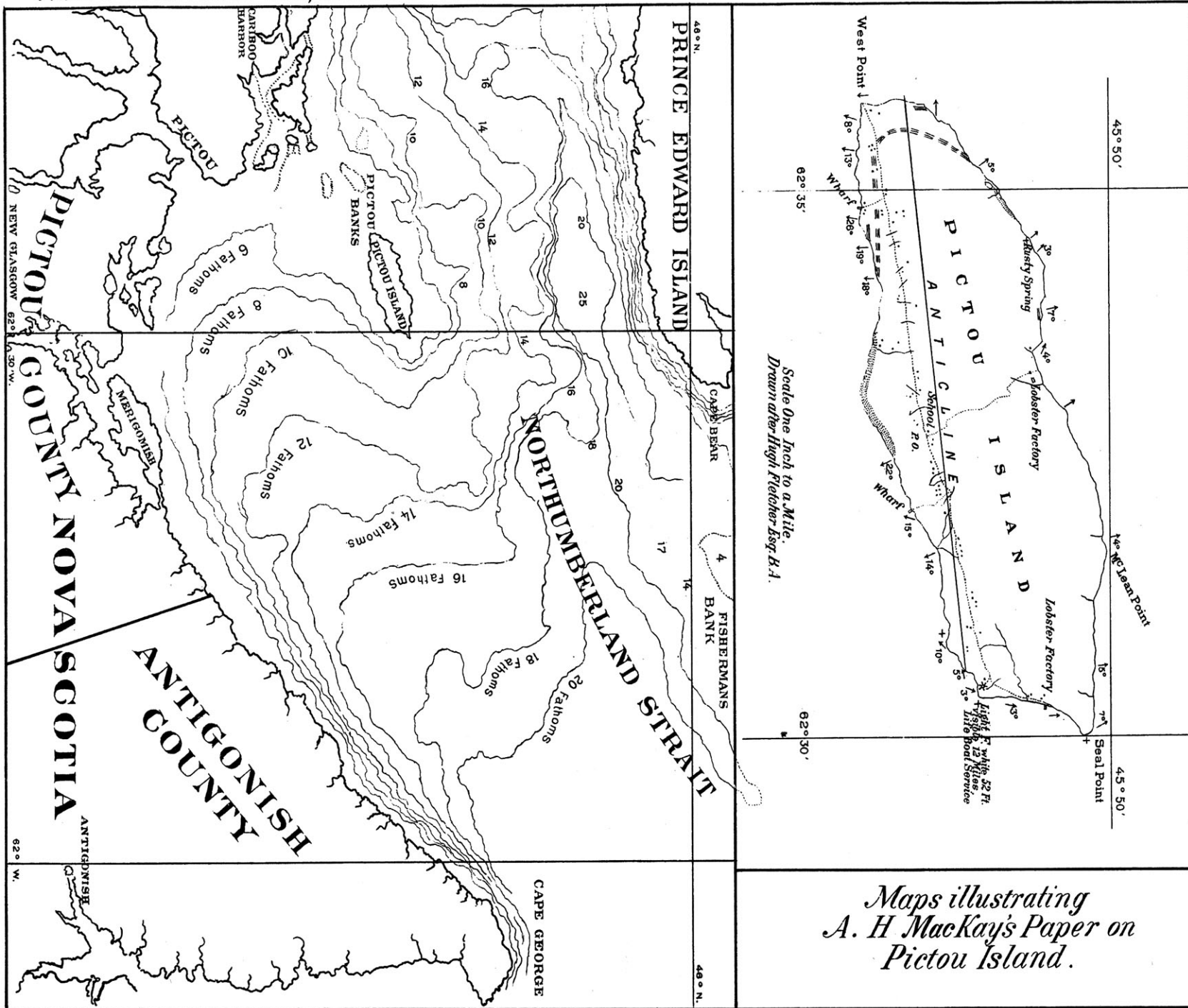


VIII. — PICTOU ISLAND. — BY A. H. MACKAY, B. A., B. SC.,
F. R. S. C.

Pictou Island lies in the Straits of Northumberland, mid-way between Pictou County, Nova Scotia, and Prince Edward Island, between lat. N. $45^{\circ} 48'$ and $45^{\circ} 50'$ and lon. W. $62^{\circ} 30'$ and $62^{\circ} 35'$. It is about five miles long and one wide, the axis of its greatest length being nearly due magnetic east and west, *i. e.* astronomically about N. 65° E. A circle described from the centre of the island with a radius of about eleven miles would touch the approximately parallel coast of Prince Edward Island on the one side and come within a mile of the nearly parallel island of Merigomish and adjacent coast line on the other side, while it would reach the land near the mouth of Pictou Harbor, cutting off the head of the peninsula on which the town is built, leaving the mainland tangential to the coast line of Carriboo Harbor. The island rises from 100 feet in the west to 150 feet in its eastern half above the level of the sea; and its rock base exposed by the action of the water around the coast line, is capped to the depth of many feet with boulder clay and gravel drift forming a gently undulating surface and a superior soil for all agricultural purposes. Seven or eight miles towards Prince Edward Island, the water attains a depth equal to the island's extreme height, and on the other side towards Merigomish it attains a depth of only one half, about 75 feet.

From a glance at the map it will be observed that the corrugations of the earth surface running northeasterly and southwesterly are well marked in Nova Scotia and New Brunswick. The general elevation of Nova Scotia above the water is in this direction, as is also the coast line, the mountains, and the depressions of the Bras d'Or in Cape Breton, the coast line of Nova Scotia from near Pictou Harbor to Cape George, the synclinal depression of Pictou Harbor itself, which appears to run out in the strait parallel to the coast, the depression of the Hillsborough River in Prince Edward Island, and portions of



*Maps illustrating
A. H MacKay's Paper on
Pictou Island.*

Maritime Steam Lith. Co. S. John & Halifax.

the coast line such as that from Cardigan Bay to East Point. Pictou Island would thus appear to be the highest part of the crest of a submarine ridge of elevation of the bottom of the strait, which may be traced from the mainland through the islands outside Carriboo Harbor and a series of shoals in some places reaching to within 10 or 12 feet of the surface of the water for a distance of eleven miles to Pictou Island, then for five miles in the island itself, then for about 20 miles more northeasterly until it passes beyond a line from Cape George to Cape Bear. This elevation in the floor of the strait may be compared to a huge submarine monster whose head is the islands abutting against the mainland at Carriboo Harbor, whose neck and shoulders are the six or seven miles of shoals and banks extending to the Pictou Island, whose humped or crested back is the five miles of the island itself, and whose submerged tail extends in the same general direction, N. 60° E., midway between and subparallel to the coast line on each side, until it vanishes in the wide bay beyond the capes about forty miles from its head.

The floor of the strait and the land on each side appear to rest on Upper Carboniferous or Permian rocks. The base of this group is considered to be the belt of New Glasgow conglomerate lying immediately above the coal measures. This conglomerate belt is also sub-parallel to the coast line. From Merigomish to New Glasgow it lies about N. 70° E., while the coast line easterly is about 60°. West of New Glasgow the conglomerate gradually curves to 80° and ultimately runs nearly east and west, tending to become sub-parallel to the sharp flexure of the coast line in the vicinity of Pictou Harbor.

Pictou Harbor is a narrow depression in the sandstone rocks newer than the conglomerate, caused by a downward folding as much below the general surface of the country as the deepest channel of the straits is below the coast line. The axis of this synclinal depression runs about N. 60° E. parallel to and between the Merigomish and Antigonish coast line on the one side and the Pictou Island sub-marine ridge on the other side; which suggests that this half of the bottom of the strait is floored with the sandstones on each side of Pictou Harbor, and that the sharp flexure

of the coast line between Merigomish and Cariboo was caused by the more complete collapse of the Pictou synclinal just at the harbor's mouth, which submerged the Permian entirely between Merigomish and Pictou Island.

We now come to examine the structure of our submarine ridge as shown by its exposure in Pictou Island. The rocks are well exposed nearly all round, and they dip down on each side into the Nova Scotia and Prince Edward Island troughs of the strait. The anticlinal axis is well marked, running from one extremity nearly to the other, not exactly in the direction of the greatest length of the island and the submarine ridge but approximately so, N. 84° E. This line when produced would appear to pass a little north of Cariboo Islands and strike a distant anticlinal in the Permian rocks at Cape John. However, from the observations of Sir Wm. Dawson (*Acadian Geology*, 1868, page 327), and from the variable dips, and possible faults in the region, the anticlinal west of Pictou Harbor probably occurs at the mouth of the Cariboo River, from which we would infer that the Pictou Island submarine ridge is on an anticlinal axis sub-parallel to the Pictou Harbor synclinal axis and to the present coast line of East Pictou and Antigonish.

Before giving the detailed measurements of the different strata of the island (for which I am entirely indebted to Hugh Fletcher, Esq., B. A., of the Geological Survey of Canada, with whom I had the great pleasure, in August, 1890, of studying the geological structure of the island), it may be well to give a general description. As has been already indicated, every part of the island has superior soil for agricultural purposes, and excellent springs of water. Crops appear to be more luxuriant than on the mainland. One main road runs through the length of island. It contains some thirty families, specially healthy and comfortable, of Scottish descent, with a good school. During the summer, lobster fishing and canning draw some more inhabitants to the community. A lighthouse is situated at the southeastern point of the island, from which point we number our geological sections of the coast.

Coarse sandstone strata of different textures abound, some of

which would make good grindstone. Fossil plants and stems and trunks of trees imperfectly preserved are observable at several points, and are often strongly impregnated with iron pyrite. No indications of copper were seen, although such are very common in the Permian rocks of the mainland. Strata of limestone probably run under the island. It is exposed towards the west end of the south coast and again apparently on the north side of West Point. Its probable outcrop will be under the drift parallel to the anticlinal axis and near the northeast coast, its eastern outcrop being probably contained in the concealed measures immediately south of Seal Point. Westerly it probably curves parallel to the west coast to its exposure on the south. The course of the anticlinal from near Light House Point to north of West Point is as has been mentioned about 84° . The westerly dip of the rocks at the commencement seem to indicate that its axis is slightly tilted. The sections begin at Light House Point and follow the shore northward, then west and south and east to point of beginning. They are of course only approximate, the dip being too changeable, particularly in the sandstone, to admit of close measurement. A thickness of only 562 feet of strata occupies the whole shore.

SECTIONS ON THE SHORE OF PICTOU ISLAND.

SECTION I.

From Lighthouse Point, westward, in ascending order.

- | | | |
|---|-----|-----|
| | Ft. | In. |
| 1. Gray sandstone of Lighthouse Point, in thick and shaly beds; with carbonized plants and spheroidal concretions; false bedding. The upper part is fine. Certain bands have been quarried, but the want of a shipping-place has retarded the development of this industry. Dip $24^{\circ} < 3^{\circ}$ (astronomical, the variation being about 24° W.). Cliffs 15 feet high. Of indefinite thickness; exposed on both sides of the anticline for a great distance | 173 | 0 |

	Ft.	In.
2. Red marl and sandstone, with harder greenish bands. The marl contains nodules of impure concretionary limestone, also green spots, stripes and blotches. Dip $14^{\circ} < 4^{\circ}$	91	0
3. Measures concealed by a sandy cove to wharf at the lobster factory	77	0
4. Measures concealed from wharf. Dip $3^{\circ} < 3^{\circ}$	39	0
5. Greenish-gray and light gray sandstone, like that of Merigomish, of good grindstone grit, in thick jointed beds.	29	0
6. Gray sandstone, like 2, but full of hard spots or bull's-eyes	16	0
7. Gray sandstone, with pyrites and calcespar. Markings of <i>Lepidodendra</i> and of other plants. Dip $336^{\circ} < 7^{\circ}$. Seal Point	85	0
8. Measure concealed on a sandy shore at a small brook. Dip $1^{\circ} < 5^{\circ}$	7	0
9. Reddish-gray fine sandstone, in thick beds, exposed on low reefs, alternating with greenish-gray and gray coarse and fine sandstone, with carbonized drift-plants. A band of light gray sandstone of good grindstone grit at top. Not well seen, but for a great distance on strike in reefs.	45	0
	562	0

Ascending as far as McLean's Point, then descending to repeat the foregoing measures as follows.

SECTION II.

At McLean's Point, descending.

1. Gray sandstone like that of Chance Harbor and the vicinity.	155	0
2. Measures concealed in cove at lobster factory on the north side,— a white sandy cove into which flows two little brooks.	75	0
	230	0
Section now ascends.		

SECTION III.

Rocks from Lobster Factory Cove, westward, in ascending order.

	Ft.	In.
1. Measures concealed. Dip $316^\circ \triangleleft 4^\circ$	21	0
2. Reddish and gray, shaly and thick bedded sandstones, exposures of which begin 40 yards north of a fish-house at the mouth of a brook	15	0
3. Brownish and gray sandstone in thick beds fit for grindstones. Dip $0^\circ \triangleleft 7^\circ$	13	0
4. Greenish and reddish nodular, concretionary, calcareous marl		
5. Gray, fine, flaggy sandstone.....	15	0
6. Light-gray, rusty-weathering, coarse, pebbly, crumbly sandstone like that of Toney River. Dip $311^\circ \triangleleft 3^\circ$	10	0
7. Gray, fine, crumbly sandstone	12	0
8. Gray, rusty-weathering, pebbly sandstone to a spring which deposits yellow ochre	35	0
9. Gray sandstone in unbroken reefs.....	17	0
*10. Measures concealed, but probably reddish or brownish sandstone seen at intervals in reefs immediately east of a little pond or marsh	14	0
*11. Measures concealed by a fishing cove, Dip $292^\circ \triangleleft 4^\circ$. Very many blocks indicate that blueish-gray limestone is in place in this interval.....	46	0
†12. Light-gray, pebbly, concretionary, calcareous rock		
†13. Gray and brownish, flaggy, fine sandstone well exposed in reefs.....	56	0
†14. Reddish-gray sandstone and shale with bands of gray, fine sandstone; not well exposed. Dip $273^\circ \triangleleft 5^\circ$	43	0
†15. Red and green concretionary marl.....		
†16. Gray, fine sandstone exposed on west point with a dip which bends sharply to $182^\circ \triangleleft 8^\circ$	87	0
†17. Light-gray, crumbly, coarse, thick bedded, pebbly		

*Perhaps underlying the thick sandstone.

†Perhaps Nos. 1 to 9 repeated and nearly doubled by being measured at the turn of the anticlinal.

	Ft. In.
sandstone seen east of the point. The highest rocks are on reefs about 400 yards west of a wharf and lobster factory near Hugh McLean's.	
Dip. $182^\circ \angle 14^\circ$	53 0
	437 0

The section is now repeated descending.

SECTION IV.

From near West Point, eastward, in descending order.

1. Gray sandstone, Nos. 14 and 15 above. Dip. $182^\circ \angle 14^\circ$	140 0
2. Light-gray, pebbly, concretionary, calcareous rock	- -
3. Red marl	2 6
4. Bluish-gray, knobby, impure limestone	2 0
5. Red marl and sandstone. Dip $182^\circ \angle 17^\circ$	48 0
6. Gray, rusty-weathering, fine sandstone in flaggy beds	36 0
7. Red sandstone and marl. Dip $187^\circ \angle 18^\circ$	9 0
8. Gray limestone of fair quality, like that of Carriboo and Cape John	1 6
9. Red marl	8 0
10. Gray limestone	1 0
11. Red, shaly sandstone and marl with dark red blotches and green spots. Here, near a brook, begins a beach and low bank of brownish-white fine sand, which occupies the south shore of the island for more than a mile. The relation of the rocks next seen to eastward is consequently obscure, but as the dip of the succeeding rocks is similar, we may perhaps assume that they directly underlie the red strata	46 0
12. Gray sandstone, coarse and pebbly or fine and flaggy, alternating with bands of red marl and sandstone with nodules of limestone. Dip $164^\circ \angle 13^\circ$. Extends 45 chains to eastward of the	

Ft. In.

public wharf, the shore conforming with the dip which turns more to westward, and the cliffs being of the following:

13.	Gray fine sandstone and coarse rusty-weathering sandstone, in thick and in flaggy beds full of broken plant remains and of prostrate and erect trees mineralized with calcspar and siderite. Dip $188^{\circ} \angle 10^{\circ}$. Quarried for grindstones some years ago near the wharf.	91 0
14.	Gray thick-bedded sandstone, full of plant remains and of aggregations of "bulls-eyes." Dip. $232^{\circ} \angle 10^{\circ}$ to $263^{\circ} \angle 4^{\circ}$, then turning northeasterly and repeating the rocks in ascending order from Light House Point.	82 0
		467 0