. Flags gray, light brown and purplish black $\frac{1}{4}$ to $\frac{1}{8}$ inches thick. These are followed by 2 feet of thin papyraceous beds splitting into sheets less than $\frac{3}{16}$ of an inch thick. Then come 10 or 12 feet of thin bedded ($\frac{3}{4}$ " - 2") arenaceous shaly layers with some blocky beds, a couple of feet of thin papyraceous beds & some 4-6 inch flaggy layers. These upper 10 or 12 feet are the Dr. 1171, July 24, 1903, page 12.

1398-1402. At bottom a 6 inch band very coarse almost flaggy blocky beds containing a couple of *Ambocoelia*, *Spirifer* fragment & small *Lernaeus*. Then 2-24 inches of bluish slightly arenaceous shales containing *Ambocoelia*, *Spirifer* & a *Trigula* cf. *punctata*, - fauna = Dr. 11 H/2 a.

Then a 6 inch flagstone gray in color containing *Leptodesmids*, *Spirifer*, *Microcrinus* (?), *Delthyris*, *Camarotoechina*, *Delthyris*, *Chus*, *Ambocoelia*, ? *Rhipidomella*. = 11 H/2 b

Then about 8 inches of blocky beds containing a cluster of *Trigula* cf. *punctata* and a *Leptodesma* = 11 H/2 c.

Dr. 11 H/2 e The top of the 23 foot fall described p. 12-13 is 95 feet below the road, according to the barometer, or at 1505 A.T. Above the fall there continue about 25 feet of very coarse beds, blocky, breaking into angular fragments, rock similar to the cliff & fall, also the common blocky arenaceous shales and some flags the last two predominating in the upper half. #3

A careful search was made for *Tropidoleptus* in the beds described as 11 H/4 (see page 13). No *Tropidoleptus* was observed (the fauna is *Ambocoelia peregana*).

Chonetes sutulus

? *Delthyris vesicostata*

Schizophoria impressa?

(?) *Rhipidomella vanuxemi*

= Dr. 11 H/2 d.

Palaeonilo plana (large)

Pleuronomaria capillaria

Productella lachrymosa

Orthotetes channingensis

The dip? of the rocks at the cross corners (= Dr. 11 d/5, page 13) is 3°, E. 15° N.

Fossils ~~are~~ rare. An occasional *Ambocoelia* is found throughout. An *Atrypa* was collected.

Aug. 12, 1905.

On the road running southwest up the hill in extreme western part Dr. 10 c.

1258-1265. 7 feet of soft, friable olive and gray shales, some stained a deep copper red and with 2 or 3 2 inch flaggy layers. Shales barren. Some *Lernaeus* with plant fragments in flaggy seams. Probably equivalent to soft shales below *Hiram* & undermarks.

1296-1300. 4 feet of flaggy beds with a little olive shale. see Dr. 11 d/2, page 13, 14.

1260. In roadbed 3/4 mile southwest a foot of flaggy beds. Barren.

" " road running west from 11 d into 12 d.

1370. 1 foot coarse flaggy beds. Barren.

1415-1420. 5 feet coarse blocky & flaggy beds with a couple of 6 inch layers purer sandstone. Barren.

1458-1470. 2 feet arenaceous shales in roadside *Ambocoelia* common, *Delthyris* less common. *Schizophoria impressa* occasional. *Atrypa reticularis* (!!) (seen in field with? collected), *Gammusia* = [12 d 2 a]. crinoid joints also fairly common.

1478-80. 2 feet very coarse blocky beds. A few *Delthyris* in a soft joint. *Coarctata flexuosa*, a *Tridionomorphia sulcata*, also 2 or 3 crinoid joints. = 12 d 2 b.

1487-1491. 4 feet medium coarse & very coarse blocky beds. *Ambocoelia peregana* & *Chonetes sutulus* abundant especially the former.

? *Rhipidomella* (= *Schizophoria* large?), *Atrypa reticularis*, a *Camarotoechina* also occur. (12 d 2 c). This fauna, the lithology & method of weathering of the fossils is the same as Dr. 11 H/4 (page 13 = Dr. 11 H/2 d page 86).

The elevations given from 1370 and higher are by barometer and should be about 40 feet less than they are. The outcrops Dr. 12 d 2 a, b, c are on the east-west road near the eastern margin of block 12 d, on the little spur east of the house. The

highest elevation given in the preceding list
i.e., 1491 should be 1451 etc., etc. The outcrops
are marked by the cross on the map page 15.

In creek marked ① in southeast part 12 D.

1475-1495. 5 feet arenaceous & slaty shales mostly
laminated. A little of the thin flags and coarse
beds. Barren
1475-1495. 20 feet ~~blocky~~ blocky shales and
flaggy beds capped by 4 or 5 feet of
coarse sandstone and very coarse blocky
beds (probably equals the massive beds
between Dr. 8 d 4h and 1i in White
Church Gully. Fossils crinoid joints
of several kinds, ^{Trilobites} Ceratopora, Ambro-
coelia, Pleurotomaria capillaria and a
fragment which resembles Tropidolepta
but is probably a Spirifer. = (12 d 3a)
Fossils from just below top hard layers.

Monday, Aug. 14, 1905. # On the spot on map 5 w.
of the road going up the hill in 12 I, -
at junction of forks of one of the upper
branches of Deputron Creek
(1365-1377). # Twelve feet of five inch flags and
flaggy sandstones with a little blocky beds
Gambusia (12 I 3x), Fossils rare, - Ambocoelia,
Crinoid joints, Spirifer (Delthyris?), Camarotoechia - in flags
In Deputron Creek, marked ②.

1357-65. - 8 feet flaggy sandstone with a little
arenaceous blocky shale. Fossils very rare. An
Ambocoelia & crinoid joint were seen (not collected)
1375-1395. (12 I 4a). 20 feet blocky arenaceous
shales, bluish gray, fairly soft. Fossils mostly
in some of Spirifer (Delthyris?). Ambocoelia,
coeloid also common.

(Dr. 12 d 4a) = Lower 2 1/2 feet. Spirifer pennatus, Sp. marcyi
also a Spirifer with 2 spines in mesial sinus, Atrypa
reticularis, Ambocoelia, Palaeonich, Bellerophon beds
Dr. 12 d 3x should be at forks of branch
① (at 1465-77.?)

12 I 4a. Middle portion at base of falls and
at creek

12 I 4a. Upper 3 feet. Spirifer pennatus,
Atrypa reticularis, Ambocoelia's com-
mon.

12 I 4b. 8 feet of very coarse blocky and
semi flaggy arenaceous beds. Form-
ing the upper portion of the upper
fall and the rocks just above for a
couple of feet. Exposed also a cliff on
the W. bank, from which the collect-
ions were made in 1903 (see Dr. 11 d 4,
page 14). Typical Eganville forming the
upper fall. 1395-1403. Ambocoelia plegaria,
Chonetes scitulus, Schizophoria impressa, Rhipido-
mella sp., Crania(?) sp. In over two hours
search only 1 or 2 small specimens of TROP-
IDOLEPTUS CARINATUS were found. I feel
quite certain that these beds are the
same as Dr. 11 H 2 d (page 86) or Dr. 11 H 4 (page 13)
and probably also 12 d 2 c (page 87)
12 I 4a & 4b form 2 falls under a bridge
which has been built for a lumber road.
Barometric observations. The barometer today
has been extremely unstable, 12 d 3x
registered 1365 - and a few minutes
later the bridge mentioned above register
ed 1410. A couple of hours later the
bridge registered 1500 and a quarter of
an hour later 1485. A rapid walk from
the bridge to the old house above on the east
side of the N-S. road (on boundary between 12 I
and 12 J) showed a difference of about 200
ft., so that the bridge may be considered to
be at 1390 or 1400 ft. A. T., and the elevation
of 1357-1365 and Dr. 12 d 4a & 4b should each
be reduced 5 feet, since the highest beds of
this series are 2 feet below the bridge.
Dr. 12 d 3x is at a fork of two branches
on the creek marked ①. According to the barom-
eter the elevation was 1365-1377 which fact
led me to believe that the outcrop was at

the forks worked in blue pencil, which, as the map is at this elevation. I am quite certain however that the outcrop is along D, and is either at a bracket not shown on the map, or else the forking as mapped should be 100 feet lower than it is.

Another point which needs explanation is the fact that less than a hundred yards and only 10 or 15 feet higher than the bridge Deputron Creek forks again. This is evidently the fork shown on the map at 1480 in 12C. This should be 60 or 70 feet lower down in elevation than it is mapped.

Note Dr 11 d 3, ~~7~~¹⁰ page 14. This is not in place there are 2 or 3 gigantic lenses or boulders in the drift, covering an area over 30 feet long and at least 10 feet wide, and over a foot thick. There are also very common at this point boulders containing *Balanella leonensis*, *Spirifer digimatus*, crinoidal remains, *Productella lachrymosa*, *Pterinea chemungensis* etc. in a firestone.

① & ②. Above 12744 there are frequent outcrops of thin coarse flaggy layers, thicker flags, and arenaceous shales, mostly blocky. Fossils scarce. An occasional *Ambocoelia* seen in the coarser blocky beds and lower part of flaggy layers and a *Spirifer* occasional in softer blocky beds. The same conditions are met with in ① below 1273 a for at least 60 feet.

On road running down the hill northeastwardly from Dr 11 J into 10C.

1380. 10 inches very coarse blocky or semi-

flaggy arenaceous beds. *Tarva*, *Spirifer* of

granulosus, *Spirifer* (*Delthyris*), large *Atrypa reticularis*,

Ambocoelia, crinoid joints.

1372-1375. 3 feet blocky shales. *Delthyris* (?), *Atrypa reticularis*, *Spirifer granulosus*?, *Sp. mareyi*, *Productella* (stri-

ate), *Ambocoelia umbonata*, *Chonetes scitulus*, *Lingula complanata*, *Pterinea chemungensis*, *Palaoneilois*, *Camarotoechia* sp.

1360-1365. 5 feet of flaggy beds with a little

blocky coarse shale, a couple of *Ambocoelia*,

a *Camarotoechia* & an *Aviculopecten* fragment.

1350-1360. Blocky beds and flags, barren.

1338-42. 4 feet arenaceous shales semi-blocky-fragile.

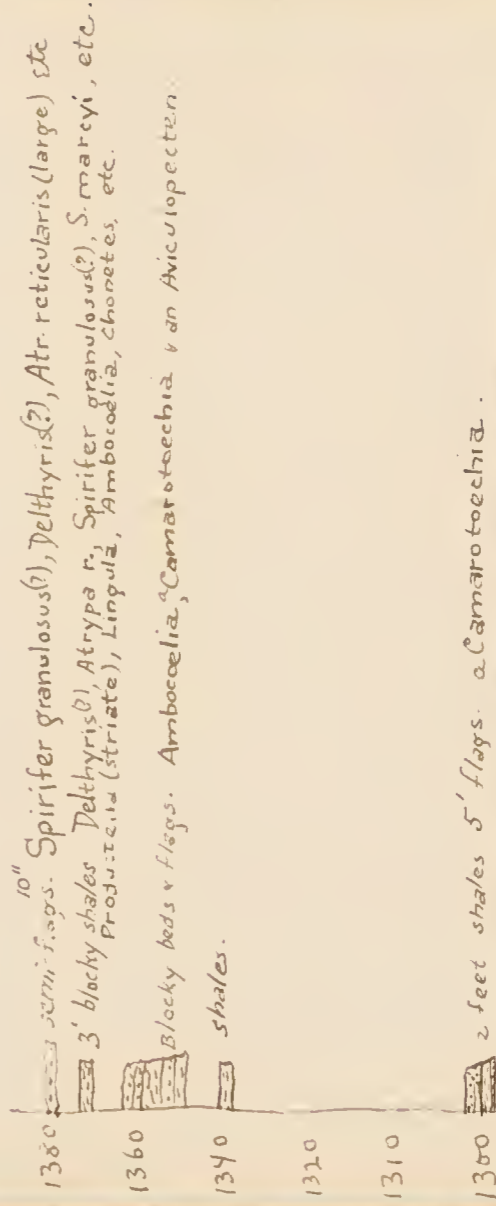
1298-1305. 6 inches of flag at base, then 2 feet

of gray semi-fragile-blocky shales. 2 inches

of flag. A *Camarotoechia* in the shale then

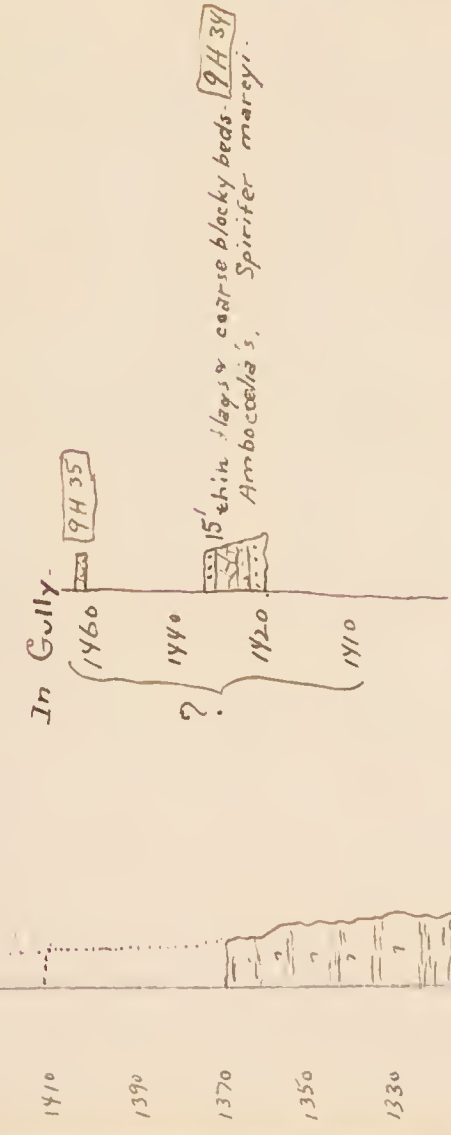
3 feet of flags.

Section 10J-11J (Dr).



Section below Hiram Vandermark's, on north west spur Bald Mt. Dr. 9H v Dr. 8H. (pages 8, 9, 84).

Shales olive. Ambocoelias Paleoneulo Nucula, Grammysia etc. (9H33)



Soft shales. (dotted lines represent probable limits of this formation.)

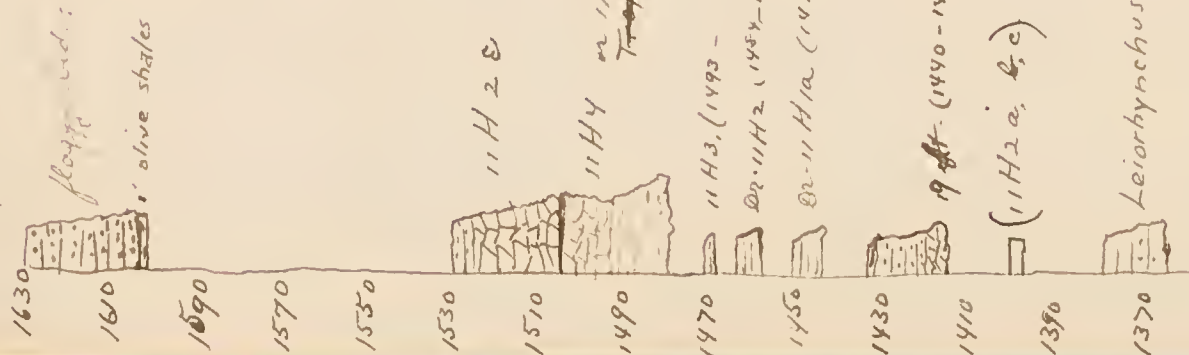
6 feet gray arenaceous shales. no. now barren

1470
1450
1430
1410
1390
1370
1350
1330
1310
1290
1270
1250
1230
1210
1190
1170
1150
1130
1110
1090
1070
1050
1030

Section up Johnston's Hollow (Danby Hill). Dr. 11H

12, 13, 85, 86. 1' olive shales

1630
1610
1590
1570
1550
1530
1510
1490
1470
1450
1430
1410
1390
1370
1350
1330
1310

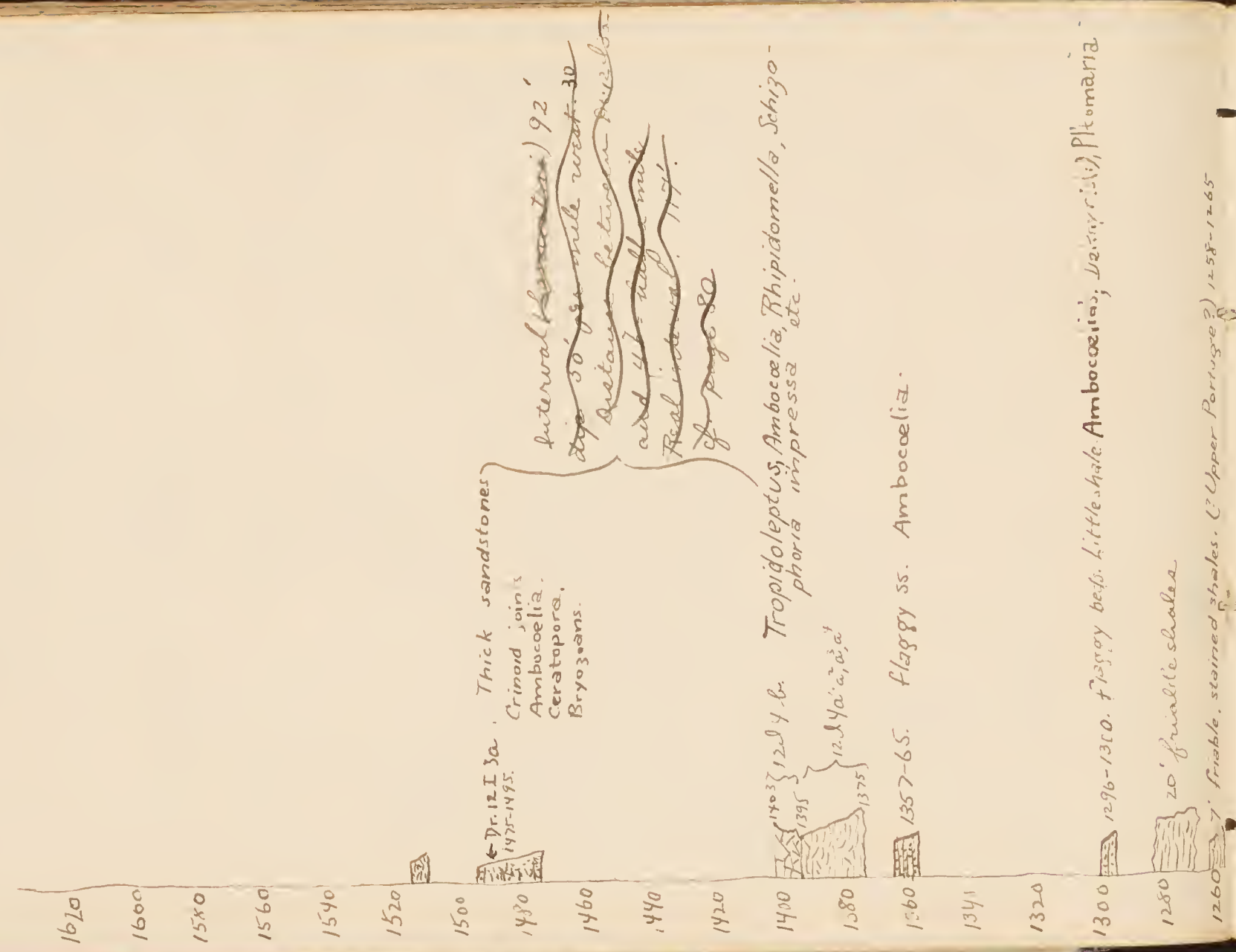


should be 25 feet lower than elevations given page 12, 13.

(11H2 a, b, c) Ambocoelias, Dalmanites?, Leptodesmos, Rhipidomella, Lingula, etc.

Leiorhynchus sp. - thin flags & blocky shales. 11 H1.

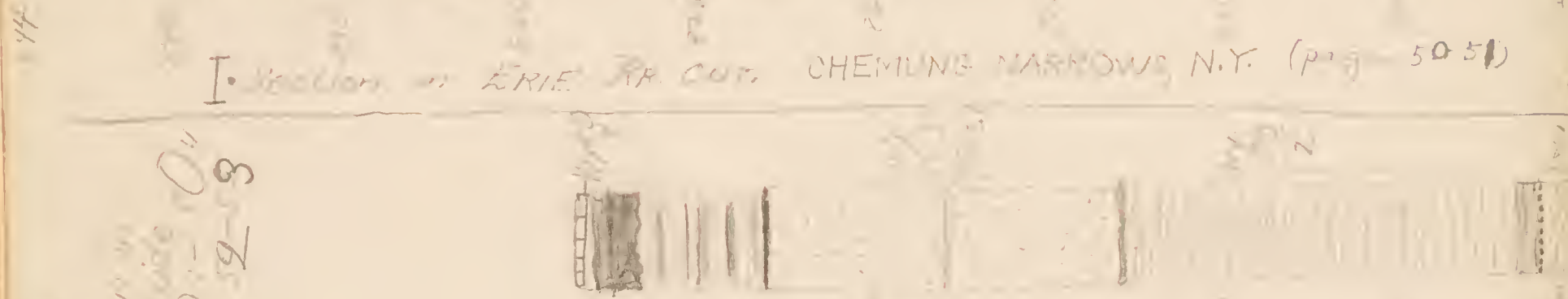
Section up Deputron Hollow (Dr. 11d, 12 cl), pages 4
13, 14, 87-90.



1894

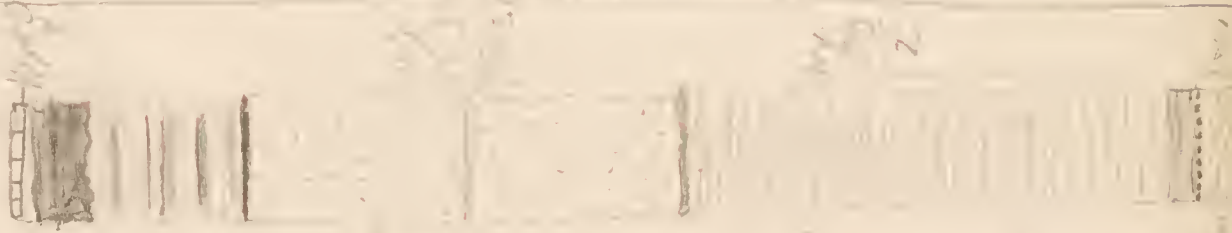


I. Section at ERIE RR CUT, CHEMUNG NARROWS, N.Y. (p. 50-51)



II

Section in
middle of
W.P. 1-0
page 52-53

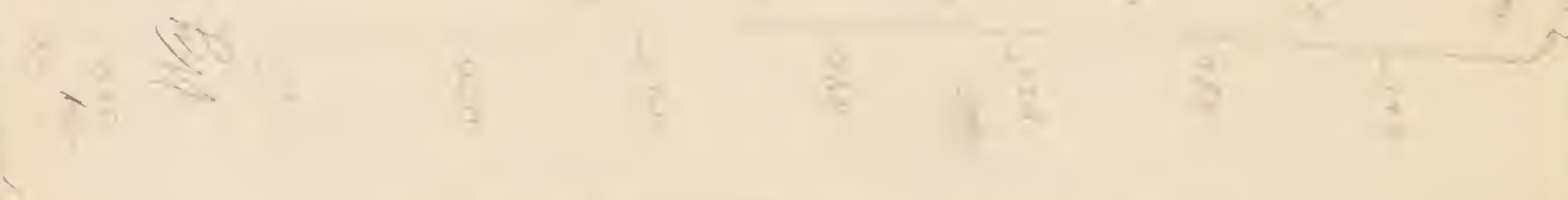
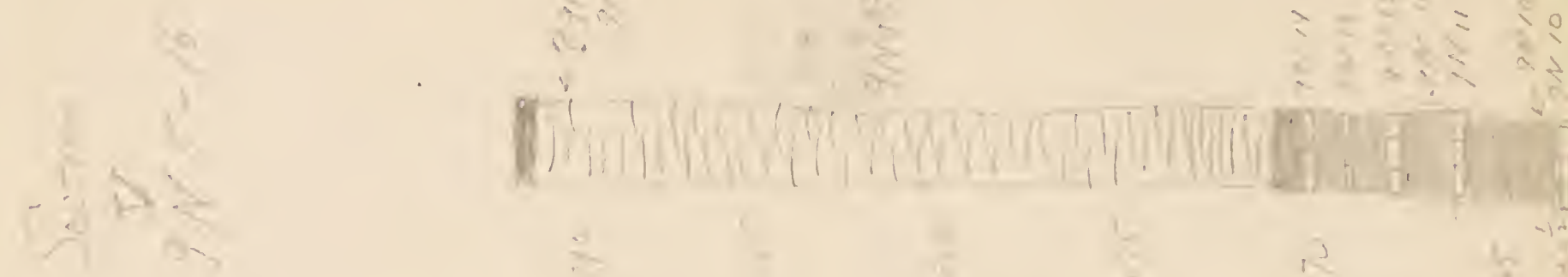


III

Section in
middle of
W.P. 1-0
page 52-53



1894



*

* Position in relation to other sections approximate.

Pencil lines represent dip.

Probable dip

HORIZONTAL SCALE.
VERTICAL SCALE.

1 SQUARE = 80 feet
1 SQUARE = 25 feet.

Conglomerate #
? 1265
page 61.

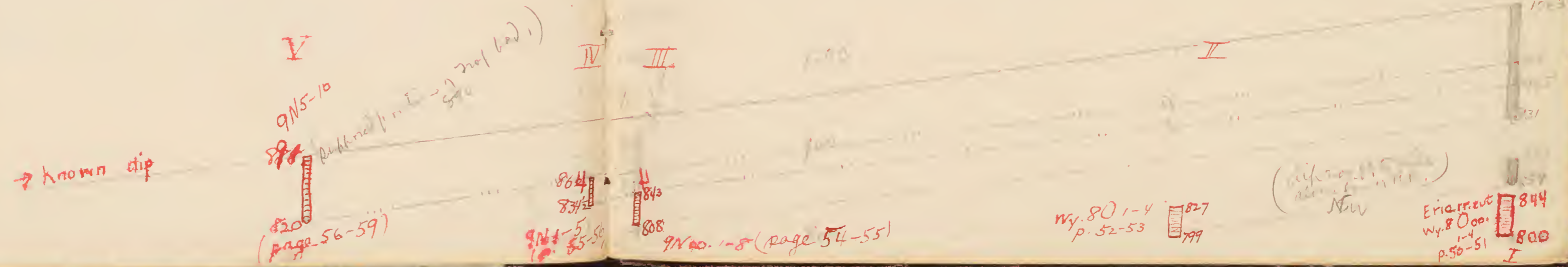


Diagram of Sections at Chemung Narrows.

All five sections are exposed along a practically straight line extending N. of N.W. The lowest (and most southeasterly) section I is that exposed in the Erie RR cut, showing 44 feet of strata. The second section is about 400 yards northwest; ~~between~~ The top of the first section is at 844; the base of the second is at 799; the latter is however (stratigraphically) about 15 feet higher than the top of the first section. This is shown by the penciled line (representing dip, N.W. = 200 ft. per mile.) extending from 799 (in the 2d section, to the figure 859 above no. I.). In the same way, there are shown pencilled lines extending from the base of each section, and which show the exact STRATIGRAPHIC relation of the sections to each other.

wy. 801-4
p. 52-53

Erie RR cut
wy. 800
p. 50-51

9V40.1-8 (page 54-55)

9V50.1-50.2 (page 56-59)

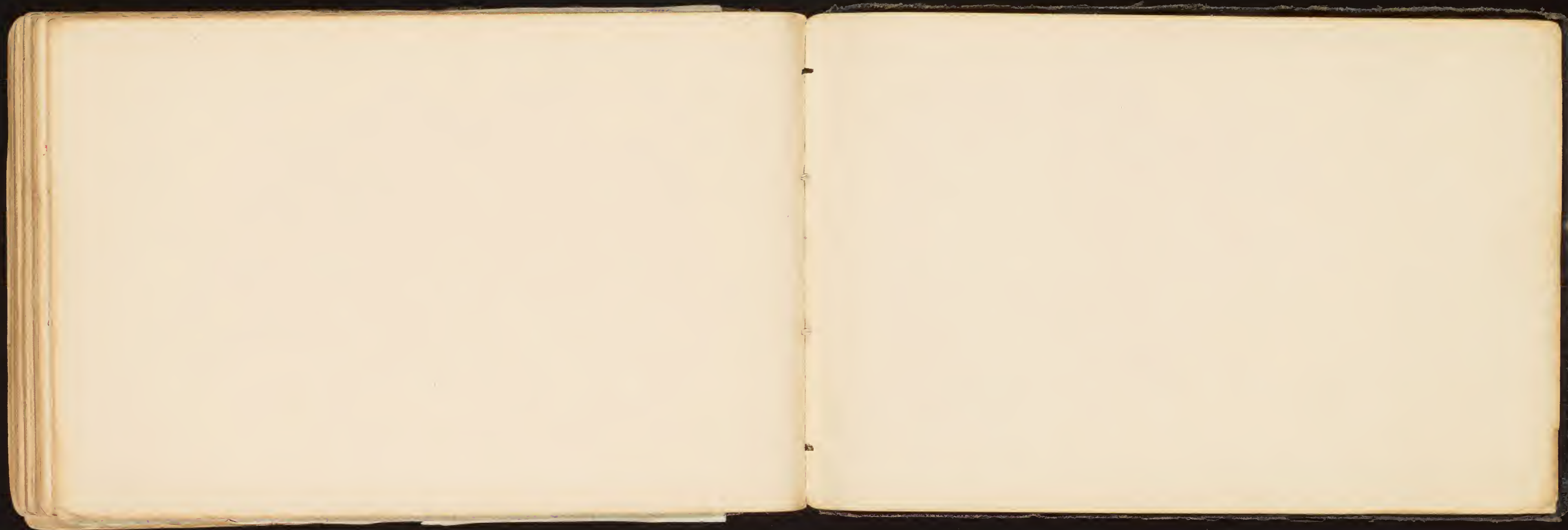
100

C

*

木
52

4



DESCRIPTION

The United States Geological Survey a topographic map of the United States work has been in progress since 1882, one-fifth of the area of the country, Alaska, has been mapped. The maps are widely scattered, nearly every State represented, as shown on the accompanying each annual report of the

This great map is being published in sheets of convenient size, which are in parallel and meridians. The four-cornered portion of land corresponding to an atlas is called a *quadrangle*. The sheets are approximately the same size: the paper dimensions are 20 by 16½ inches; the map occupies 11½ to 16 inches

Section up Swartwood
Road from 7B to 9C.

1. opposite house of Jim Wood-
over in road at 10 feet f
gray & olive iron stone shales
Two fossils of Spirifer maccosi
also found in talus - 1065 to
1075 AT 7A1. The upper portion
of these beds continues into the
creek just west of the 2nd bridge
below the small falls of 2 ft.
Where exposed in the bank of the
stream the shales are
blocky and contain a con-
spicuously rich fauna of
Spirifer, Schizophoria, Productella
Dionides coronatus or scutellus
Spirifer disjunctus? Ambocoel-
ia unilobata Lingula
complanata, Pterinea, Orthis,
Chonetes, Chemungensis, Leior-
hynchus westonensis, An-
cipiter etc 1375 - 79. (7A2)

A 6 inch hard ss. band forms a small 2 foot
fall over 7A2. The shales similar to 7A4
continue 15 ft. above the ss. band

100 yds to the S.W. crop out on the road bank
about 90 ft of similar shales with a similar fauna
characterized by *Leiorhynchus* but in which no

Chonetes is found. *Spirifer mucronatus* &
disjunctus also quite common in some beds

There are 5 or 4 6"-8" bands of ss. with many smaller
bands of more aren sh. In the latter fossils
are ~~quite~~ common. There is a dip of 50 ft. per

mile a few ° east of N. These beds are from 1090 to
1175 A.T. The remaining beds are covered but

② some distance westward, on the south side of the road, from 1215 to 1245 A.T. are 30 feet of sandy and flaggy beds with little if any blocky shales, but with a small amount of more laminated shale. No fossils found except in one of the harder layers at 1235 A.T. The fossils here are Schizophoria, Crinoids and a few Productellas. B5. About 100 yds W of S. in the bank of the stream at 1220 A.T. the same bed is found with also Spirifer digimetus, showing a declination of about 125 ft per mile

Just above this zone in the bank of the
stream but apparently (not in situ) is found
a brown flaggy layer with *Schizophoria*, *My-
ressa*, *Leptodermas*, *Ambocoella* & *Spirifer*
micronatus. (WY 7 B 5½)

In the roadside from which WY 7
B 3 comes, there outcrops at 1105 A.T.
a very hard band of gray ss. with some
calcareous material. Iron near the sur-
face this band is colored a deep brown
by the iron. The thickness varies from
4 inches to 8 inches being deposited be-
neath or wave depressing. In these

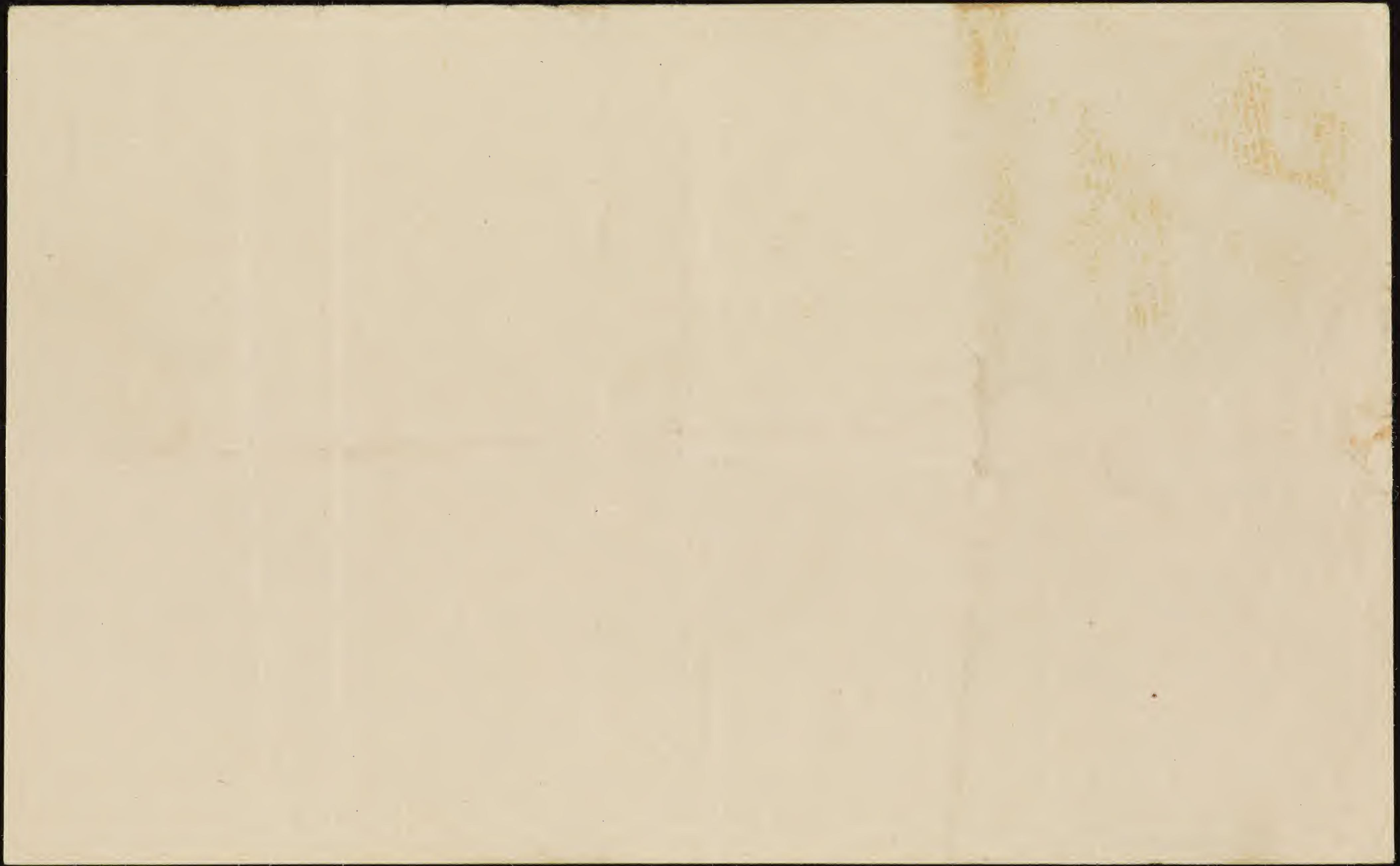
③ small basins as it were fossils
are extremely numerous. In the lowest
rock there are great numbers of very
small Ceratopores which die out
Above this is a band full of Productella
Orthis impressa, Spirifer planus or goster
and a single Tridacnoid Leptodesma
The upper $\frac{2}{3}$ of the ss band are barren
and where the band is thinner than
usual no fossils are found. This band
shows a dip of 50 ft per mile. A few
Above this band at the S.W. end of the
outcrop are 5 or 6 ft. of blocky shales, but
in about 100 ft. going N.E. these shales

increase over 1 foot in thickness
The higher hard bands are mostly
barren. The upper portion of the
outcrop is less fossiliferous than the
lower. In a few places there are
clusters of *Lecanospira* ~~*but*~~ *but*
costalis, but a very larval form
of *S. pumilus* is predominant. Few
if any specimens of *S. disjuncta* have
been found in this outcrop.

4. In the bed ^{of the} creek at 1180-90 AT.
are some blocky shales with a hard
band at 1182 and some hard bands
in the upper portion. Just below the
the lower hard band for 1 foot fossils
are numerous. There is a band of
Productella, *Orthis impressa*, *Leptocyclus*
mesostolus, while a couple of inches
higher but still below the hard band
are found some immense *Spirifer posterus*
3 1/2 or 4 inches across, and a large
Pterinea channingensis together with
a few specimens of *Ceratopora dichotoma*.
These fossils are Uy 7 B 4.5.

Ny 7B10.1. This is just under 7B11 and
is a three inch hard ss. band which
does not weather into rotten rock.
Spirifer granulatus & *Cypricardella*
bellastriata are the commonest
fossils. *Schiz. impressa* though
quite common is less so than in
the lower bands. *Tropidoleptus car-*
natus is present in the lower part
of the band to which the *Orthis*
are almost entirely restricted. *Atrypa*
aspera is absent. A very large *Modi-*
orpha cf. *mytiloides* was present

as were some *Pterinea*, *Leptodesma* etc
Wg. TB10.2 is the next lower band. It is
between $2\frac{1}{2}$ & 3 inches thick. On the
upper and lower sides there is a thin
hard band varying from 0 - $\frac{1}{2}$ inch thick
and enclosing the middle portion which
when exposed, is a rotten brown rock
composed of casts of *Schizophoria ingressa*,
Atrypa aspera



Thursday

By 6 B1. On the road in the NW corner of 6 B, is a hard jointed 6" band covered by by 18" of brown iron stained (blue) shales. *Stroph. capita* is very common in the shales. A few specimens of a small *Oriskany* was only other pieces observed. The altitude given on slip in green = 1015; ~~should be 1012~~

At 1025-31 on the railroad bank ~~tracks~~ are found some coarse shales with some flags. These beds are barren and are not far below 7 B1. The dip is quite heavy fully 50 ft. or more per mile N. about 15° W.

By 7 B1. In the middle part of northern 7 B on south bank of north branch of stream 1235' to 1245'. Blocky shales with a rich fauna of *Productella*, *Spirifer mesa*

costalis, *Orthis regressa*, *crinoid* joints
Above these beds are some soft, argillaceous,
barren shales grayish brown in
color and not blocky.

Near the boundary between 6A & 6B at 1576 A.T
there crops out in the roadside the Tropido-
leptus zone 6B1. The rock is a very hard
coralline ss. above which is the usual
rotten rock. *Otrypa aspera* is as usual the
commonest species. Together with *Product-
ella lachrymosa*, *Schizophora impressa*,
Strophonella colata, while among the
lamellibranchs several specimens of *Schizo-
dus channingensis* were found together
with *Leptodesmas*, *Synoplecter*, & a
large *Pterinea channingensis* covered
by an *Aulopora* coral growth. The coral
of the coralline ss. is a *Verbinolia* or

called Cyathophylloid coral and is also
found in the rotten rock. The same
fauna occurs at Cheung Narrows.

6A1. On the roadside in the N.E.
part of 6A, at 1573 A.T. only 3 feet
lower than 6B1 the same zone is found

(2) at Foucks land than in Swartwood
Hollow, this shows a general W. of N. dip.
This result is also verified by the fact
that the coral *Tropidoleptus* zones in
6A & 6B show the same dip. It
must therefore be accepted that the
dip between Vanetten's & Foucks is
local though very heavy. The Ambro-
cocelia band contains great nos. of
Ambrococelia, with a few *Strophodont*,
a *cypta* and a couple of *Spirifers*.

Tropidoleptus (Boral)
zone in S.W. corner
of 9A at 1690[↑] A.T. This zone crops
out on the land of Geo A Fouck, n.w.
1/8 mile from the house of Geo Smith
(occupied by Fouck). Borals are fairly
common in the zone. In addition to
the outcrop, in situ there are great
slabs of blue fossil rock strewn a-
round the field.

9 B1. — This is the Ambocoelia zone.
Its best outcrop is ^{front of} at the house occupied
by Jno Vanetten, in ~~the~~ roadside at
1770 ft. A.T. The same band crops out
in the roadside in front of the
house occupied by Hauck, ^{at 1737} but there
is a descent of 35 ft. This shows a
dip N.W. very heavy. (The house
occupied by Jno. Vanetten is on the
~~road~~ ^{road} running about E. & W. while
Hauck's residence (owned by Lew Smith
estate) is ^{on road} more N.W. running N. & S. But
as the Inopidoleptus zone is higher

2. ~~2.~~ The *Amalocochia* zone of Wy 9 B?
is found (but not in place) at 1940 where several
slabs are found with the thin rotten seams
of fossils as at Wy 9 B on the road in
front of the house in a part of Sth 10 M.
There is every reason to believe that the
outcrop in situ is about here. But 50
feet higher is a thick firestone
which may be the *Tropidoleptus* zone
but the rock surrounding the rotten
portion is usually a white soft ss. and
neither *Tropidoleptus* nor corals have been
observed in the field. The firestone is

which, and contains the usual brach-
iopodal fauna of the Trepidoleptus zone
see 10 N, 1.

~~A single slab of what is probably~~
~~from the Trepidoleptus zone~~
Stk 17 L. Beginning at the house on the
N.E. corner of Stk 17 L at 2640 there is
a section of nearly 40 ft. in the ditch
up to the road corner at 1680 A.T. The
rocks are blue with some gray and red
shales with a few hard layers and a
couple of columnar ss. bands. Fauna of
Artus impressa & Acensis, Stroph. sayuta
and Atrypa aspera

is, Sp. Peltopyrus of Catskillensis Lepto-
decimas and an Orthis-like Thelid
State people collected from this locality in
road bed and road bank

Loc 8 L. Hard blue stained and gray beds
with a sparse fauna of Leptodermas Ambro-
cocha etc at about same horizon as 7 D. 2
probably just immediately beneath the
latter. What is probably the same beds
as 8 L, are at the road corner in
s.e. of center of L. Both lithologically
and faunally there is a strong
link to the Ambocochea zone of my 9 B.

Itiv
6L1. In western part of 6L at 1760 A.T. some
Leptodesmus and Spirifer mesacostalis
Rocks gray coarse shales with soft
blocky red stained shales along roadside

7L1. In the center of 7L at 1810 A.T. a
firestone with *Atrypa reticularis et aspera*, *Pro-*
ductella lachrymosa, *Schizophoria impressa*
etc

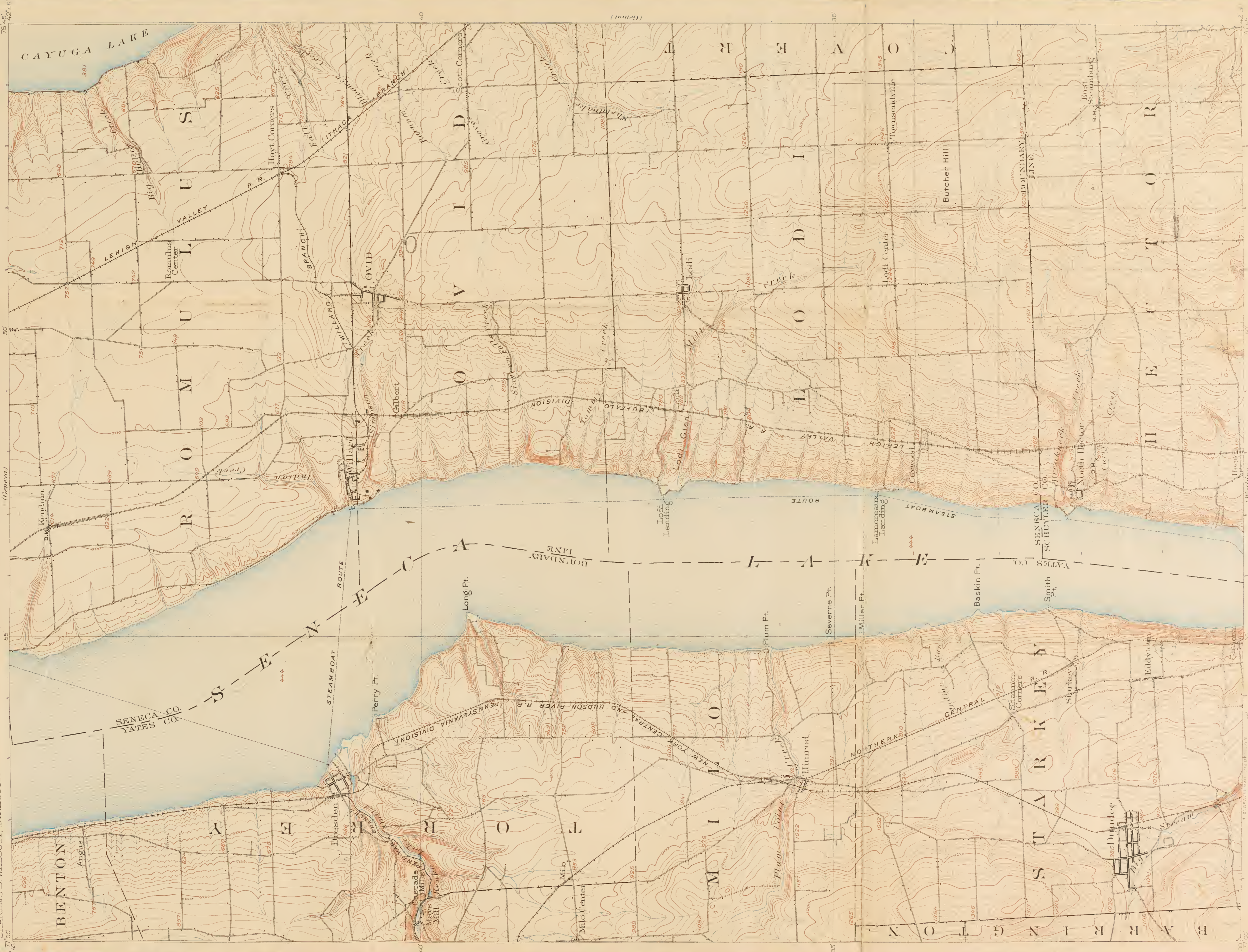
7L2. On the road running N. & S. in
7L at 1855-68. red blocky shales and
hard layers similar to 6L but with
a fauna characterized by *Camarotoechia contracta*
and duplicata, *Tetorhyuchus mesacostalis*

TOPOGRAPHIC SHEET

U. S. GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

STATE OF NEW YORK
EDWARD A. BOND
STATE ENGINEER AND SURVEYOR

NEW YORK
OVID QUADRANGLE



U. S. GEOLOGICAL SURVEY
H. M. Wilson, Geographer in Charge
Control by W. T. Griswold and J. H. Wheeler
Photograph by J. H. Penning and J. M. ...
Approved in cooperation with the State of New York

Scale: 1:62,500
5 Miles
5 Kilometers

Contour Interval 20 Feet
Datum is mean sea level

Published June 1902

DESCRIPTION

The United States Geological Survey a topographic map of the United States has been in progress since 1880. One-fifth of the area of the country, Alaska, has been mapped. The maps are widely scattered, nearly every represented, as shown on the accompanying each annual report of This great map is being published sheets of convenient size, which are parallels and meridians. The four- tion of land corresponding to an called a *quadrangle*. The sheets are mainly the same size; the paper is 20 by 14½ inches; the map occupies inches of height and 11½ to 16 inches wider varying with latitude; however, are employed. The largest, 1:62500, or very nearly one mile to one inch; i. e., one linear mile on the ground is represented by one linear inch on the map. This scale is used for the thickly settled or industrially important parts of the country. For the greater part of the country an intermediate scale of 1:125000, or about two miles to one inch, is employed. A third and still smaller scale of 1:250000, or about four miles to one inch, has been used in the desert regions of the far West. A few special maps on larger scales are made of limited areas in mining districts. The sheets on the largest scale cover 15' of latitude by 15' of longitude; those on the intermediate scale, 30' of latitude by 30' of longitude; and those on the smallest scale, 1° of latitude by 1° of longitude.

The features shown on this map may, for convenience, be classed in three groups: (1) *waters*, including seas, lakes, ponds, rivers and other streams, canals, swamps, etc.; (2) *relief*, including mountains, hills, valleys, cliffs, etc.; (3) *culture*, i. e., works of man, such as towns, cities, roads, railroads, boundaries, etc. The conventional signs used for these features are grouped below. Variations appear in some maps of earlier dates. All water features are shown in blue, the smaller streams and canals in full blue lines, and

datum or zero of elevation being mean sea level. The contour line at, say, 20 feet above sea level is the line that would be the seacoast if the sea were to rise or the land to sink 20 feet. Such a line runs back up the valleys and forward around the points of hills and spurs. On a gentle slope this contour line is far from the present coast line, while on a steep slope it is near it. Thus a succession of these contour lines far apart on the map indicates a gentle slope; if close together, a steep slope; and if they run together in one line, as if each contour were vertically under the one above it, they indicate a cliff. In many parts of the country are depressions or hollows with no outlets. The contours of course surround these, just as they surround hills. Those small hollows known as sinks are usually indicated by hachures, or short dashes, on the inside of the curve. The contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval varies according to the character of the area mapped; in a flat country it may be as small as 10 feet, in a mountainous region it may be 200 feet. Certain contours, usually every fifth one, are accompanied by numbers stating elevation above sea level. Many other heights, instrumentally determined,

PRINTED STATES

When given, the number in each case being in close proximity to the point to which it refers. Works of man are shown in black, in which all lettering also is printed. Boundaries, State, county, city, land-grant, reservation, are shown by broken lines of different kinds and heights. Cities are indicated by black squares representing the built-up portions, and houses by small black squares. Roads are shown by fine double lines (full for the roads, dotted for the inferior ones), trails by dotted lines, and railroads by full black lines with cross lines. Other cultural features are represented by conventions which are easily understood.

The sheets composing the topographic atlas are designated by the name of a principal town or of some prominent natural feature within the district, and the names of adjoining published sheets are printed on the margins. The sheets are sold at five cents each when fewer than 100 copies are purchased, but when they are ordered in lots of 100 or more copies, whether of the same sheet or of different sheets, the price is two cents each.

The topographic map is the base on which the facts of geology and the mineral resources of a quadrangle are represented. The topographic and geologic maps of a quadrangle are finally bound together, accompanied by a description of the district, to form a folio of the Geologic Atlas of the United States. The folios are sold at twenty-five cents each, except such as are unusually comprehensive, which are priced accordingly. Applications for the separate topographic maps or for folios of the Geologic Atlas should be accompanied by the cash or by post-office money order (not postage stamps), and should be addressed to—

THE DIRECTOR,

United States Geological Survey,
Washington, D. C.
September, 1899.

CONVENTIONAL SIGNS

CULTURE
(printed in black)

RELIEF
(printed in brown)

