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Breger

U. S. GEOLOGICAL SURVEY.

9-889

C.B. (9-161.) # II

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UNITED STATES GEOLOGICAL SURVEY.

Note Book

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Notes-Book No. 1.

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Note-Book

No. 1.

June 10, 1907. p 33

to

July 5 1907 (p 22)

Eastport 1

LIGHTS / 2 3 4 5

(an elevation of 15 feet above the level of the sea.)
ashes, Rev. Revolving, W. White, R. Red, G. Green, and varied by

Latitude West Longitude	Character	Interval bet. Flashes	Color or Structure	Height above Sea	Visibility Naut. Miles	Fog Signals
42° 14.2'	F. G.		White	51 ft.	10	Horn*
4 27 24.0	Occ. W.	0 ^m 05*	White	45 "	12	Horn*
4 27 36.1	F. W.		White with Red Cross	64 "	13	Trumpet
4 27 38	F. W.		White	130 "	15	
4 28 03.2	F. W.		White	40 "	10	Horn*
4 28 11.4	F. W.		White	42 "	10	
4 28 32.2	F. W. & W. Fl.	0 ^m 30*	White	76 1/2 "	12 1/2	Bell*
4 28 40.6	F. W.		White	32 "	10	
4 28 50.6	F. W.		White	32 "	10	
4 28 54.7	F. R.			29 "		
	F. W.		White	48 "	12	Trumpet
	F. W.		White	34 "	7	BELL

ded in answer to signals

21 22 23

10 feet difference of level
 quays on the hills denote
 etc.

31 32

41

51



Tuesday, June 18, 1907

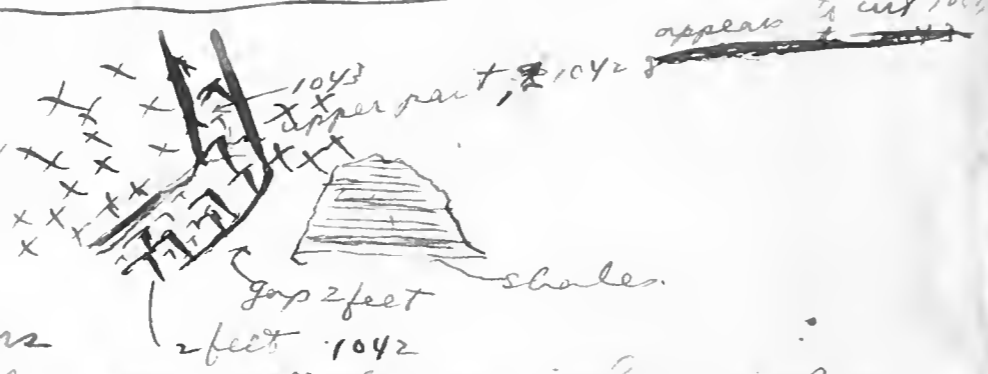
Blackford Head

West of Blackford Head from the factory eastward there is a fine series of exposures of rhyolitic ash or breccia. These ash beds differ from those of Kendall Head & Northern Moore Island in having a lavender pink matrix instead of the gray or olive green matrix. In places this rock assumes the character of matrix material pink rhyolite but generally the fragments included are quite conspicuous. A few specimens no. 1040 were collected on the north side of the road in front of the house opposite the fish factory. No. 1041 is a similar fragment from the shore 100 feet east of the factory, and which shows the included "pebbles". Throughout the rock these stand out upon weathered surfaces like lumps of feldspar nearly white or cream color. Other inclusions are larger fragments of dark red glassy rhyolite or feldspar, small pebbles of light gray acid rock, rarer fragments of dark nearly black basic lava, and dark purple fragments. None of the fragments exceed three quarters of an inch.

65.7

In the west shore of Broad Cove (= cos. A of Prof. Williams), occurs a little patch of gray shale striking N. 75° W., dip 21° a section N. 15° E. This little patch of shale is a 10' x 10' square and 5 feet high and occurs at the east end of a rhyolite flow. The exact locality is just above the 2nd. winding above the "L" in "stk", and at the west end of the little cove. The fossils in this little patch include great numbers of ostracodes (Peyriclia, P. schumina), a few Bryozoa, and a few Bryozoa (one specimen shows 2 or 3 cardinal teeth). A few Lingulella = 65.7a

On the west of this patch of shales is what appears to be a rhyolitic flow. Between the flow & the shales is a very dark dike-like rock. The lower part of which bears a dip of N. 10° E., but the upper part is suddenly deposited to the vertical and bears about N.W. This upper part contains large pyrite crystals half an inch thick = 1043. It appears to be intruded into the rhyolite as glassy rhyolite with "flow lines" appear on both sides of it, up to the shales on the east, & extending westward. The shore cliff is composed of pink rhyolitic rock which exhibits horizontal flow lines and a rude columnar structure. These flow lines stand out on weathered surfaces. A few specimens 1044 show them quite well. The matrix is glassy & nearly dark purple, becoming purple in spots. On the west side the lava gradually becomes gray or greenish and in spots is quite gray. At a little point there occurs some ash or possibly a flow breccia. A specimen was collected 1045, showing the gray-green matrix.



No. 1041 b is a specimen from the hill north of the highway in west-central 6:5:4. It shows the lavender purple matrix & "pebbles". The rock composes this hill.

Wednesday, June 19, 1907

At the head of Deep Cove, on the south side (opposite pt 3) some 70 yards, a thin one foot thick rhyolite rock, 1046 projects up into the sky with a sharp cutting line. The rhyolite continues in beautifully worn cut sea cliffs (caverns underneath at base of joint glass) for about 100 yards south, when the pink rhyolite is succeeded by a gray volcanic weathered surface of which are sometimes black, occasionally dark brown. A few scattered amygdalae occur in places in this rock which is 1047. This rock appears to overlie the pink rhyolite but the appearance as indicated in the figures may be due to recent erosion. There is a slight ledge on the north side above A (rhyolite), and on the north side above B (gray rock) overlying the 1047 rock. The rock composing 1047 forms low ledges in contact with the wave cut cliffs of rhyolitic rock.

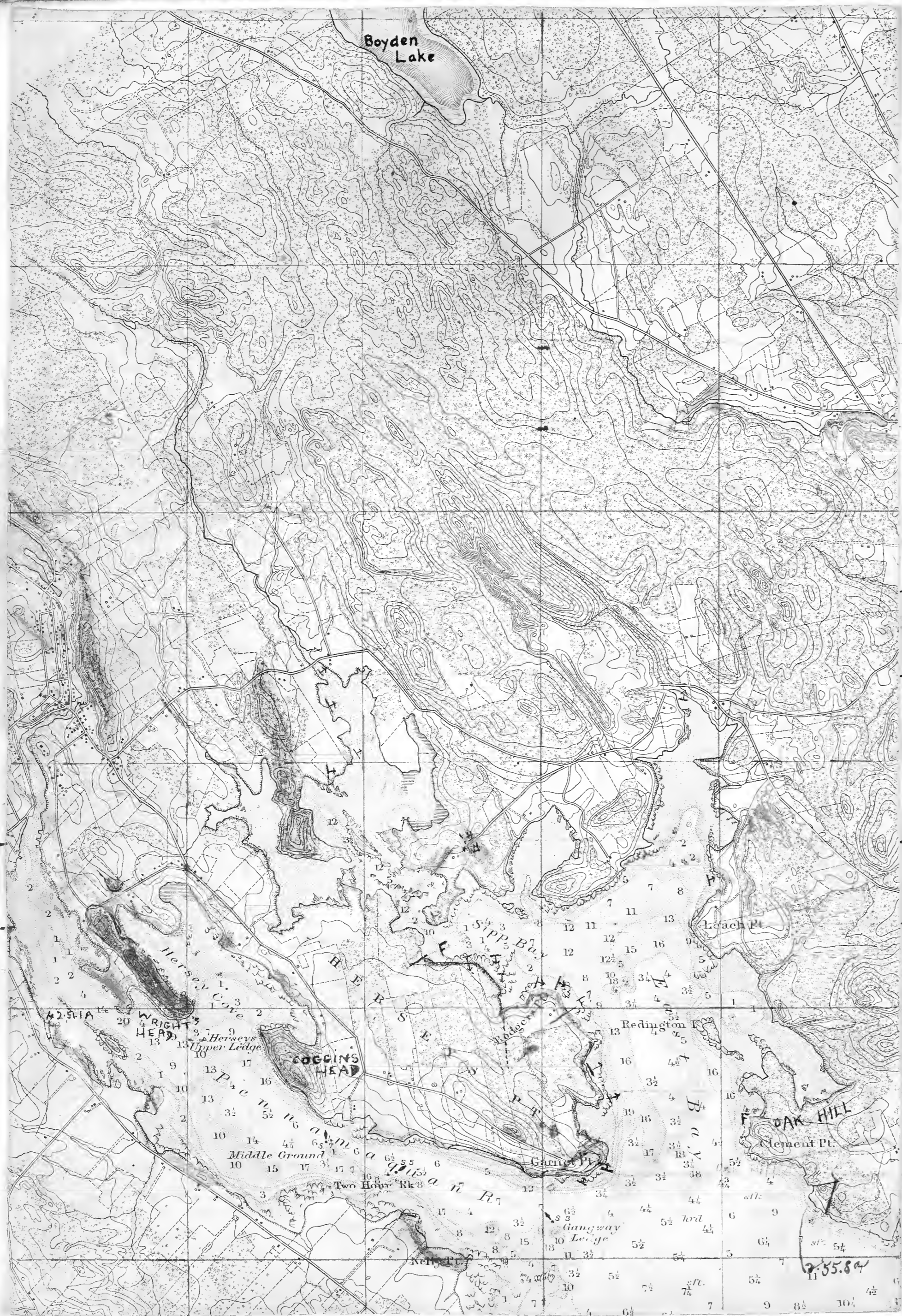


Figure 2 represents a little section on the west side of Blackford Cove, in the middle of the little cove, in the line with one of the 6:4:9. "a" is the lowest rock on the south side and represents a rhyolite flow with very coarse breccia with a dip of N. 25° W. & a dip of 40° to the N. 60° E. "b" is a harder dark purplish flow with a dip of 40° to the N. 60° E. The darker harder lava is about 11 feet thick. "c" is succeeded by some rocks 13 feet thick which at a distance resemble resinous light gray colored shales, but when examined more closely are seen to be very fine grained soft shaly beds of a very light gray color with dark green spots and numerous inclusions of pink rhyolite the latter 1/4 to 1/2 inch thick rarely an inch thick. "c" is followed by some hard beds. "d" which vary from 0-15 feet within a distance of 50 feet N.W. In the top the rock is a hard ash-like bed which is strictly banded in the upper part. "e" The top of the section is formed by an exceedingly interesting mass of ash beds. The matrix is a very hard dark purple glass similar to many of the hard fragments of dark purple rhyolite in the Perry. Included in the mass of dark purple matrix there stand out light gray colored spots which when examined are seen to be the common gray Silurian shales. These shale inclusions are generally 1 to 3 inches thick & more or less rounded, - rarely a fragment becomes to a foot thick. Besides the typical light gray shaly beds which are included fragments, there are also included red and gray mottled dust like fragments similar to those occurring in 3, 4, 4, 7. There are also bed fragments of some of them nearly a foot thick over

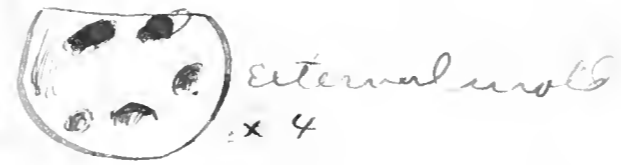
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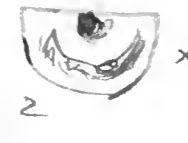
flow lines = 2 feet thick. The flow planes strike of 40° to the N. 60° E. "b" is a harder dark purplish flow with a dip of 40° to the N. 60° E. The darker harder lava is about 11 feet thick. "c" is succeeded by some rocks 13 feet thick which at a distance resemble resinous light gray colored shales, but when examined more closely are seen to be very fine grained soft shaly beds of a very light gray color with dark green spots and numerous inclusions of pink rhyolite the latter 1/4 to 1/2 inch thick rarely an inch thick. "c" is followed by some hard beds. "d" which vary from 0-15 feet within a distance of 50 feet N.W. In the top the rock is a hard ash-like bed which is strictly banded in the upper part. "e" The top of the section is formed by an exceedingly interesting mass of ash beds. The matrix is a very hard dark purple glass similar to many of the hard fragments of dark purple rhyolite in the Perry. Included in the mass of dark purple matrix there stand out light gray colored spots which when examined are seen to be the common gray Silurian shales. These shale inclusions are generally 1 to 3 inches thick & more or less rounded, - rarely a fragment becomes to a foot thick. Besides the typical light gray shaly beds which are included fragments, there are also included red and gray mottled dust like fragments similar to those occurring in 3, 4, 4, 7. There are also bed fragments of some of them nearly a foot thick over



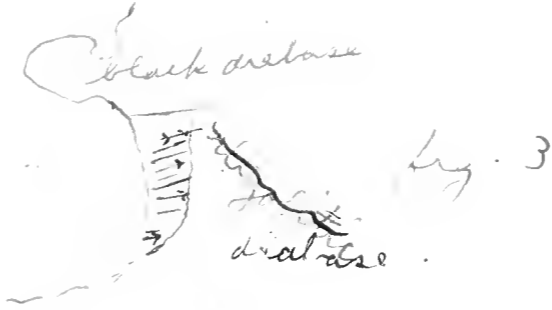
There are also included large chunks a foot thick, of beautiful flow breccia show the flow lines in the light colored interstices. The matrix of this flow is dark purple. There are also dark gray & red shaly beds which contain fossils = 6.4.9. a. Fossils also occur in other beds.



gibbous
x bilobed
stratified



also occur in other beds shale part - or a red set of pebbles from separate pebbles in layers 6.4.9a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z. 6.4.9c very much resembles the fossiliferous seams of 6.4.7x, of also below.



In the little cove in Fig 3 (S.W. part) 6.4.9 occurs a ~~small~~ line of exposure of shale about 250m long. The seams are probably gray in color, very fossiliferous in seams and contain scattered calcareous lenses 1 inch to 1 1/2 inches thick & some to a foot and a half long. These seams some conglomerate are merely masses of The shales are 66 and 70° as taken in 2 sections ~~at~~ N. 70° E and strike N. 20° W. About 10 feet of shale ~~is~~ are exposed below a 1 1/2 foot quartzitic band above which appear in places a bit of my fossiliferous gray shale

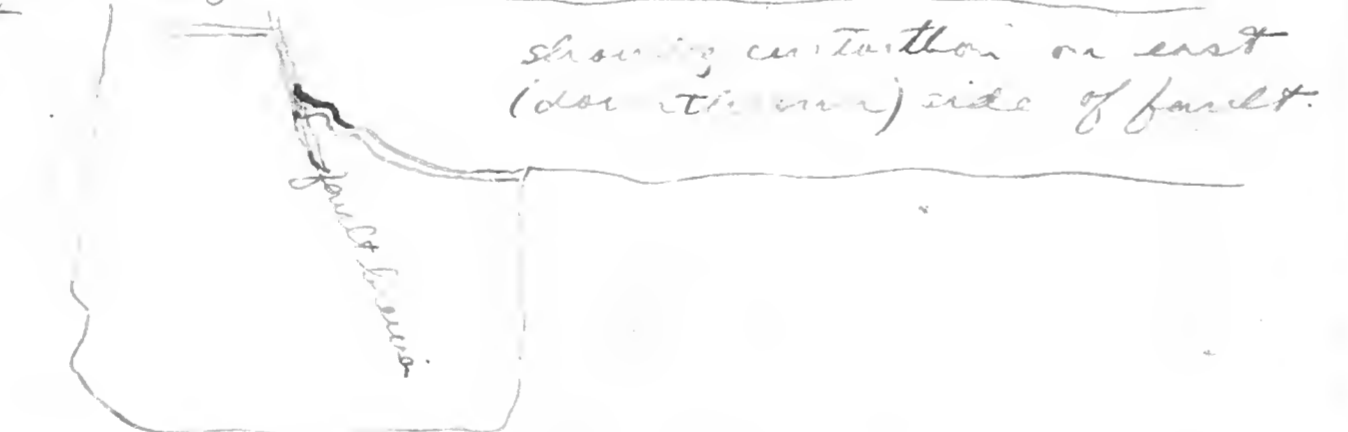
6.4.9 m

Thursday June 20, 07.
Spent in collecting fossils from west side of Blackford Head = 6.4.9 m, p. 5, and the northwest corner of Broad Cove = 6.5.7a. p. 2.

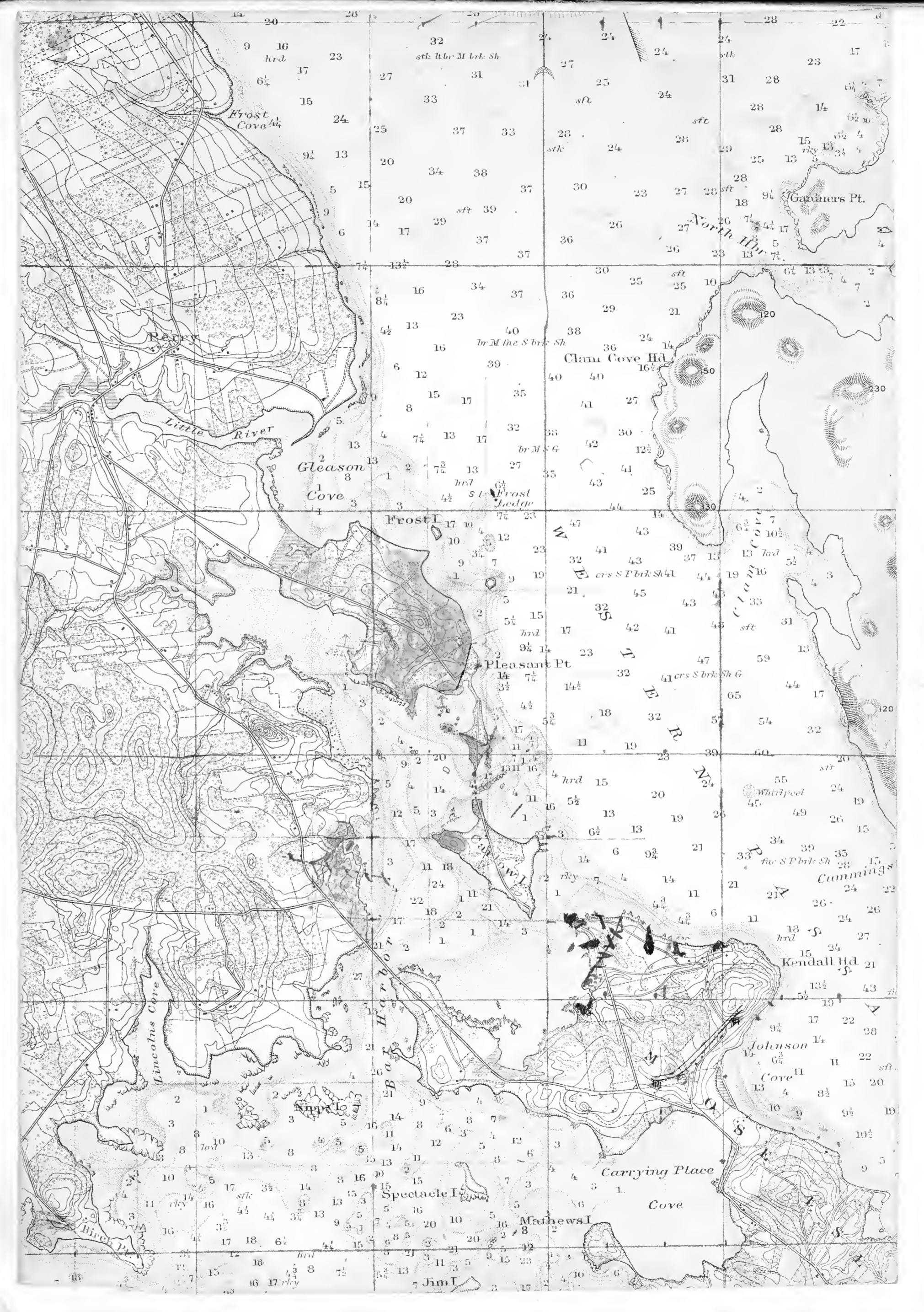
Friday, June 21, 1907.

6 In the northeast corner of Broadlove below the letter A in Eastport ^{shore} ~~east~~ empty two little streams (only one on map) which run in their lower portion over glacially striated ^{darkish} ~~darkish~~ limestones of fossiliferous shales & limestone seams. The shales are gray in color and rather coarse. The calcareous seams are very abundant especially in the ^{upper 2' thick} ~~upper 2' thick~~ and are from 1/2 inch to 1 1/2 inches thick generally an inch they are full of fossils which are unfortunately unrecognizable. A few fragments were collected (= 6.5.6a). The fauna includes a few ostracods, a Modiolopsis (not collected) and a rare Lingula. The rocks strike W. 7° N. x E. 7° S. and dip at ~~an~~ heavy angles, - 66° in the lower part (merely vertical in places) and 51° in the upper part, direction N. 7° E. Perhaps 50 ft. of strata are exposed.

By ^{south} ~~way~~ ^{way} of the little ravine (near the middle of 6.5.6, west of S. of the letter E in Eastport, there is a series of long exposures of shales and calcareous seams, evidently of the same series as the rocks including 6.5.6a above. The beds dip 45° direction N. 7° E. strike W. 7° N. by E. 7° S. The calcareous seams are here quite abundant, as in the preceding outcrops. One calcareous band was 5 inches thick. The gray shales resemble ^{fine grained} ~~fine grained~~ beds in their fine grain & in the appearance of a network structure. The soft shales contain some seams of Modiolopsis. The calcareous layers mostly contain shells & ostracods. A few thin bands of quartzitic sandstone usually found, banded the fine lamination showing cross bedding. A rare Lingula is scattered through the shales & a seam of Modiolopsis was collected. A ^{small} ~~small~~ gastropod is also present but very poorly preserved. Fossils 6.5.6 b. About 25 ft. from the east end may be observed a fault extending N. 26° W. with the east side pushed to the south about 7 feet & vertical depressed about 4 feet.



Just near the west end of 6.5.6 (at the west end of the little smooth patch of S.W. shore line on map) the gray shales are followed by reddish purple beds which feel like shales but are ~~not~~ without the slightest trace of fossils and which probably represent purple volcanic flows. There are no foreign inclusions. At this point a thin one foot wide of light gray pyritiferous rock cuts across both the gray shales & the purple beds. This dike dips about 45° eastward, extends N. 2° E. x N. 104° 10' 48". Twenty feet to the west the purple rocks are again cut by a dike. This dike is thicker about 10 feet across and extends N. x S. It is 10 1/2 feet wide & another thick dike which penetrates up into the gray shale but does not pass through and the broad blunt top is ~~not~~ covered with shales & calcareous seams. That the latter

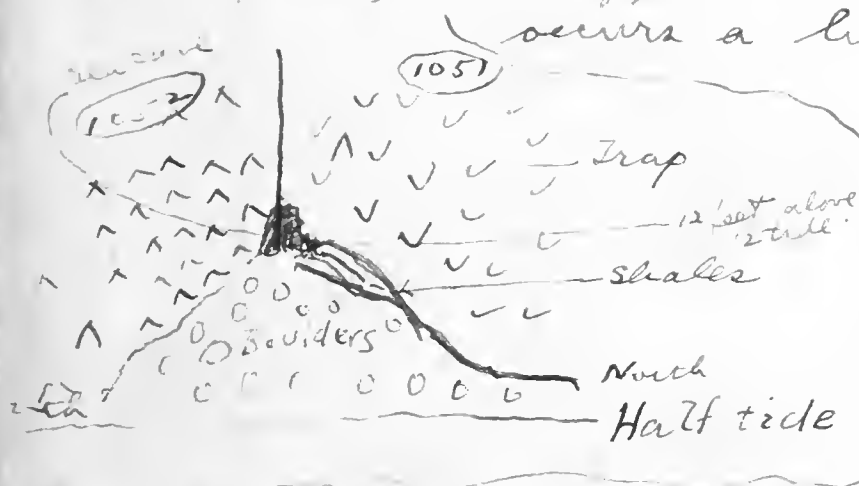


are older than the dike and not deposited on the dike is proved by their being later at the contact. This dike is 1050 and with 1049 and 1048 appears to be offshoots from a more ~~to be~~ ^{present} south ~~1050 & 1049~~ appear to be forks of the same offshoot.

In the southeast corner of 6.5.5 lamellibranchs are abundant in the thin gray shales which appear to be the same as the thin gray shales and beds of 6.5.6a. These lamellibranchs are 6.5.5.a. The shales here dip 24° N. 12° W., strike E. 10° N x W. 10° S. (= N 80 E)

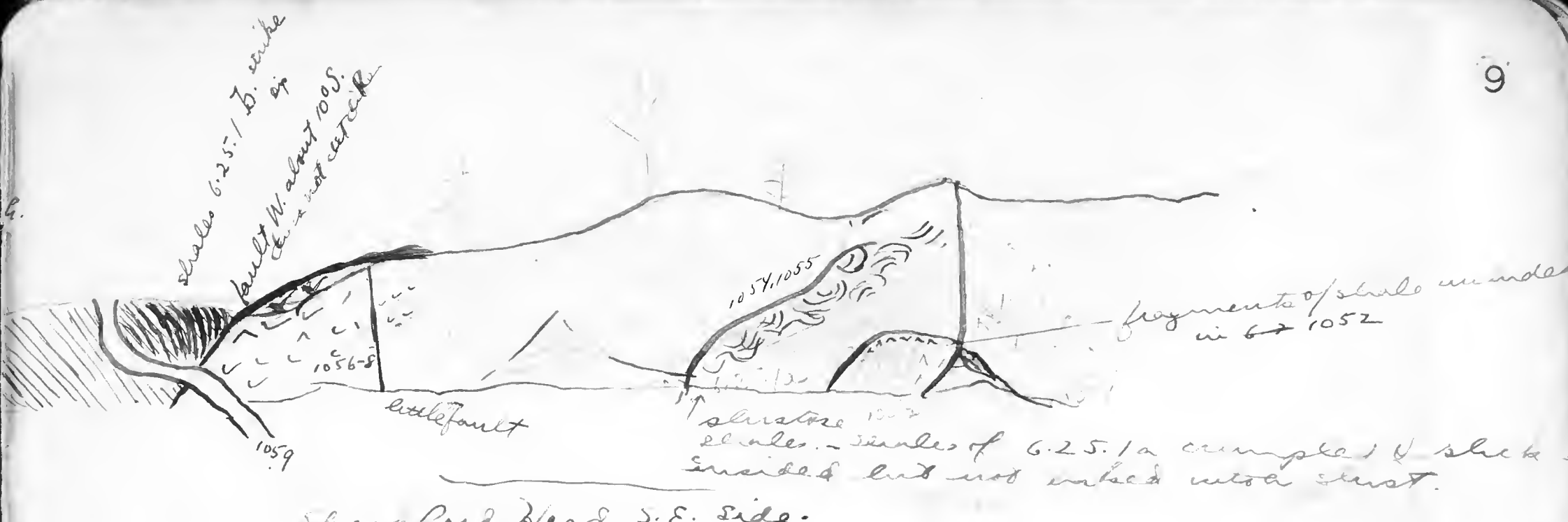
Saturday, June 22, 1907.

At the foot of the cliffs on the east side of Shackford Head, near the base of the letter B in Broad Cove there occurs a very interesting little exposure. A sea cave is worn into the trap at the base of a fissure which runs approximately N.E. x S.W. On the N. (west) side of this fissure



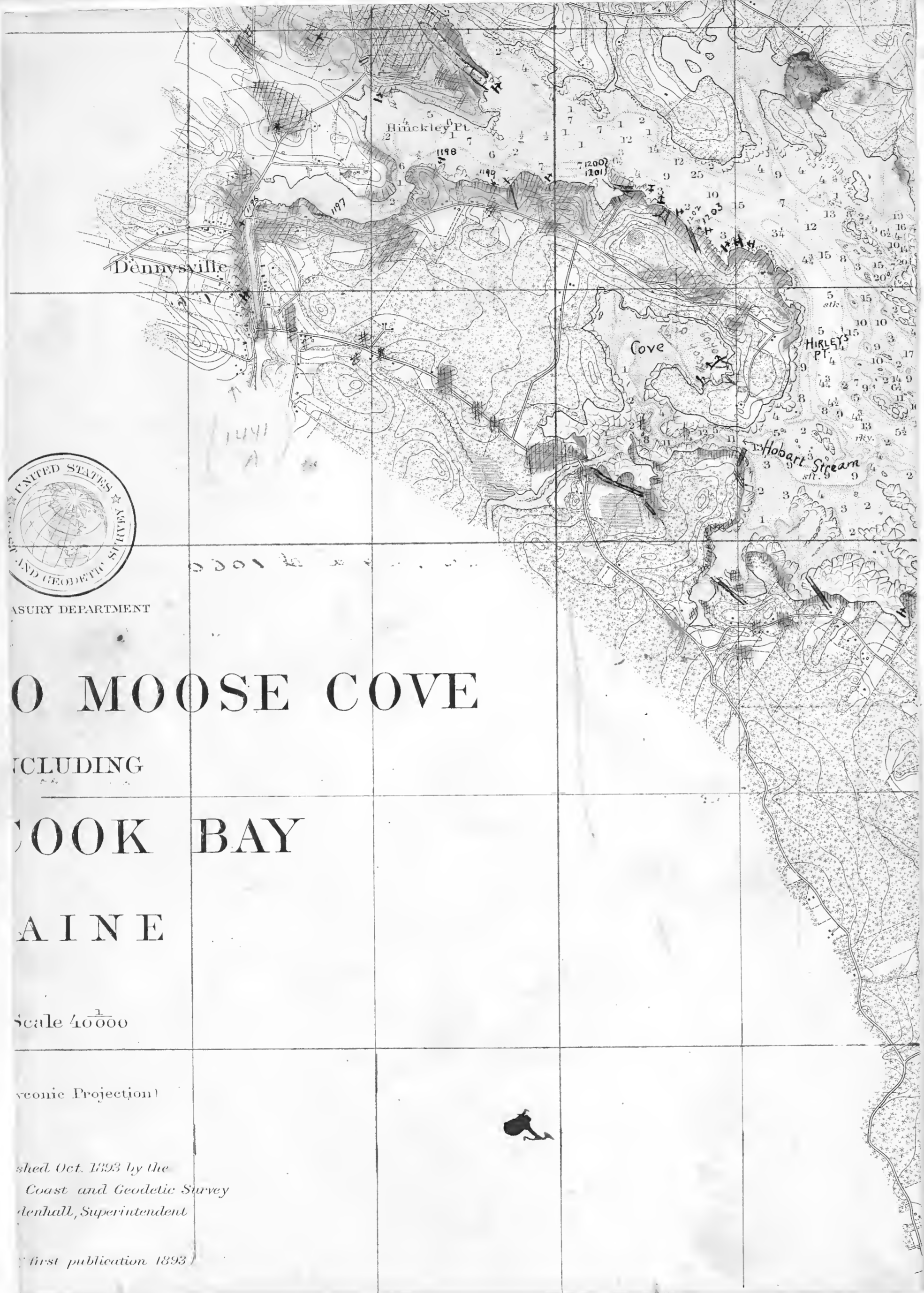
occurs a little exposure of a foot of shale, (dark gray, coarse sandy shale with a very rare singular fragment of *Murchisonia* fragment, not collected). There is no trace of these shales on the south side, and the fissure is probably a fault. The lower dip at a very high angle approximately 70° W. of North. Amount of dip unknown. Shales contacted. The rock on the north side is 1051. That on the south is 1052. Both appear to be the same.

A fine grained gray volcanic somewhat similar lithologically to the stratified beds of Kendall Head. In places the rock appears to include angular fragments of a light gray lava = 1053. These are possibly fragments of lake shale. No. 1052 is a dark dome like knob of trap which is covered by a thick mass of thin gray shales, perhaps fifty feet thick. These shales are quite fissile, strike N. 45° W., and dip to the south-west at an angle of 58°. They contain scars of lamellibranchs and a few ostracods with some Lingulas and are in the same series with 6.5.5a and the general mass of thin gray shales about Shackford Head & Broad Cove. The fossils are 6.25.1a. The rock is free from quartzites or calcareous sandstone, & consists of thin bedded gray shale throughout. The lower ^{most} part is very much laked & fragments are included in 1052 indicating that the latter is an intrusion. The upper 20 feet of 6.25.1a are extremely crumpled, contorted & slickensided into a massive unbedded shist. The rock is quite dark in places and the glossy coal black appearance of the shist has produced a low appearance of coal. This is one of the countries which has been regarded as a possible field of iron. The so-called coal is merely the slickensided shist shale in the upper part of 6.25.1a which has been oxidized by the underlying volcanics. These volcanics represent a flow of light gray lava including large fragments a foot commonly a foot & occasionally 2, 3 x 4 feet thick of another light gray lava, 1054 and one of these fragments, 1055 represents the matrix. There are large



inclusions of the underlying shales. A very sharply marked fault occurs opposite the 4-ft. sounding in northern 6.25.1 (about 75 feet south of 6.25.1a which is at the north edge of the square) but the fault is very slight, apparently as the same matrix rock occurs on both sides. On the south side of this fault which appears to bear S. 25° W. the conchoidal fracture in the gray lava flow is finely developed. A hard specimen of this lava is 1056. In places it is quite pumiceous. A piece of pumice is 1057. In western surfaces, the lava is in spots beautifully mottled with colored areas. A mottled specimen is 1058. 1057 is a dike which cuts through the lavas 1056-1058 and bears S. 50° W. This dike also cuts through the shales and across a large fault. The fault bears N. W.

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MOOSE COVE

INCLUDING

COOK BAY

MAINE

Scale 40000

(Conic Projection)

Sheet Oct. 1893 by the
Coast and Geodetic Survey
Denhall, Superintendent

first publication 1893

Tuesday June 24 1907

At the northeast end of the little promontory in front of Blackford Head appears a fine series of fossiliferous shales. The shales are soft, fragile, thin, ~~dark gray~~ without calcareous hard bands. The color is dark gray, in places quite black & sooty, almost resembling coal. A few thin seams about an inch thick show network structure, but for the most part the bedding is that of normal shale. About ~~eighty feet~~ ^{eighty feet} ~~is~~ ^{is} ~~exposed~~ ^{exposed}. The lower 40 ~~feet~~ ^{feet} contain a few indistinct ostracods & small branch fragments with Lingule fragments & little round balls. These fossils are 6.25.1 b. This portion of the series dips 27° N. 53° Strike ~~is~~ N. 35° W. It is cut by a trap dike 1060 which runs N. 35° E. In the upper part of these forty feet of shales a few lamella-branches were collected 6.25.1 c, and these are followed by a couple of feet of very fragile, sooty black shales containing lamella-branches (generally small), a few Lingule, and great numbers of ostracods. The ostracods are generally poorly preserved. These fossils are 6.25.1 d. The upper 40 ft. are less fragile shales and several seams yield good lamella-branches, Lingules & ostracods. 6.25.1 e. 6.25.1 e include the dike 1054 and dips at an angle of 2 1/2° to the N. 15° E, strike N. 77° W. The differences in the strike and direction of dip appear to be due to the intrusion of the dikes 1054 and 1060. The preceding rocks crop out on the S.E. corner of Blackford Head but continue downward along the N.E. corner of the little promontory for perhaps another 75 ft stratigraphically, the shales here carrying a trap intrusion and contain horizontal beds of light gray volcanics. The shales are horizontal toward the southern part of the exposure but dip toward the north quite rapidly. On the west of Blackford Head the shales reappear horizontally on the northwest corner of the little promontory but are overlain by the trap ^(rhyolite) which is light gray in color & light in weight.

6.25.1 n

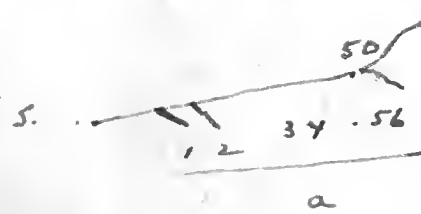
The ^{trap} rhyolite cuts across the horizontal shales at a low angle, rising about 30 ft. in a length of 125 ft. toward the north. Immediately west to the contact there is a sharply marked 5 in. band in the base of the rhyolite which is extremely porous & spongy. Above this the rhyolite is light gray in color & of a light weight = 1061, but a few rods toward the south the rock becomes much more crystalline, of a slightly greenish-gray color, and includes pink feldspathic crystals about 1/8" in long. This rock makes up the mass of the point and is 1062. At about 100 yds S. of the northwest end of the point the crystalline rhyolite is cut by a coarse grained ~~trap~~ trap dike several feet thick = ~~1063~~ 1063. min

The shales as stated are horizontal, and quite thin & fragile with ^{some} net work structure quite common in the lower half. About 20 ft. are exposed, and contain in the lower portion especially several fine seams of well preserved lamellibranchs & ostracods. In the short time available only a few specimens could be collected, enough to show the identity generally (as lithologically) with the other shales of Shackford Head and Broad Cove. These fossils are 6.25.1 m.

Tuesday, June 25, 1907

3.32.6

On the west side of Pleasant Island a fine series of very fossiliferous exposures of gray coarse shales & quartzitic bands and some interstratified fossiliferous red shales & shaly sandstones in the upper portion. A detailed section was begun today at the little island like cape in south central 3.32.6. This cape consists of a little isolated patch of gray very coarse shales & quartzitic layers with a few very thin seams of soft shale & calcareous sinter. This patch is tied on to the mainland by gravel and is really a little land tied island. About 30 feet of the gray beds are exposed on the island dipping to the N. at the rate of 35-45°. Strike ~~W. 8° N.~~ W. 8° N.



3.32.6a* = lower 5 ft. exposed on island; coarse tough shales or thin shaly sandstones with frequent stratified layers of quartzose limestone 1" to 2" thick & exceedingly porous. Also tough shaly sandstone partings. Shaly beds & calcareous layers gray in color without greenish tinge but with red spots on some of the shaly surfaces. 3.32.6a represents a section fifty long N. 80° E. 1. & 5 feet vertical height, dip 38°. The rocks are all similar to the preceding. It occurs at 12 ft., at 17 ft., 2³ at 34 ft., a⁴ at 39 ft., a⁵ at 50 ft. - and a⁷, a foot vertically above a⁵.

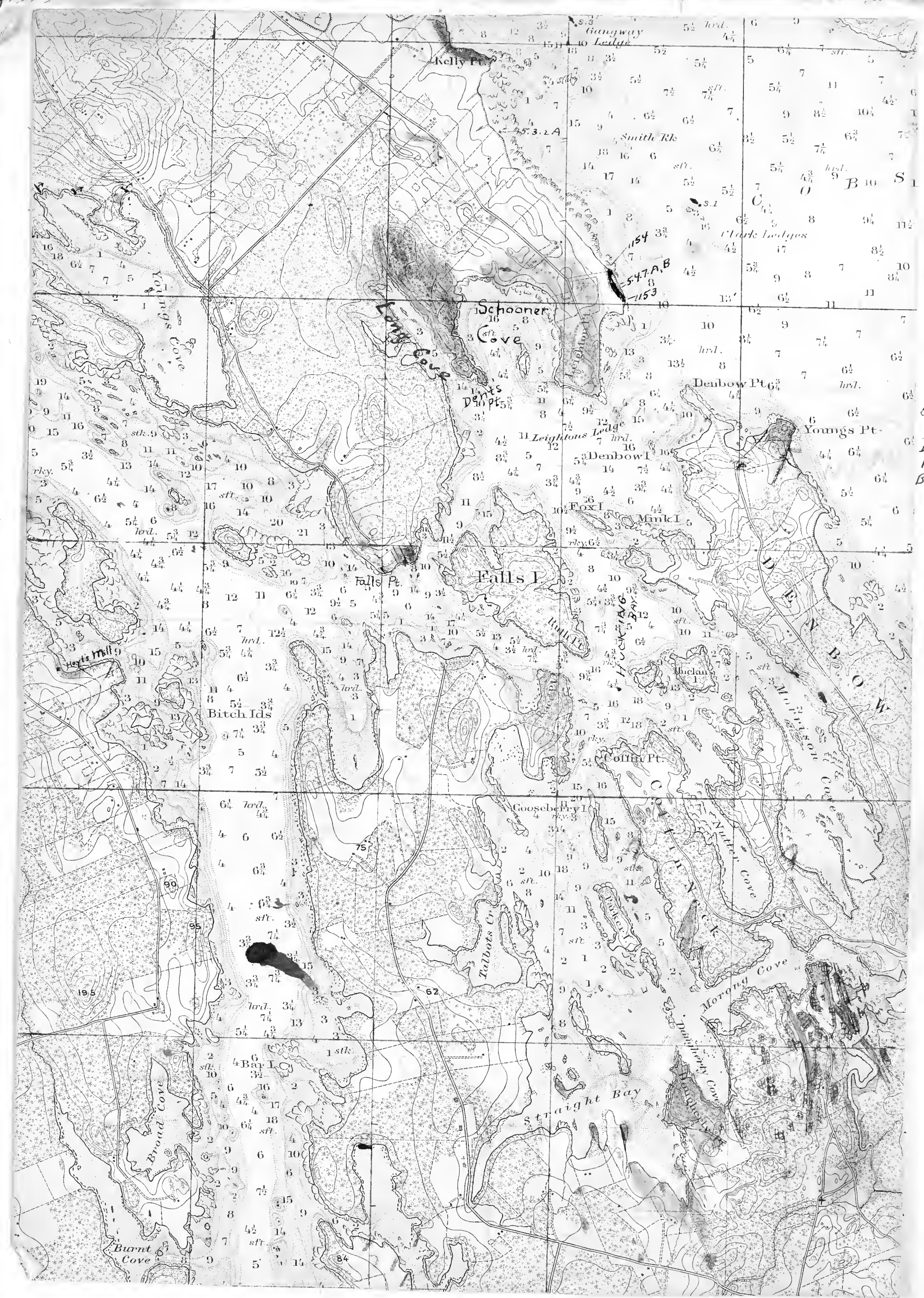
3.32.6 A

June 27. 07. The rocks forming the northern half of the island continue as those below, - hard 1 inch to 2 inch calcareous layers with hard 1 inch to 2 inch coarse floggy layers. The rocks are all coarse flags or calcareous layers with very little shale. Lamellibranch seams are common. One of these 16 ft. stratigraphically above 3.32.6a⁷, gave a large series of lamellibranchs = 3.32.6b, and another seam 3.32.6c is 1/2 ft. above b. The rocks exposed on the little land tied island continue for 18 feet more (stratigraphically) and have the same uniform ~~strike~~ of W. 6-8° N. The rocks consist of thin even flags & calcareous seams with a few seams thin partings of

3.32.6 B

June 28. 3.32.6 C

1064 } rhyolite (dark). volcanics behind house of Mr. on extreme west edge of 3.33.4. In close proximity in same hill along with purple ~~XXXXX~~ veins;



enlarged map of Denbo-Young Pt. see Book 3 p. 35.

3.32.6
3.32.6

shale. Nearly all the layers are coarsely wave marked in variable directions and fossils are very common. A seam at about 12 ft. above 3.32.6c gave some *Lamellibranchia* and also *Lingula* & a few *Lepidodictya* = 3.32.6d.

The upper half of the beds exposed on the island also crop out on the shore to the east where the strike W. 10° N. & dip at an angle of 36° N. 10° E. They are here cut by a trap dike 10 feet thick = 1066 which bears N. 30° W. and is nearly vertical. Twenty feet further north is another trap dike possibly a fork of 1066. It bears N. 18° W. and is 1067. 1067 is however coarser grained and than 1066 & the latter is a little different shade, more bluish.

3.32.6
3.32.6

Above the trap dike 1067 are 16 ft. of bluish gray flags & calcareous beds similar to those including 3.32.6d, and which are either identical with them or immediately over them, probably the latter. The strike is W. 10° N. & dip 34° North. 10° E. Fossils 3.32.6e², include *Lepidodictya* - *Meridionopsis* - *Lingula* seams.

3.32.6
3.32.6

There then ensues a covered gap 100 ft. long along the shore & then appear a series of red & gray beds beginning with a foot & a half of olive gray-green massive shale overlain by 10 feet of red beds. These 10 ft. of red beds = 3.32.6e are thin, 1" to 3" uneven rough floggy layers separated by thin partings of shale. The fauna includes *Lamellibranchia* & *Lingula* but apparently no *Lepidodictya*. Some of the floggy layers are wave marked. 3.32.6e¹ is at the base of the red beds, e² in the middle (5 ft. above 3.32.6e¹) and 3.32.6e³ is 2 ft. below the top immediately below 1/2 inch seam of olive green shale.

3.32.6
3.32.6

The 10 ft. of red beds, 3.32.6e are followed by 3 1/2 ft. of light gray or grayish olive green shales & thin flags. The shales are friable & in 3" to 5" seams with 1" to 2" floggy layers between. A thick 8" shelly sandstone or flag is at the base. Fossils in these 3 1/2 ft. of gray beds = 3.32.6f, of a couple of inches is here a little fault ~~with~~ ^{with} upthrow on the east. Fault N. x S. nearly.

3.32.6
3.32.6

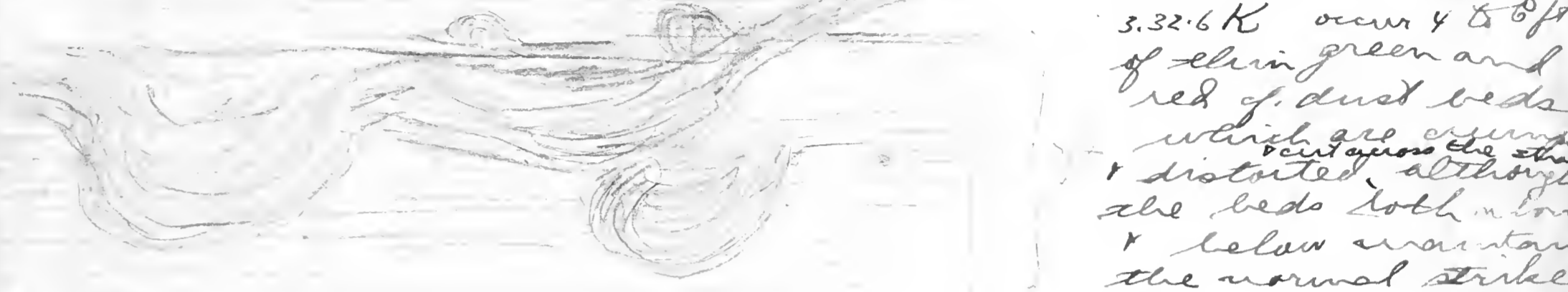
3.32.6f is followed by 12 ft. of red beds mostly thin friable shales. These 12 ft. of red beds, 3.32.6g contain (a) 2 ft. of thin red shales, (b) a massive 5 inch hard sandstone band, (c) 5 inches of shale, (d) 5" floggy & shelly sh. & e. eight 1/2 ft. of alternating sh. shales with floggy layers 1" to 3" with shales & flags about equal. The flags are wave marked on upper surfaces. Wave marks include both an. rain type & sea scale. Ripples follow strike.

3.32.6
3.32.6

The 10 ft. of red shales & flags of 3.32.6g are followed by 9 ft. of gray flags & shales. The flags are very uneven & all are wave marked. The wave marks are of exclusively the basin type. Flags 2 to 5 inches thick. Shale seams rarely exceeding 5 inches. Calcareous seams are much thicker are very common but as usual pinch out when followed for a few yards. *Lepidodictya* common in the gray beds which are very fossiliferous = 3.32.6h.

The nine feet of gray beds are followed by 4 1/2 ft. of a network shales in seams (inch to 3" thick intervals + 15 feet) with ~~essentially~~ bands of red shale, slaty shale, shaly flag and ~~long~~ one or two tougher flags. In the coarser shales seams *Lepidodictya* occur with *Lamellibranchia* & *Lingula* = 3.32.6i. 3.32.6i² is a seam of *Lamellibranchia* 2 inches higher in the red shales.

July 13, 1907. Then follow 20 feet of gray shales & thin flags 3.32.6k which strike like the rocks below W. 7° W. by E. 7° S. and dip to the north at an angle of 40°. The uppermost band is a massive quartzose shelly flag a foot or more thick near the middle of 3.32.6k occur 4 to 6 ft of thin green and red of dust beds which are ~~cut across~~ ^{cut across the strike} & distorted, although the beds both above & below maintain the normal strike & dip. They are apparently volcanic muds. The thin flags of 3.32.6k are abundantly ripple marked. The ripples vary from E x W. to N.E x S.W.



3.33.5
A

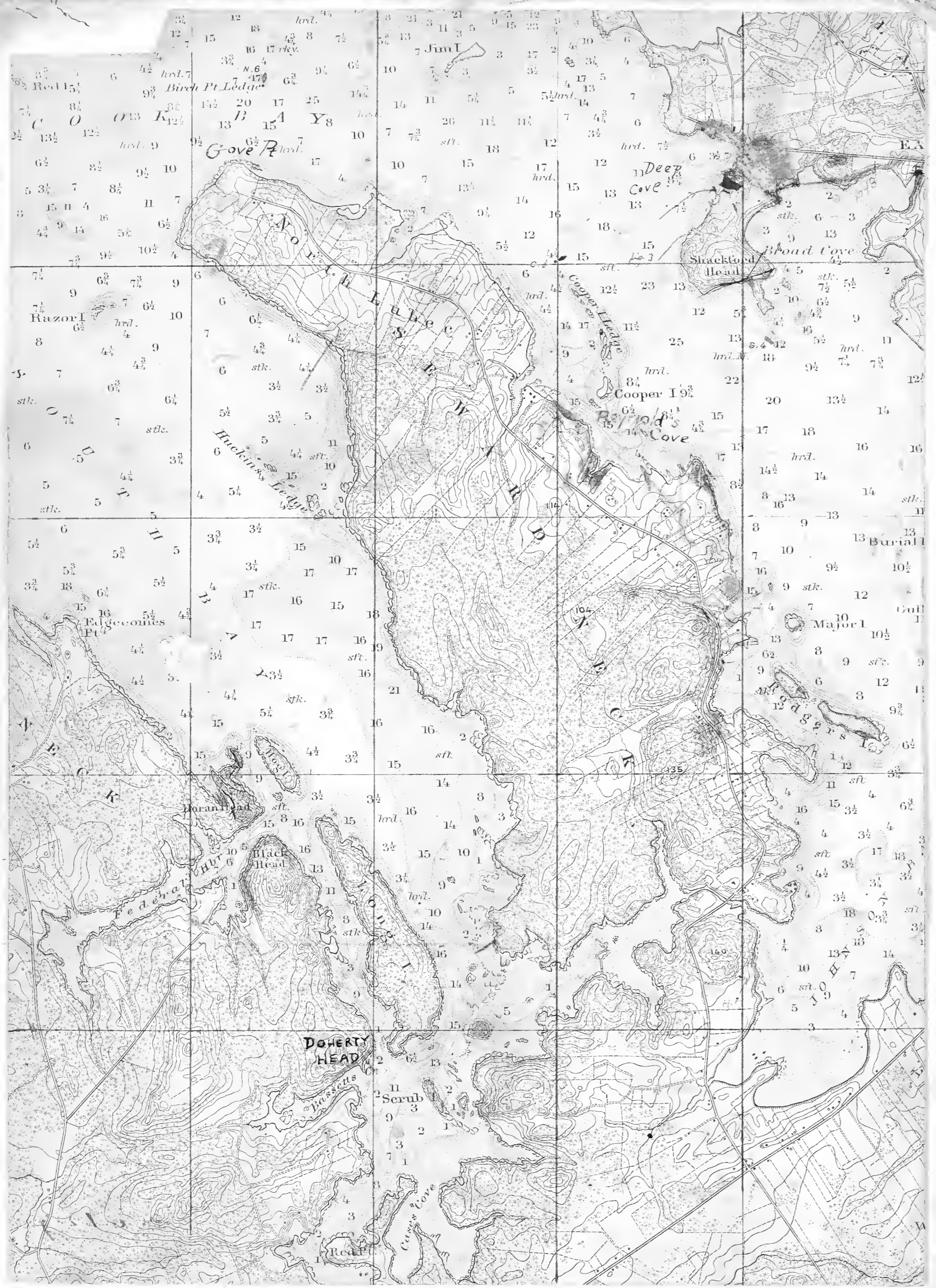
(Monday July 1, 1907.

On the east side of Pleasant Point opposite the beach there occur on the shore some small vitreous (below low tide) of gray coarse shaly layers & calcareous seams striking N. 37° E. and dipping 28° N.W. The rocks contain some *Lepidodictya*, *Lamellibranchia* & *Lingula*, sparingly the shales abundantly in some of the calcareous seams 3.33.5a. The remnants are cut by a vertical 3 ft. trap dike which bears N. 28° W.

Tuesday July 2, 1907 (cont. p. 20). & note book page 55.

3.33.8
A

On the west side of Pleasant Point on the north shore of the cove in 3.33.8, there occurs ^{flaggy} about the west third of 3.33.8 a little cliff of coarse gray shales & abundant calcareous seams full of fossils. The cliff is over 150 feet long, but the rocks are here nearly level there being a dip of only 11° to 18° to the north, strike E. 8° N. (cf. strike 3.32.6). About 15 feet are exposed. The coarse gray flaggy shales are abundantly ripple marked the ripples bearing E. 4° south. Fossils 3.33.8a, a 5 inch calcareous seam near the base containing *Lepidodictya*, *Lingula* & fish remains. 3.33.8b includes the fossils from several horizons in the upper 14 feet. *Lepidodictya* seams with a few *Lingulae* are common. A few *Lamellibranchia* occur in the shales with an occasional *Lepidodictya* & *Lingula*. The shales are cut off on the west by a ^{volcanic} intrusion which is very dark (cf. Blackford Road Cape) and ^{is} contact for several feet 71069 = rhyolite 1 1/2 ft. west of contact. 71072 is 10 ft. x 10 ft. x 25 ft. west of contact.



enlarged map of Federal Harbor region
see Book 4, page 1.

enlarged map of
Red Head
see Book 3, p. 39.

Station June 29, 1907
17.50

6.24

shack for

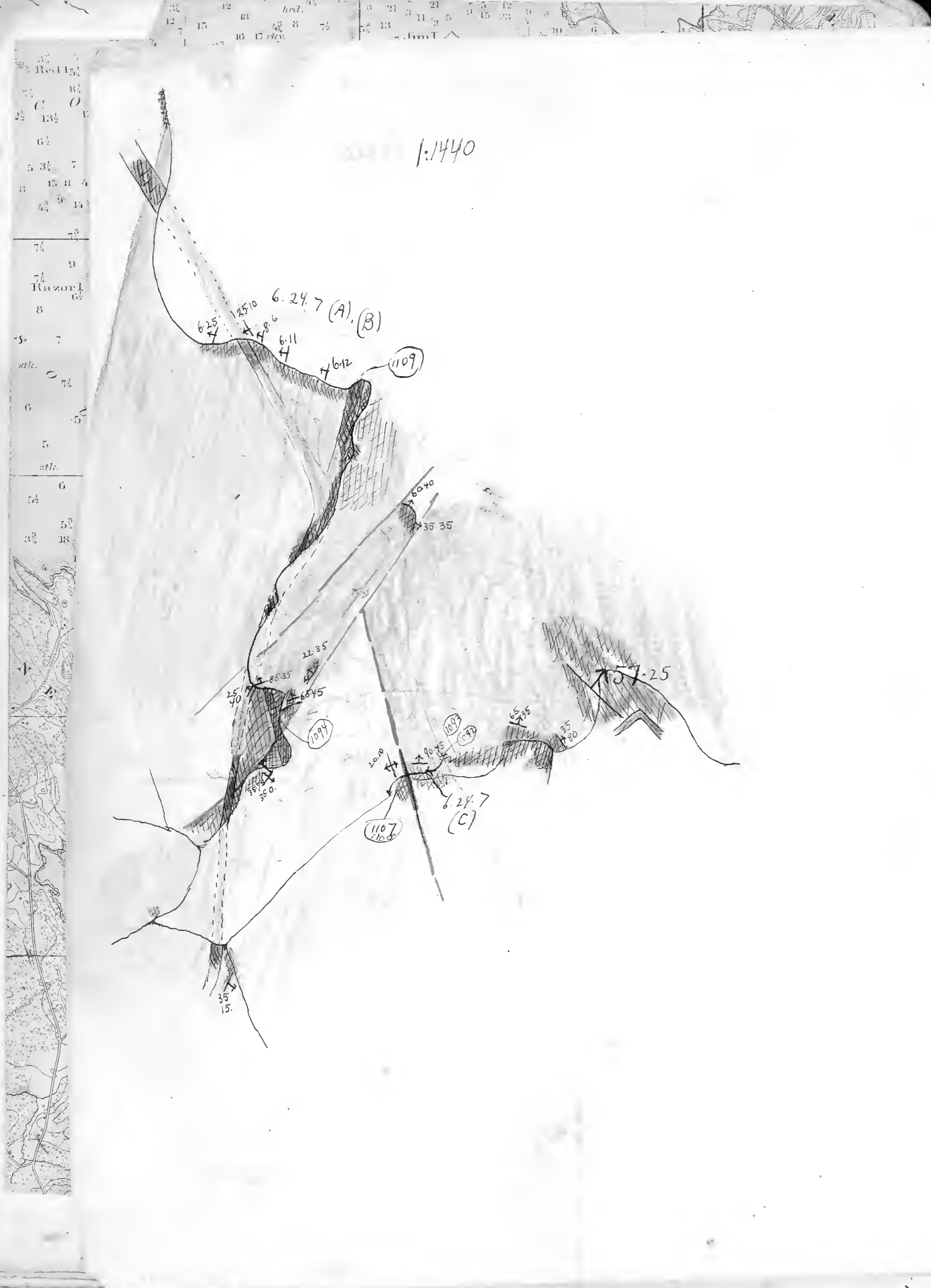
Reynolds's Cove

(see also charts #2, #23 etc)



6.34

enlarged map of Federal Harbor region see Book 4, page 1.



Birch Point (cont p. 21, 24) sill
 Work was begun at the peak of the sill = 1068 this is a fine 17
 felsitic rhyolite which is overlain conformably by the silt
 and the latter are labeled on the contact, which, besides the
 coarse structure, proves the rock an intrusion. This rhyolite
 is cut by a thin basalt dike a few inches thick and is
 followed by a series of slaty & floggy shales which strike N. 66° E.
 and dip 27°, N. 25° W. The rocks are gray in color, the floggy
 appearance predominating. Occasionally a thin seam of fossil
 many fossils that it is calcareous & yellow. ~~Some of the fossils~~
~~are~~ The fossils include Leperditia, some
 also some ostracods (Primitia, but mainly Oeckmina, similar to those
 of Shickford Head Beds). ~~Some of the fossils~~ are unknown except in thin
 seam near the top.

6.1.2 a is a seam of Leperditia 3 ft. above the contact
 dike.

6.1.2 b is a seam 6 ft. above the dike and contains
 Leperditia & shales of little Primitia (similar to those found
 railroad cut). Leperditia occurs in several additional seams below a & c.

6.1.2 c is a calcareous seam 30 feet above 6.1.2 b. It
 contains besides Leperditia some ostracods & is similar to those
 of Shickford Head. The rocks hereabouts are bluish gray floggy &
 quartzite shales with thin laminular calcareous seams
 1/8 to 1/4 inch thick. In places the rock amounts to a fine grained
 sandstone of which a couple of good bands are 5 or 6 inches
 thick in places the rocks in weathering break out to almost
 as white.

6.1.2 d is a "rotten" seam an inch thick, composed of
 ostracods & a few Leperditia - 2 1/2 ft. above 6.1.2 c.

6.1.2 e is a series of rotten seams extending through
 seven inches and about half a foot higher than
 d. 6.1.2 e includes the fossils from the lower seams. E
 from the upper seams.

20 inches above 6.1.2 e is a coarse grained trap which
 with the shales and resembling a flow in its evenly
 interbedded stratigraphic position as well as in the fact that
 the shales underneath are only slightly laked and those
 overlying hardly laked at all. The trap is however too massive
 & coarsely crystalline for an extrusive & represents a perfect
 sill. It is 3 1/2 or 4 ft. thick. = 1068 B

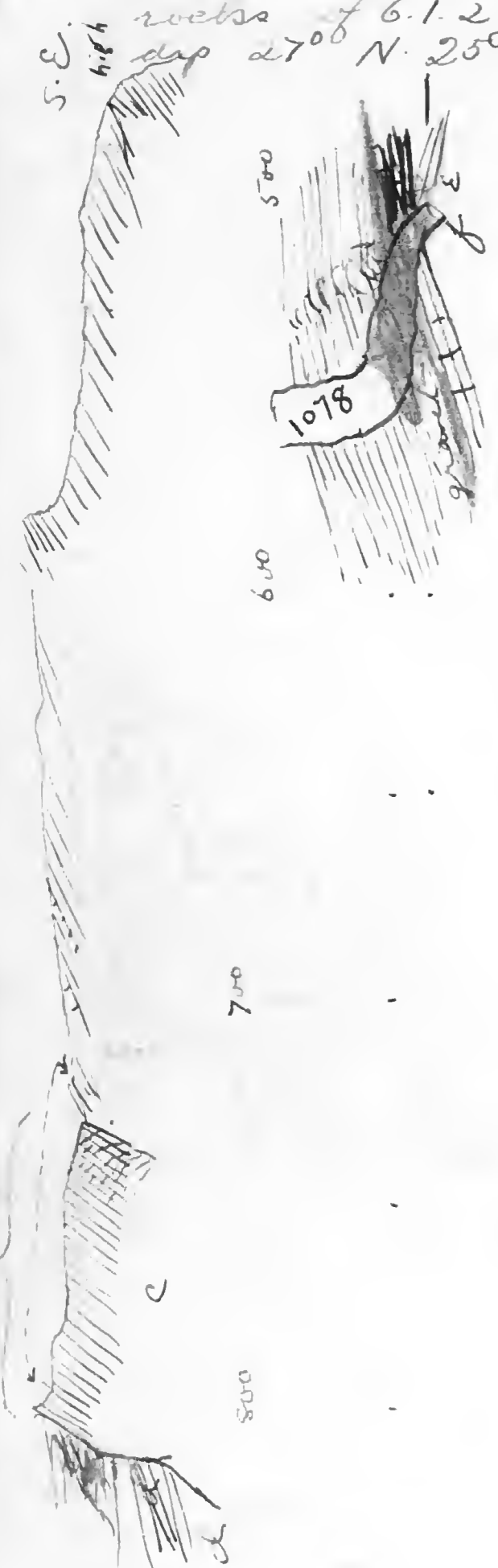
Below the trap are 20 inches of gray shale which weather in places nearly
 white & which are a little laked into a compact firm
 rock. A seam of obscure Leperditia occurs 2 inches
 below the top = 6.1.2 f.

Above the trap dike are 11 ft. of dark gray slaty
 shales and evenly shaly flogs. There are a few 3 inch courses of
 very fine gray shale and in the middle no course of
 persistent calcareous seams an inch thick containing
 some obscure Leperditia & ostracods = 6.1.2 g.

Above the 11 ft. of slaty dark shales of 6.1.2 g are 7 ft. of massive
 very fine grained argillaceous sandstone of a light gray color weathering
 nearly white. The sandstone occurs in eight or nine
 shells and appears to be of fine quality. It is probably too
 jointed & too thin to be of commercial importance. A seam

Lepidostrea & rotten remains of ostracods occur in the middle of the seven feet. These fossils are 6.1.2 h. The rocks of 6.1.2g & 6.1.2h strike N. 63° E. x S. 63° W. and dip 27° N. 25° W.

section, see p. 22.



500
600

700

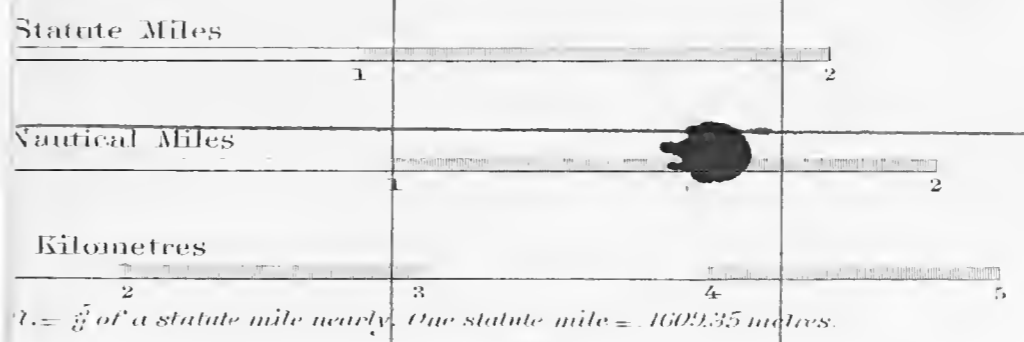
800

14

M 50 W

N 50 W
high tide

between 1861 and 1889
do. 1861 and 1890
Admiralty Charts



LIGHTS

an elevation of 15 feet above the level of the sea
ashes, Rev. - Revolving, W. - White, R. - Red, G. - Green and v. - varied by

West enrich	Character	Interval bet. Flashes	Color of Structure	Height above Sea	Visibility Naut. miles	Fog Signals
27 ^m 36 ^s 1	F. W.		W with Red Cross	65 ft.	13	Trumpet
27 55.3	F. W.		White	60 "	13	
27 54.6	Flg. W.	0 ^m 15 ^s	White	52 "	13	Bell
27 48.3	F. W.		R & W hor bands	83 "	17	Whistle or Bell

BUOYS

in entering, on Starboard hand
off, in entering, on Port hand
horizontal stripes - Danger Buoy
perpendicular stripes - Channel Buoy
Can, Nun, or Spar.

TIDES

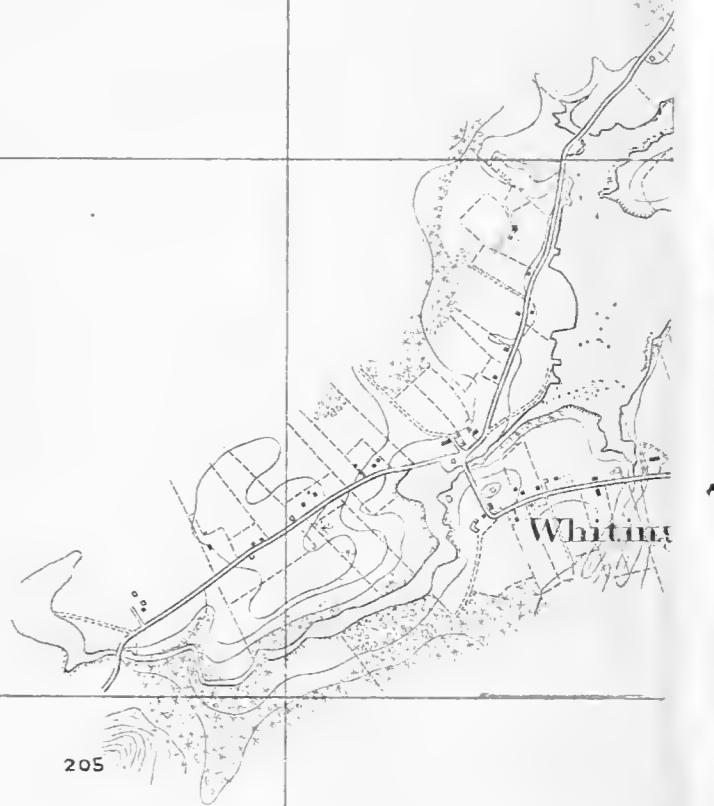
	Moose Cove	West Quoddy Head	Lubec	Eastport	Federal Harbor	Garnet Point	Hallowell Point
ge. ...	10 ^h 49 ^m	10 ^h 55 ^m	11 ^h 04 ^m	11 ^h 08 ^m	11 ^h 24 ^m	11 ^h 27 ^m	12 ^h 10 ^m
ce. ...	14.7 ft.	15.2 ft.	18.3 ft.	18.2 ft.	19.0 ft.	19.0 ft.	17.8 ft.

as at all principal ports, are predicted for every
for the Atlantic Coast, published annually.

SOUNDINGS

expressed in fathoms except on the dotted sur-
in feet.
h at mean low water.

Bells ML 2



Tuesday, July 2, 1907. P.M.

Prince's Cove.



(a)



(b)

In the northwest corner of Prince's Cove are seen some trap intrusions, baked shales. The shales contain some

small *Lingulid*s & obscure *Lamellibranch* (not collected) and are nearly horizontal with low wrinkles.

Farther down on the west side under the herring pressing house of Mr. Leonard, & between just under & south of the wharf of Mr. Lyon occurs a series of a few feet of very much baked shales which are nearly horizontal and contain several seams of large *triodolopoid* *Lamellibranch*s & a few *Lingulid*s = B.1.4 a. These shales are cut by a narrow trap? dike two feet wide or less of a massive coarse grained rock = 1072 which may be followed as illustrated in the sketch into the hills for hundreds of feet, so that the so called dike is ^{really} a fissure. The molten rock came up between a & b and spread out over it where it is many yards thick & long. Being traceable continuously into the rock mass of Ester Head.

Saturday July 6, 1907 (cont. from Tuesday July 2, 07.)

Pleasant Point, west side. Between the rhyolite stock in 3.33.5, and the rhyolite flow composing the south-pointed cape in 3.33.7 there occurs in the little cove on the boundary line between 3.33.7 and 3.33.8 an exposure of MARINE CLAY WITH FOSSILS. These fossils may be obtained about 50 feet north of the purple rhyolite flow mass and include chiefly *The Mya* (*Macoma*?) like shell found everywhere on the present beaches, *Mytilus edulis* and barnacles (*Balanus*) also *Panopea*. No *Leda* observed. The shells are the same as those living a few rods away. The exposures are a few feet above extreme high tide mark.

The east side of the cape is composed of a purple rhyolite glass = 1076, presumably a flow through there are no indications of flow except the glassy ~~structure~~ texture. There are injections into the purple glass of a coarse grained trap = 1077 which also occurs as thick dikes in the purple rhyolite. There are several such dikes.

Friday July 5, 1907

Birch Point

(section see p. 18)

(a) On the point between tide marks and continuing just above high tide are exposed about 35 or 40 feet of thick coarse, sandy flags of a light gray color with a few thin partings of friable gray shale. These thick flags are as much as 8 to 10 inches thick but split into 1 1/2" to 2 1/2" shells. Wave laminations are abundant on these flags. Strike S. 75° W, Dip N. 15° W, 26°. No fossils found in 20 minutes. No calcareous seams nor nodules. Near the top occur one or two thin "rotten" seams; also a half inch seam composed of angular shell fragments.

(b) The preceding are overlain by about 20 ft. of light gray, even textured thick flaggy free-stone like rock. It is nearly white and turns olive brown under acid but with no effervescence whatever. Strike S. (approximately) 75° W. These rocks are exposed for a couple of hundred feet along the beach above high tide. The dip is 26°, N. 15° W. During to the fact that the easterly side of the point trends north a few degrees ~~west~~ giving an apparent inclination of the rocks to the east whereas the westerly side dips toward the west, there is the appearance of an anticline but this does not exist as the same strike (S. 75-80° W) and dip (26°, N. 15° W) are maintained on both sides, and the apparent ^{rise of its anticline} ~~is~~ therefore due to the bend of the shore. The rocks include a few calcareous seams 1/2 inch thick and a couple of (dolomitic bands (also epidotic) 1 1/2 inch thick which weather cream white & contain *Lepiditina*. The *Lepiditina* were collected just to the east of the tip of Birch Pt. (= 6.1.3a, and a foot higher, 6.1.3a²). Many of the layers contain large & distant sun shrinkage cracks and a few contain fucoids; no rain prints; no wave marks. The outcrop on the west side of the point for a couple of hundred ft. is at a small angle from the strike so that the rocks appear to be nearly level.

(c) For 75 ft. along the beach, the beds are abruptly discolored and hardened by baking and the strike abruptly changed. Strike N. 27° E. x S. 27° W. or a change of about 50° (swing toward the south). The dip is 27°, W. 27° N. The rocks are gray flaggy beds baked hard and a few thin calcareous seams and ^{near} ~~near~~ the southeast end the rock is extremely brecciated and veined. There is here a fault trending N. 15° W. by S. 15° ~~E.~~ but the rocks on both sides the fault are apparently the same except for the baking, containing circular fucoids & large shrinkage cracks and in one or two cases ^{except a granite sill 150ft west} ~~presumably the same~~ beds are traceable. There is no dike in the vicinity. The top of the faulted area is formed by a thick massive 5 foot ~~massive~~ bed which may be followed on both sides the fault, but is not ~~displaced~~ ^{displaced} either vertically or horizontally ^{except for the} and only horizontally at the angle of deflection of the strike where the fault is situated. The structure is evidently due to lateral torsion and deflection of the line of strike by a laterally thrusting force but without any vertical deflection.



6.1.3 A



Friday July 5, 1907

Birch Point

(section see p. 18)

(a) On the point between tide marks and continuing just above high tide are exposed about 35 or 40 feet of thick coarse, sandy flags of a light gray color with a few thin partings of friable gray shale. These thick flags are as much as 8 to 10 inches thick but split into 1 1/2" to 2 1/2" shells. Wave lumps are abundant on these flags. Strike S. 75° W. Dip N. 15° W, 26°. No fossils found in 20 minutes. No calcareous seams nor nodules. Near the top occur one or two thin "rotten" seams; also a half inch seam composed of angular glass fragments.

(b) The preceding are overlain by about 20 ft. of light gray, even textured thick flaggy free-stone like rocks which weather nearly white and turn olive brown under acid but with no effervescence whatever. Strike S. (approximately) 75° W. These rocks are exposed for a couple of hundred feet along the beach above high tide. The dip is 26°, N. 15° W. Owing to the fact that the easterly side of the point trends north a few degrees ~~west~~ giving an apparent inclination of the rocks to the east whereas the westerly side dips toward the west, there is the appearance of an anticline but this does not exist as the same strike (S. 75-80° W) and dip (26°, N. 15° W) are maintained on both sides, and the apparent ^{east} anticline is therefore due to the bend of the shore. The rocks include a few calcareous seams 1/2 inch thick and a couple of (dolomitic bands (also epidotic) 1 1/2 inch thick which weather cream white & contain *Sperditia*. The *Sperditia* were collected just to the east of the top of Birch Pt. (= 6.1.3a, and a foot higher, 6.1.3a²). Many of the layers contain large & distant sun shrinkage cracks and a few contain fucoids; no rain prints; no wave marks. The outcrop on the west side of the Point for a couple of hundred ft. is at a small angle from the strike so that the rocks appear to be nearly level.

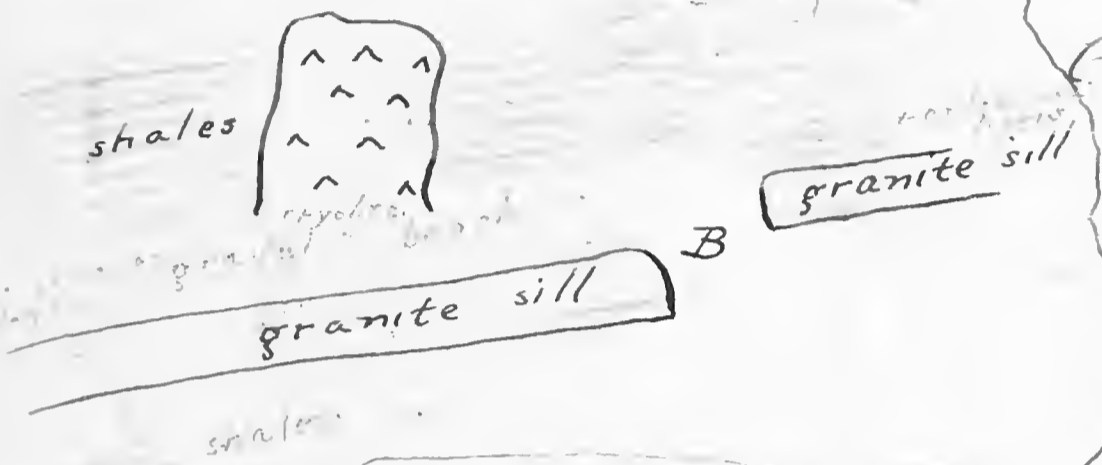
(c) For 75 ft. along the beach, the beds are abruptly discolored and bordered by lobing and the strike abruptly changed. Strike N. 27° E. x S. 27° W. or a change of about 50° (swing toward the south. The dip is 27°, W. 25° N. The rocks are gray flaggy beds baked hard and a few thin calcareous seams and ^{large} veins. Near the southeast end the rock is extremely brecciated and veined. There is here a fault trending N. 15° W. by S. 15° E. but the rocks on both sides of a fault are apparently the same except for the lobing, containing circular fucoids & large shrinkage cracks and in one or two cases ^{the same} leads are traceable. There is no dike in the vicinity. The top of the faulted area is formed by a thick massive 5 foot ~~bed~~ ^{bed} which may be followed on both sides the fault, but is not displaced either vertically or horizontally ^{and only hor-} ~~cepting for the~~ ^{izontally} at the angle of deflection of the strike where the fault is situated. The structure is evidently due to lateral torsion and deflection of the line of strike by a laterally thrusting force but without any vertical deflection.



l. On point 3 feet above bed.
siliceous sinter with shells & corals.
dikes
volcanic ash. strike S. E.

(d). The normal strike of N. 75° E. is abruptly resumed in a little outcrop of a few flossy layers in the shingle below high tide (= d of section), beyond which for 175 ft. there is a covered interval and the next beds cropping out have the normal strike of N. 70-80 E.

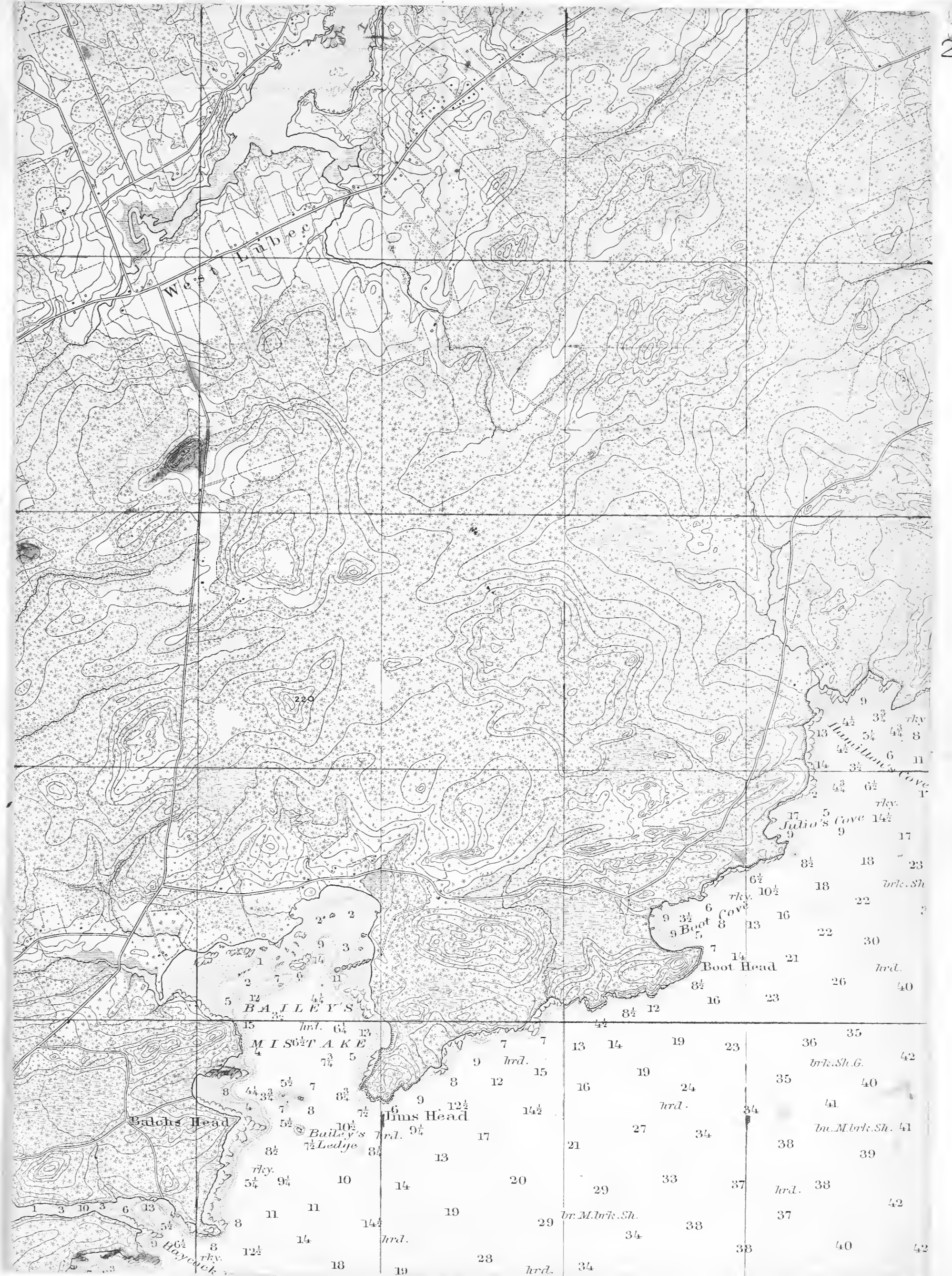
(E). These beds begin near the base with a massive 5-foot stratum of coarsely crystalline rock which was originally mistaken for limestone owing to its beautiful & distinct stratification, the strong effervescence under acid, and the perfectly interstratified appearance in the ~~stratification~~ ^{sediments}. The rock is really a granite (the strong resemblance to which was noted in the field when the rock was called limestone). Five feet of this granite sill are exposed, the lower limit unknown, but the sill cannot be more than 10 feet altogether since ^{four inches of} some flossy shale crop out about 5 feet below the base. This granite is 1075-



The relations of the granite (which is ~~followed~~ ^{explained} by shales containing a ^{vertical} 12 ft. rhyolite dike) with the rhyolite are illustrated in the sketch. At the foot of the cliff of shales & rhyolite dike there is a shingle beach, and the granite sill comes up through the shingle directly in front of ^{and distinctly} cutting

across the path of the rhyolite dike, a few rods to the eastward however, at the point B there is a little fault and displacement in the granite sill, the fault area is ^{by few yards} ~~in~~ ^{marked} by a crumpling of the shale in the cliff. In the shingle, rhyolite boulders are common but no more so than anywhere else along the beach. To the east of the faulted area the granite sill is overlain by calcareous layers which do not appear on the west but whose place must have been in the granite beach between the cliff & granite sill. The supposition that the rhyolite came up through B, and occurs between here & the dike as a sill in the beach cannot hold, because this place in the beach ^{ought to be} largely, if not entirely filled by the calcareous layers. Hence the cutting of the granite sill across the rhyolite dike is real & proves the granite younger than the rhyolite. The rhyolite is 1078

(Continued p. 17)



Island ...
 get brood of ...
 follow ...
 some ...
 of the ...
 gray-brown 4.35.3.1.



North of the toll bridge across Moose Island the Perry ss. crop out with a uniform dip of 32° to the ~~W.~~ 30° ~~W.~~. This dip is maintained throughout the series of tweek-tide exposures along the east shore as far as the cove at the northern end of Esp. 3:42:6. There are no exposures in the ~~west~~ side of this cove; but on the ~~west~~ side the Perry sandstones reappear with an abrupt change of dip. On the ~~west~~ side of this cove the Perry ss., kgl. & sh. are nearly vertical, line of strike N. 54° E.



342.3
A



This red shale, Silurian, of red shales on W. side Moose Island S. of RR. bridge to Carlow Island (1921)

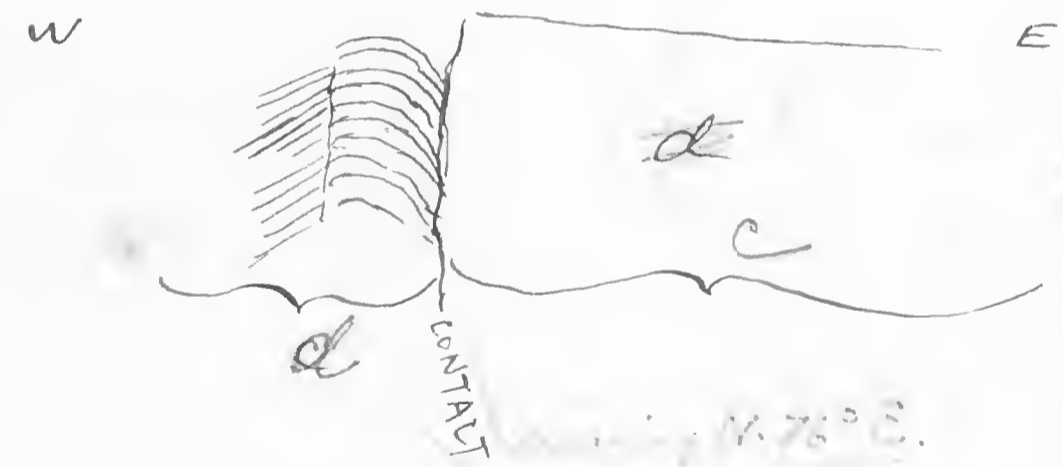
Monday June 10 1907.

N. End of Moose Island, where RR bridge crosses to Carlow Island. On the south side of this bridge there crop out on the shore at high tide mark, Silurian shales which are usually labeled on middle. These shales dark gray in color, weather a light gray and are labeled exhibit imperfe + slaty cleavage. The shales dip uniformly at an angle of 35°, direction N. 13° W. strike S. 80° W. The shales are intersected by rhyolite dikes & sills, coarse grained & pink on weathered surface.



Section of section N. 15° W or along line of dip

- 3:44:7
A) a. Fossiliferous gray shales taken in places. Sp. as given above. Fossils: *lingula*, *carnea*, *cutilata*; also a couple of species of *tridacloids*. The *Lingulae* & *lamellibranchia* common in many sections.
- (b). A selva-like seam about 3 feet thick of shaly like crumby soft gray rock; strongly spherulitic with pebbles & volcanic tuff or ash. 3:44:7a
- c. rhyolite dike approximately 10 feet thick - broad
- 3:44:7
B) d. gray shales. Dip 31-33° direction N. 5° W. Strike S. 86° W.
- e. Covered gap of beach about 10 feet long
- f. Same as (c) This rock also forms the point marked 1 in 3:44:7



Contact between c & d above. To the west the shales dip as given above for (c). The shales are distinctly bedded & slightly laked. For a foot west of the contact the shales are are up into a little anticline are indistinctly & very much laked.

To the east of the contact the rhyolite is of a darker gray color & finer grain. At 20 inches from the contact the rhyolite is normal. A photograph was taken

A3

(a few *Modiolopsis*). Nearly opposite the house there is a loose dike cutting across volcanic dust beds & shales. Large "horses" of the dike are intruded into the shales & dust beds, & "horses" of the latter are included in portions of the dike. The dike appears to stretch N. 38° E. but this may not be the real direction. Underneath the dike is a one foot layer of volcanic ash which may also be observed on the nose like point S.W. of the house. The strike of this ash bed is N. 80° E.

dike = 1012



Marine clay (stratified) occurs in a little patch as indicated on accompanying sketch map of S. part of 3:44:7. The clays differ from the usual massive gray (unbedded) clays in being composed of fine seams of red clay, apparently derived from the red dust beds & Silurian shales a few rods away; these red seams interstratified with thicker layers of clay of the color of normal boulder clay. The red clay seams are 1/2 inch to 1 inch thick; the dark yellowish brown clays 4 inches to a foot thick about four feet are exposed dipping inland apparently under the till. The strata of clay are ~~strongly~~ ^{weakly} ^{irregularly} wrinkled into minute low domes or wrinkles and are not flat, though

On the nose-like point in the southern part of 3:44:7, southwest of the house shown on the map, is a fine series of ~~dust~~ ^{volcanic} beds & volcanic ash with shales. The southern half of this nose is entirely free from red beds as is the series, studied Monday June 16 (see p. 33). The red beds dominate the section of Silurians from the northern half of this nose-like promontory as far north as the rhyolite dike at the upper end of 3:44:7. They are entirely ~~with~~ absent about south of this limit in the region studied, - the lower shales being gray & flaggy; the red shales, red dust & volcanic ash beds reappear on the northern end of the island just east of the railroad bridge (covered at half tide).

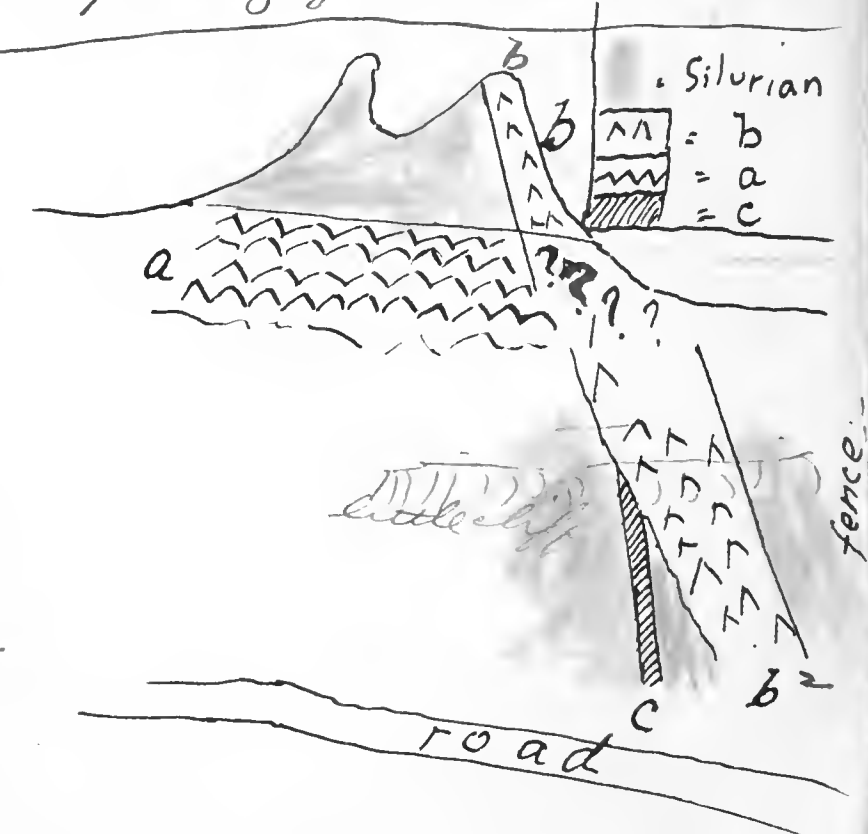
The volcanic ash bed, apparently the same as that described above (line 7) - yielded a few specimens, - Eastport (3:44:7 ash 2). A thin dike may be followed for many yards below high tide mark. The dike is N. 22° E x S. 22° W, & varies in thickness from 6 inches to ~~inches~~ ^{inches}. A specimen is labelled 1013.

3444
C
3444
A

1 inch ledges (Silurian) including the preceding form the first ledge seen just at the house shown on the map on the north shore at the ^{west} end of the old road (this house is now no more, its site is marked by ruins & the foundations). For over a hundred yards the Silurian strata extend northward with a dip of 34° N. 5° E., strike W. 7° N. The lowest beds are exposed above high water just west (a couple of yards) of the ruins of the house shown on the map. They are gray shales which are unlabeled and which for three or four feet contain several seams with immense numbers of *Modiolopsis* and *Lingula* is also common. These fossils are Eastport 3:44:4a. A thin seam in the middle of these 3 or 4 feet contains so many shells & ostracods that it is calcareous. This calcareous seam (1 inch thick) and its fossils is 3:44:4a². Nearly all the rocks of the promontory (covered at three quarter tide) are gray shales & flags with a couple of thicker flags or sandstones. Very little red shale & apparently little if any dust beds (tuffs) occur. The red shale is confined to a few thin patches & beds 40 to 50 feet from high water (along line of dip). These red shales yielded a few *Modiolopsis* (*Modiolopsis*) and a *Lingula* 3:44:4b. They are a couple of feet below the lower ash bed, - 3:44:4c.

At the second or easterly of the two points shown on the map, - that is, the easternmost of the ledges shown on the map in 3:44:4, the structure is somewhat as follows "A" (a) is a fine grained basic dike, cutting ^{diagonally} across the edges of the Silurian strata. The direction of this "A" (a) dike is E. 5° S. by W. 5° N. A hand specimen is numbered 1014. The dike is about a width of six or seven feet; its southern limit was not observed (covered with gravel).

On the east side of the ledge there is another dike "B" of the sketch which is directed N. 16° W.



the angle included between this dike and "a" being 69°. The dike shows 6 feet of width with the eastern limit unknown. A hand specimen is 1015. The next dikes are exposed in a little cliff, which unlike 1014, 1015, shows above high tide. 1016 represents a dike (b² of the sketch) which stretches N. 19° W. It is apparently the same as the dike 1015 (b of the section) of which it is a continuation. It may be fifteen feet wide. A yard or two to the west of 1016, there is another dike, a basic one, 1017, which weathers nearly black. This dike (c of the section) is two and a half feet wide & is separated from b² by somewhat baked shales with an occasional *lingula*. The strike of the dike is N. 4° W. 1016 distinctly cuts across 1017 on the gravelly beach, as is indicated in the figure.

Following the shore eastwardly, in the little cove in the western part of 3:44.5, between the fence and the rock ledges mapped, (just west of the latter) the shales are crumpled and turned on edge, - strike N. 85° W; dip 60° degrees, 3° E. of north. The cause of the crumpling is apparently the intrusion of a dike of amygduloidal diabase¹⁰¹⁸ with calcareous amygdulae which effervesce under acid. The rock is similar superficially to the dike 1012 (see p. 36 top).

3:44.5
to
3:44.9

Beginning at the rock ledges shown in the western part of 3:44.5 and extending eastward for nearly about 3/8 of a mile as far as the ^{being shore} rock ledges shown on the western edge of 3:44.9, there is a beautiful continuous section of red shales, red & gray clust beds, volcanic ashes, gray shales, gray flags. The rocks are exposed in a shore cliff which cuts diagonally across the line of strike, which exhibits the strata in beautiful section dipping in a general westward direction. The section begins on the east # (see footnote for location) with an igneous dike resembling the contact phase of the rhyolite. Specimen 1019. This dike is at least 20 feet thick, the east limit unknown, the beach from this point eastward being gravelly as far as the large igneous hills & sea cliffs beginning near the east edge of 3:44.9. To the west of this dike (possibly a flow) there is an enormous bed of volcanic tuff over 6 feet thick, red in the lower half, gray-green in the upper half. This in turn is surmounted by a massive volcanic ash which contains fragments two feet or more in thickness. The strike of this enormous ash bed is S. 60° W, dip 36°. In the ensuing section of shale flags etc there occur several more tuff beds

at the east of the two heavy shore ledges near the western edge of 3:44.9, nearly due north, - a couple of degrees to the west - from the westernmost of the group of houses shown on the map

usually red in color, and with fine network structure, occurring interstratified with the shales & thin flags, but the tuffs themselves not stratified (stratulate).

The dip & strike of these beds is variable. Near the lower third we see a few thin flags with calcareous concretions. On weathered surfaces these concretions stand out as coarse knobs. Similar beds occur south of the inlet shown in south part 3:44.7 (near border line 3:44.7 and 3:54.1). The strike of the ash bed has already been mentioned as being S. 60° W, Dip 36°, N. 30° W. Just west of the ash beds the shales dip 37° W. 5° S, strike N. 5° W. A little farther west in the knobby, calcareo-concretionary shales the strike is S. 45° W, dip 27° N. W. In eastern part of 3:44.8 occurs a very thick junk rhyolite dike stretching west and south and more than 25 feet wide. It contains large scattered cubes of pyrite nearly half an inch thick. ^{near the top of this section in the shales a sample of ash bed west of} the dike 1018, occur some *laminellibranchia* 3:44.5a. (For fossils of lower part of section, see p. 45. A fresh spine (Anchura) was found in a calcareous nodule 4 ft. lower down (= 3:44.5 h, July 6, 1907)

Thursday, June 13, 1907.

A section was made to ascertain the THICKNESS OF THE LOWER PERRY as exposed just north of the Toll Bridge across to Moose Island. The section begins on the shore at nearly half tide. The rocks here strike N. $10-12^{\circ}$ E and the dip is W. $10-8^{\circ}$ N. The section was run along a line extending W. 10° N or along the line of maximum dip normal to the strike. The section begins at some ledges which are covered ^{above} at low tide and which include the first ^{shore} exposures N. of the Toll Bridge (about a quarter of a mile).

"a." - A continuous series of compact conglomerates with the pebbles mostly the size of peas, very commonly one inch to 2 inches. A very small fraction of 1% of the pebbles are as large as 5 inches in thickness. The pebbles are for the most part rounded, but an occasional seam a few inches thick has more than half the pebbles angular. These sandstones occur but these are lenticular and usually cap the little ledges of conglomerate. A dark sandstone lens (2 feet thick) strongly cross-bedded is found at 80 ft (from the beginning of the section) but this lens thins out to nothing 50 feet to the north. A thinner hard sandstone band, four inches thick caps a ledge at 30 feet. This thin sandstone is a little more persistent. Dip, 25° .

"b." - Covered for 165 feet (110-275 feet). This portion is a mud-flat covered with pebbles & these small. There are no rock outcrops but at the southern end is a patch of gray massive marine clay indicating that this little cove is possibly a buried channel running along the strike of the rocks.

"c." - The first rocks reappearing are the edges of some red shales which are partially buried in gravel. These continue the same strike (N. 10° E) as the preceding and, like "a", also have a heavy dip to the west, though the exact amount could not be ascertained. The shales cover a space of 9 feet (275-284 ft.). In color they somewhat resemble the Silurian red shales, and like these are also olive green in coloration like spots, but are coarser & sandier than the Silurian red shales, and are not so crumbly or friable, - the Perry shales breaking into tougher shales and being in places nearly "slaty".

"d." - A shore cliff at high tide of conglomerate, the cliff varying from 5 to 10 feet in height. The conglomerates grade downward into the shales in a fairly gradual passage, the rocks immediately above the shale being somewhat shaly and in many places free from pebbles, and the pebbles where they first occur are small, - the conglomerate becomes more & more massive above. The pebbles are rounded and usually not more than 1 or 2 inches thick. The bulk of the pebbles are little, rounded white quartz fragments the size of a pea. Following the cliff of conglomerate along the shore which is also along the direction of the line of strike, we find the character of the conglomerate varying. In places the entire 5 to 10 feet are massive conglomerates. In other places there appear some thin sandstone lenses 5 or 6 inches thick, and thinning to nothing in the course of a couple of yards. A precise reading of the strike over an extended stretch gave N. 12° E, instead of N. 10° E. N. 12° E. represents the real strike of the section, apparently.

Friday June 14 1907.

Pleasant Point.

The north spur of Barlow Island is composed of the massive pink rhyolite beautiful exposures of which are visible on the east & west shores as well as higher up in the railroad cut. Crossing to Pleasant Point by the railroad bridge, we find no outcrops on the southern end. Passing up the east shore the first outcrops occur on the point in the southwest corner of 3.33.9 and consist of the massive pink rhyolite associated with darker fine grained igneous rocks which probably represent contact phases of the rhyolite as they grade into the latter. The darker fine grained rocks look as though they might possibly be masses of metamorphosed shale or quartzite. A specimen of the pink rhyolite is no. 1030, of the dark rock 1031. The principal ledge of rhyolite we come to a thick dike of fine porphyry bearing N. 14° E. The porphyry, 1032, is distinctly cut across by the pink rhyolite. The N.W. edge of the rhyolite for several feet in width with the Sierran series is fine grained & gray in color (= contact phase) and the shales overlying are highly contorted. For 10 feet beyond the contact the shales strike S.W. by N.E. with a dip of 85° N.W. or nearly vert. For the next 13 feet the shales strike

N.W. by S.E. with a dip of 50° S.W. - thus indicating the great disturbance in the shales by the intrusion of the dike of rhyolite. In the fifteen feet of shale with a N.W.-S.E. strike & S.W. dip of 50° occur some fossils, - a seam with *Lamellibranchia* & several species with *LEPERDITIA*. These fossils are 3.33.9a. There then comes for a hundred feet or more along the beach (diagonally across the strike) a series of shales constituting the main mass of shales of the island like Pleasant Point. These shales strike N 21° E

and dip 24 degrees, W. 20° N. They contain *Leperditias* throughout, in a few seams *Ostracods*, and in some seams little *Modiolomorpha* of subalata or an occasional *Lingula*. In the lowest foot and a half of these shales exposed (above high water) there occurs a couple of seams containing great numbers of *Leperditias*, apparently exclusively. An occasional specimen occurs throughout the shales. These fossils are 3.33.9 b. A foot and 3 inches higher up is another very fossiliferous seam or rather two or three seams close together containing many *Ostracods* (*Byrrhinia* & *Primitia*), besides *Leperditia* & *Lamellibranchia* & a rare *Lingula*. These fossils are 3.33.9 c. A few several

horizontal 5 to 20 feet stratigraphically above 3.33.9 c occur seams containing immense numbers of *Leperditias* (common throughout) as well as small *Modiolomorpha subalata*, great numbers of *Byrrhinia* & *Primitia* & a rare *Lingula*. These fossils all lumped together as 3.33.9 d. In the upper 10 or 15 feet of the section the fossils are extremely scarce and there then ensues an abrupt synclinal bend beyond which a few feet of shales crop out on the beach striking N.E. & S.W.

and dipping 20°, S. 48° E. These resemble the beds above 3.33.9 d in being sparsely fossiliferous but contain an occasional *Leperditia* so that the bend is merely a synclinal fracture without appreciable faulting. Fossils 3.33.9 e. Two cross sections 150 feet beyond which they become very much eroded. Fractures suggesting a anticlinal dike follow along the near snow-igniter well, the *Leperditia* beds reappear with the nearly normal strike of N. 40° E. dip 20° N.W. These beds are profusely ripple marked and one layer displayed rain prints. These wave marked beds are also displayed on the west side of the point.

On the west side of the Peninsula south of Pleasant Point the Silurian shales occur in apparently three unconformable, ~~courses~~ ^{courses}. The unconformability ^{consists of 3 patches being a different strike but same dip} ~~is~~ ^{however, may be more apparent than} real & probably represents faulting or disturbances. The rhyolite-shale boundary bears W. 20° N. and passes nearly through the southernmost Indian Cottage. Rhyolite appears in P.C. cut to S. of this cottage about 100 feet. No fossils collected on west side today.

Saturday June 15, 1907.

CARLOW ISLAND.

After finding that the *Leperditia* beds included all the Silurian exposures on Pleasant Point, a search was prosecuted to find out to what extent, if any, these beds continued southward on Barlow Island. The Lamellibranch beds 3.43.6a (page 43) were followed along the shore; then ensued the wave marked, rain-printed & ripple marked gray shales, calcareous nodular layers & quartzitic seams with only an occasional lamellibranch, until reaching up to the railroad cut, (the northerly one containing shales; this cut encloses the latter "L" in "Barlow" as on the map, and is north of the road running west [W. 15° S.] from the house). Where some coarse shales are cut by a rhyolite (?) dike which appears on the west side of the railroad on the easterly side of the cut the shales continue uninterrupted, or nearly so, and contain *Leperditias* in thin calcareous seams. A *Leperditia* occurs rarely throughout the shales, but there are also several seams of *Lamellibranchia* with some *Lingulas*. The fossils from this cut are 3.43.6 b. Some *Primitias* also occur, but no *Byrrhinia* was observed here.

NORTH SHORE OF MOOSE ISLAND, WEST OF KENDALL HEAD.

In the long series of Silurian shales & tuffs occurring on the north shore, west of Kendall Head, an examination was made for fossils in the lower part, the fossils of the upper beds being represented by 3.44.5a, 3.44.4a, 3.44.4a, & 3.44.4b. Immediately west of the dike of rhyolite (?) (contact phase = 1019), occur occasional *Lingulas*. These *Lingulas* are found within a foot of the dike and are the only fossils found for about 10 feet above. They are not common (= 3.44.9a). 3.44.9 b includes some

more *Lingulas*, a few feet above the preceding and two feet below the dust beds. Fossils occur, but very scarcely, however, in the red dust beds, where they may be observed an occasional fragment of shell in eternal mold of *Pecten Lingula* & a small *Modiolopoid*, I am uncertain which. The dust beds are too fragile to yield any recognizable fossils. For twenty-five feet above the thick ash bed an occasional *Lingula* may be observed but very rarely. Twenty-five feet above the thick ash bed

occurs a seam of lamellibranchs 3.44.9c and above this is a seam with large *Lingula*. These beds are just below some red dust beds.

3.44.9d *Lingula* beds in gray shales about 75 yds. east of N.W. pyritic pink rhyolite. (see Bastin's section for locality & place in section. Collected June 27, 07)

3.44.9e *Lingulas* in red sandy layers. 20 feet east of rhyolite

Monday, June 17, 1906.

KENDALL HEAD & westward

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The hills from Kendall Head to the latter W. in Moore Island are composed of massive outcrops of a very fine grained, light gray-colored hard rock which has in places the appearance of an acid volcanic, on account of the absence of bedding planes, the lamination & light gray color. In places however this rock is distinctly bedded having the appearance of more or less baked shale, or of shales composed of volcanic sands. These stratified portions also contain fossils and are interstratified with volcanic ash beds. The fossils found are only Lingulæ which are rather scarce. A very peculiar feature is that the stratified beds, if followed for a greater or shorter distance, appear to pass into massive unstratified beds.

Some thick strata appear along the southeast shore of Kendall Head or northwest shore of Johnson Cove. A few fossils exclusively Lingulæ were collected here = 3.55.1a. The east localities is about 1 or 2 millimetres (on the map) below the northern base of the little square. Higher up, southeast of, and about 20 feet below the top of Kendall Head, occur some more fossiliferous strata containing a few Lingulæ = 3.55.1b.

3.55.1 B About 10 or 15 feet lower down the hill side of the southeast occur some ash beds of which 3 good specimens were collected = 1033

Some more ash beds occur in the northwest corner of 3.54.6 about the 80 foot contour just north of the fence corner. From this fence corner & extending eastward as far as ~~the~~ and including the first "O" in "Moore Island" there occurs a series of bedded fossiliferous strata containing a few Lingulæ = 3.54.6a. These are flinty shales, light gray in color, epidotic in spots. 1039 is a few small specimens of the rock which extend up to the ash bed just described, nearly to the top of the hill.

3.54.6 A Little hill at the southwest corner of 3.54.3. A series of readings in these beds gave

STRIKE	DIP	STRIKE	DIP
1. S. 70° W	84° N. 20° W	4. S. 70° W	40° N. 20° W
2. S. 54° W	62° N. 35° W	5. S. 72° W	45° N. 20° W
3. S. 45° W	53° N. 45° W	6. S. 55° W	60° N. 35° W

No. 6 is at the top of the hill, includes some finely stratified beds in which are mixed up large angular bedded stratified fragments. The general dip of the above beds is very heavy 50 or 60° or more & the general line of strike is S. 70° W. These beds are cut by a pinkish dyke which extends in a general north-south direction & crops out in a little patch (1038) a few feet long on the west side of the road below the first house.

CARRYING PLACE COVE & WESTWARD

A patch of shaly & quartzitic lean outcrops on the shore in the western edge of 3.54.6 & the eastern edge of 3.54.5. The beds of this outcrop are highly bedded, very much contorted and are cut off on the west by a dyke which runs N. & S. = 1034 (dyke, 3 feet west of contact). The accompanying sketch is on a large scale.

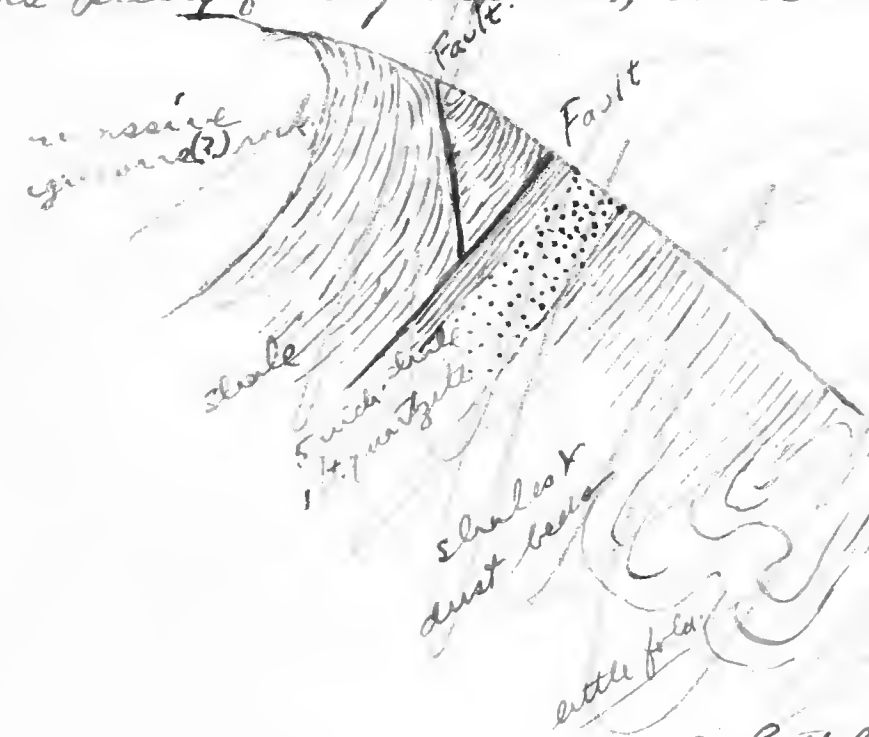
Station No. 2 represents more contorted & bedded shales displaying a little syncline. On the east side of this syncline the dip is 45-60°, S. 75° W; strike N. 15° W. on the west side the strike is S. 40° W; dip 75°, S. 55° E. The strata curve round indicating either a basin syncline, or one with the axis slightly tilted. At station 3, the beds on the east side strike approximately N. 50° W. The dip is very slight, 5° or less, direction S. 55° W. The beds are contorted



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with slight rolls, - the axis of the rolls along the dip. The western part of the joint has a markedly & abruptly different line of strike & dip. The change in strike & dip is apparently a fault plane which extends north-easterly. On the west of this plane there is a series of beds which all strike S. 70° W. and dip 66-70 degrees, N. 15° W. Near the middle however, a close examination will reveal the axis of a fold, which axis is apparently on end. The beds represent a closed fold, whether anticlinal or synclinal it is impossible to say, as the fold itself is turned up on edge.

Station 4 is at the foot of the little rock hill shown on the map in the middle of 3.54.4. The lower part of the cliff is composed of contorted volcanic dust beds displaying the usual network structure, apparently overlain by contorted ash beds or other igneous rocks different phases of which are represented by 1035, 1036, 1037. On the east side of this joint the contortion of the beds is pretty fine, exposed, as is illustrated by the following profile.



No fossils were found in the beds contorted shales on the west side of Carryng Place Cove.

P.S. This contortion may be more apparent than real & is possibly, as Dr. Peck believes, merely curved pressure rock shales rather than curved bedding. The folding at A3 appears to be local crumpling of a few strata rather than close folding.

The rocks 1035, 1036, 1037 also appear a little south of the first "O" in "Moore Island" where they appear to be well stratified and overly distinctly stratified beds. At this point they dip 47° N. 20° W, Strike S. 70° W

3.53.6 A On the ledges of bedded shales & siliceous bed at the east edge of 3.53.6a a single Lingulæ was found. These are the same series of beds as 3.55.1a b. and 3.54.6a. The beds are very distinctly stratified here.

GLACIAL STRIÆ

Eastport 3:42:6 ← Sandstone on shore at high water, mean
direction of striæ 10° E. of S. x by 10° W. of N. only one set. Extremes
5°-12° E. of S. 8°-12° W. of N.

Eastport 3: boundary 44:7 - 54:1 (in ice). N. x S.

N.W. corner Pleasant Point Peninsula . 3.33.8. N. 40° W.
3.32.6. East of Lonsdale Island. N. 41° W.



W

