

that I will not readily forget it. I presume that the specimen is now in the collection of the Geological Museum, Ottawa.

There is, therefore, reason to suppose that the Hartley specimens and our nullipore are analogous, as both have concretionary lamellar structure and attached spirorbes, and that the carboniferous concretionary limestone is coralline or nullipore in origin.

ART. III.—NOTES ON SABLE ISLAND. By SIMON D. MACDONALD, F. G. S.

(Read March 12, 1883.)

IN bringing this Island and its surroundings to your notice this evening, I feel I am opening up a rich field for the future investigation of this Institute.

From its geographical position—midway between this coast and the gulf stream—it possesses characteristics peculiar to itself, and a phenomena so varied that there is work here for us all.

But not only does this Island invite our attention in the interests of science, but *demand*s our attention in the interests of *humanity*.

Situated directly in the pathway of commerce,—enshrouded for weeks together by impenetrable fog—encircled by eddies and currents of the most erratic character—its dangerous and ever-shifting sand-bars, together with its terrible record of disasters, dating back from the earliest history of this country—it has earned for itself among mariners the well-merited appellation, that of “the grave-yard of North America.”

And were we to-morrow to visit this island and witness its wreck-strewn shores—the ghastly grin of skeletons protruding from the embankment or lying awash on the beach—and listen to the sickening tales of the surf-men, we would feel guilty, indeed, if we, as members of one of the oldest scientific societies in

this Dominion, did not put forth our greatest effort to learn something of the causes whose effects are so fraught with destruction, and give to the world the benefit of our researches.

While compiling the wreck-chart of Sable Island which we have before us, I have had to examine the early records of the Province, from which I have gleaned many facts in connection with the history of this Island. Having had the opportunity of visiting it on two occasions, and learning something of it as it is to-day, I thought it well to place the results before you, to form, as it were, a basis for further investigations.

The first notice of this Island in history, is from the voyage of John Cabot, who, in company with his son, Sebastian, sailed from Bristol in 1547, in a vessel called the "Matthew." After making the land at Labrador, he sailed south and westward, coasting Newfoundland and Nova Scotia, as far as Cape Sable. Finding here the coast trending suddenly to the *north*, and being short of *provisions*, with an *unknown* sea before him, he wisely turned his prow homeward. On the third day he passed two islands to starboard, which, from their *position*, must have been some of the higher hummocks of Sable Island. Viewed at a *distance*, these might easily be taken for separate islands.

Three years later an expedition, ordered by Emanuel, King of Portugal, followed in the wake of Cabot; but meeting with reverses, they returned, disheartened, to Lisbon.

Private enterprizes, however, stimulated by the glowing accounts given by Cabot of seas *blocked* with fish, were continued from year to year, and hundreds of Portuguese fishermen resorted to the banks.

To these people the credit is given of having placed cattle and swine on the Island for the benefit of those who might be cast upon its shores. That they were well acquainted with the place, there can be little doubt.

On a chart made by Pedro Reinel, as early as 1505, of Newfoundland and this coast, as far as *Maine*, this island is laid down as "*Sanda Crus*."

In the museum of Paris is another chart, made by Gaftaldi (of New France), in 1550, showing the fishing banks extending from off Lahave to Newfoundland, on which this island appears as "Isolla del Arena."

In 1518, Baron de Lery made the first attempt to colonize this New France, but meeting with a succession of gales, which drove him back several times, he arrived on this coast too late to place his people under shelter before winter would overtake them, so he left part of his cattle at Canso, and sailed for Sable Island, where he placed the remainder, and returned to France. In after years these cattle had so multiplied that it became a matter of speculation for parties to land and hunt them for their hides and tallow.

The next mention made of this island is in the record of the disastrous voyage of Sir Humphrey Gilbert, who sailed from England with a fleet of five armed vessels. Arriving at St. John's, Nfld.—he found a large fleet of fishermen, of different nations—and took formal possession of the place in the name of Queen Elizabeth. The Portuguese treated him well, and after supplying him with wines, marmalade, sweet oil, &c., told him of their having placed swine and cattle on Sable Island. Thither Sir Humphrey sailed.

Several days after, during a thick fog, he lost his second in command on Sable Island. As this is the first wreck of which there is any history, written in quaint old English, I will read it as recorded :

"Sabra lieth, to the seaward of Cape Breton about 45°, whither we were determind to go, upon intelligence we had of a Portingall, during our abode in St. John's, who was also himself present when the Portingalls, about 30 years past, did put into the same Island both neat and swine to breed, which were since exceedingly multiplied.

"The distance between Cape Race and Cape Breton is 100 leagues, in which navigation we spent 8 days. Having the wind many times indifferent good, but could never obtain sight of any land, all that time, seeing we were hindered by the current. At last we fell into such flats and dangers, that hardly any of us escaped. Where nevertheless we lost our Admiral, with all the men and provisions.

“Contrary to the mind of the expert Master Cox, on Wednesday, 27th August, we bore up toward the land. Those in the doomed ship continually sounding trumpet and drums. Whilst strange voices from the deep scared the helmsman from his post on board the Frigate.

“Thursday, the 28th, the wind arose and blew vehemently from the south and east,—bringing withal rain and thick mist, that we could not see a cable length before us. And betimes we were run and foulded amongst flats and sands, amongst which we found flats and deeps every 3 or 4 ship’s lengths. *Immediately* tokens were given to the admiral to cast about to seaward, *which* being the *greater* ship, and of burden 120 tons, was performost upon the beach. Keeping so ill a watch they knew not the danger before they felt the same too late to recover, for presently the Admiral struck aground, and had soon her stern and hinder parts beaten in pieces. The remaining two ships escapad by casting about E.S.E., bearing to the south for their lives, even in the wind’s eye. Sonnding on while 7 fathom, then 5, then again deeper. The sea going mightily and high.”

In the wreck of the “Delight,” or “Admiral,” as she was called, upwards of 95 *perished*, 12 only *escaped*, and afterwards reached the Nova Scotia coast and were carried by some French vessel to England.

In 1598, the Marquis “De la Roche” obtained a charter from Henry III. to colonize and Christianize New France, and sailed in May of that year. Arriving off this coast, and fearing that his people,—consisting of 40 convicts from the French prisons—might escape, he landed them on Sable Island until he could make arrangements to settle on the main land. On returning he encountered a furious gale which, in 15 days, drove him on the French coast. He had scarcely *landed*, when he was thrown into prison by an enemy, and was prevented from communicating the result of his voyage to the king. Five years after, the king, receiving *intelligence*, ordered the pilot who had led them thither to proceed to Sable Island and learn their fate, which was found to be deplorable. Out of the forty landed five years previous, only twelve remained alive.

Finding themselves alone, and deserted, as they thought, by the very one whom they looked to for liberty and comfort, they

became desperate. With no law to *restrain*, nor punishment to *fear*, each man's hand was turned against his fellow, and several had come to a violent end. The remainder, from ill-prepared food and exposure, became reduced in spirits, and had *lately* led more quiet lives. After being landed on the Island they managed to erect huts from the remains of a Spanish vessel wrecked in the breakers, and maintained existence by eating the raw flesh of the cattle Baron de Lery, or the Portuguese, had placed on the Island many years before, and which had become very numerous. In a short time their clothes were worn out, and they dressed themselves in the skins of seals.

On their arrival in France they were presented to the king. Their savage expression, unkempt hair and beards, which reached to their waists, together with their pitiful tale of want and *exposure*, so moved the *king* that he gave them fifty crowns a piece and permission to return to their homes. Strange to say, they afterwards sought passage to the island, where they accumulated a large quantity of fur.

In 1633, John Rose, of Boston, lost his vessel—the “Mary & Jane”—at this place. He was here three months constructing a yawl from the remains of his vessel, by which he reached the main land. His reports of having seen “more than 800 head of wild cattle, and a great many foxes, many of which were *black*,” so interested the Acadians that 17 of them embarked in a vessel, taking Rose as pilot. After this Rose returned to New England, where the tidings of this wonderful Island soon spread. A company was soon formed at Boston to hunt on the Island. On their arrival they found that the 17 Frenchman who had wintered on the Island, had built houses and a fort, and so slaughtered the cattle that only 150 remained.

About 100 years *later*, a French clergyman named LeMercier, claiming to be an Englishman by naturalization, sent thither a number of cattle, previous to removing with his family. He had petitioned Governor Armstrong, at Annapolis, for a grant of the Island, but declining to pay a Quit rent to the government, the grant was withheld. A proclamation was issued forbidding persons from killing those animals, and they continued there for many

years. At what period they were destroyed, and succeeded by the wild horses now upon it, is not known.

From this date up to the beginning of the present century, we have little information respecting this Island, except that it became a favourite resort of fishermen, for the purpose of hunting the walrus and seal.

With the increase of commerce, wrecks were more frequent, and it became the haunt of pirates and wreckers of the worst description, who are said to have lighted fires on the shore luring vessels to their destruction. Valuable jewels and rare articles having been exhibited as coming from there from time to time, strange stories of piracy and *murder* became frequent.

This, together with the report of several vessels being lost with all hands, in quick succession—among them being the "Princess Amelia," a transport having on board the household effects of the Duke of Kent and upwards of 200 officers and recruits, all of whom perished, although it was thought that many of them reached shore and were afterwards murdered by the pirates, excited the suspicions of the authorities.

The ~~gun~~ brig "Harriet" was dispatched, under Lieut. TORRENS, to investigate matters, when she, *too*, was lost. The government at once took action, and, by the advice of Sir JOHN WENTWORTH, an amount was appropriated for settling families on the Island to assist shipwrecked persons and for saving property.

A proclamation was issued, stating that persons found residing upon the Island without a license from the government would be removed and imprisoned for a period of not less than six ~~years~~. This had the desired effect, driving off the wretches who infested it, and the present establishment was formed under the superintendence of one JAMES MORRIS in 1807.

Such is the early history which, though dim and fragmentary, yet serves to show that the Island was well known and frequented hundreds of years before the founding of Halifax, and that by a race of people who have left no descendants along our coast.

We will now consider the general features of this Island. It is simply an enormous accumulation of loose grey

*Harriet lost
in 1803, by
a terrible storm
from the north*

mouths

1

sand, forming two parallel ridges united at either extremity. It is crescent-shaped, with its inner side towards the coast.

The valley formed by these parallel ridges extends the length of the Island, 8 miles of which is occupied by a lake. A narrow ridge separates this lake from the ocean on the south, over which the sea breaks in many places during heavy weather.

According to the last admiralty survey, this Island is situated 85 miles from White Head, the nearest point on the Nova Scotia coast. The west end is in lat. 43, 56, N., and 60, 08, W. long.,—22 miles in length and 1 mile in breadth.

From a northern approach it presents the appearance of a succession of low, naked sand hummocks, some partially covered with vegetation. Beginning at the west end, those hills or hummocks have an elevation of about 20 feet, gradually rising eastward, attaining the height of about 80 feet in the vicinity of the east end light, beyond which they slope away until they meet the N. E. bar, which in fine weather dries for a distance of 4 miles from the grassy sand hills. About two miles from the beginning of this bar, an island is forming over an old wreck, and is covered with grass.

This dry bar is succeeded by 9 miles of heavy breakers, to a depth of 6 fathoms, 4 miles further with a heavy cross sea, with from 10 to 13 fathoms, and then ends abruptly, the depth increasing in a distance of 3 miles to 170 fathoms.

The N. W. bar dries about $1\frac{1}{2}$ miles from the grass hills, with patches or shoals *nearly dry* one mile further out. Then 9 miles of heavy breakers in *fine weather*, succeeded by seven miles more in *heavy weather*, when the depth increases from five to ten fathoms, and where there is a great ripple and a heavy cross sea. The whole extent of this bar is 17 miles, beyond which the water gradually deepens.

Thus we have the Island, with its bars in bad weather, a continuous line of over 50 miles of foaming breakers, producing the most terrific effect; the Island seeming to shake to its foundation as the whole body of the Atlantic breaks upon it.

In addition to this bar, at either extremity there are three submerged bars, or ridges, parallel with the shore on both sides,

with only a few feet of water, which form heavy breakers when there is any sea running, making it exceedingly hazardous for landing in boats.

On the south side the water deepens very *gradually*, thus extending its dangers far into the sea in *that* direction. Vessels seldom anchor on the south side, because of the prevalent swell from the south, and from the great distance from a landing, which is only practicable after a long continuance of northerly winds. While on the *north side* boats can only land during *southerly* wind and after a continuance of fine weather. But there are surf-boats belonging to the Island which can generally communicate when *ordinary* boats would swamp.

On the north side vessels anchor from one to two miles off shore. The bottom being fine sand, holds *well*, but the sea is so heavy, except in off-shore winds, that on the first indication of wind from the sea, a vessel must weigh anchor immediately and make an offing.

Wrecks on the N. W. or N. E. bar are of course far more dangerous to life than those that take place on the Island. In bad weather the rescue of a crew on the submerged portion of those bars would be impossible.

We have here a *chart* showing the wrecks that have taken place since the formation of the establishment by the Government, in 1802, for life-saving purposes, which I have compiled from official reports, and submitted to the three superintendents that have had charge of the Island. This chart shows the name and position of *known wrecks*. The unknown, on the bars, are, perhaps, far *more numerous*. After gales, and a long continuance of foggy weather, there are often sad evidences of disaster in the wreckage, and frequently bodies drifted on shore, of which nothing more is ever known. These bars, on the north side, are extremely steep, especially so the N. E. bar, having as much as 30 fathoms water close to it; hence a vessel caught here in a S. W. to S. E. gale, would probably strike, forge over and founder in deep water, leaving nothing whatever above to tell the tale.

In the immediate neighbourhood of the ocean little else but

sand is seen, thrown up into every variety of drift, or scooped out by the wind into bowl-like hollows, relieved only by the stark timbers of many an unfortunate ship, washed by the waves or thrown high upon the shore, and the unceasing headlong plunge of the breakers, as each in turn rears its green head and breaks in a crest of foam as it rushes up the sloping beach. As we mount the hummocks and descend into the lake valley, the scene changes to that of a Western prairie. Desolate wastes of sand give place to green knolls and waving meadows of tall, luxuriant grass, interspersed with wild pea. In the vicinity of the lake can be gathered in their season *wild roses, lilies, asters, strawberries, blueberries, cranberries*—the latter affording quite a revenue to the Island.

Herds of wild ponies dot the valley and hill side. Here and there are fresh water ponds, girt with dense rank grass, where wild duck and water-fowl breed in thousands. Here, again is a long barren, known as the "desert," whose sands are as shifting as those of the Sahara, and equally as destitute of vegetation.

Thus alternate barrenness and vegetation, fertile valleys and sand hummocks, the entire length of the Island.

The Government establishment on this Island consists of a superintendent and 18 men, located at different parts of the Island. Besides the main station, there are five *out-stations*, where some of the staff reside. There are also two houses of *refuge*, in which are fire places filled with wood ; *match-boxes, a bucket, and a bag of biscuit*, hanging against the wall, out of reach of rats, which sometimes infest the Island. The door is simply latched. Written directions are posted up, showing the way to the stations, and how fresh water can be had by digging 18 inches in the sand. Many a crew, thrown on this desolate sand-bank in storm and darkness, finding their way to those houses, have had reason to bless the government for its thoughtfulness in providing for their emergency, without which many a poor fellow would have had to succumb.

At these out stations signal staffs are erected for the purpose of communicating with vessels or the *main* station, at which the

row's nest on the cross-trees of the flag-staff has an elevation of 120 feet, and commands a view, in clear weather, of the entire Island.

During *fog* the island is patrolled once in 24 hours by roundsmen, or men from the outposts, on horseback.

Through the kindness of Miss DIX, who spent a short time on this Island, *four* Francis metallic life boats were placed at the different life-saving stations. There are also *surf-boats*, *rockets* and *mortars*, for throwing lines to wrecks, a *life-car* and *bretches buoy* for the landing of crews.

At the different stations there is a supply of tame horses always on hand to convey the boats to the vicinity of wrecks.

The life of the surf-men, though somewhat monotonous, is not an idle one. Each day has its duties. In fine weather their time is occupied in keeping the stations in repair, hauling fire-wood, attending to the domestic cattle, and farming in its season, besides landing supplies, and shipping wrecked materials on the visit of the Government steamer, and at stated times they have rocket and mortar drill, &c. In foggy weather, or after a storm, the watching of the beach for wrecks claims their whole attention.

Mounted on his pony the patrol wends his way, frequently in the teeth of the blast that almost sweeps him from his saddle, while often snow, hail and sleet—and oftener *still*, sharp sand drift, that cuts the face until smarting with pain—forces him to take shelter between the sand hills, and follow along the central valley, ever and anon mounting the hummocks to look seaward, and betimes plunging down into the land-wash to examine some object floating in the breakers—a spar, an empty bottle, or perhaps a hen-coop. Such tokens are often all he finds. And so he trudges on for miles. At length he discovers the next patrol approaching: they draw rein, exchange notes, *turn* and *retrace* their steps to report at head quarters. Thus patrols make the circuit of the Island.

The *horses* found wild here have been considered by Dr. GILPIN and others to resemble the wild horse of *Mexico*. It is generally thought that they were landed from some Spanish

wreck. They are small, but *strong* and *active*, and show a power of endurance almost *surprising*; withstanding the inclemency of winter without other shelter than that afforded by the hillocks of sand.

The English *rabbit* has at different periods been very numerous, and threatened at one time to over-run the Island. But, to their *misfortune*, the Norway *rat* landed from an old vessel, and in a short time became so numerous that they nearly *annihilated* the rabbits, and then turned their attention to the stores of the Island, so that during *one* winter the staff were without bread for some months. In the spring the Government sent a detachment of cats to look after the *rats*. The *cats* killed the *rats* and then finished the remaining *rabbits*. In a short time the cats became so *wild* and *numerous* as to be a source of danger, when *dogs* were sent to hunt the cats, and with the assistance of shot guns in the hands of the staff, the cats were finally extirpated.

Again the Island was stocked with rabbits, when a *snowy owl* found his way thither, and being so delighted at his *find*, *disappeared*, and in a few days returned with his *friends*, who remained long after the rabbits were extinct, and still shows his kind remembrances by making periodical visits.

Until 1814, herds of wild *hogs* roamed the Island, which became *exceedingly fierce*, often attacking the cattle. But during a very severe winter all perished. Since that time this species of stock has not been allowed to range the Island, since, owing to their proclivity to hunt bodies in the sand, and devour those found in the land-wash, they became objects of horror and *disgust*.

The *walrus*, or *sea lion*, once repaired to this Island in large numbers. Their tusks are still being washed out of the sand, although they disappeared many years ago.

Early in January the Greenland seals make their appearance on the bars, for the purpose of *whelping*, and are sometimes hunted by the staff. The male is about 8 feet long, weighs often 800 lbs., and swims at the rate of seven miles an hour. They are very tenacious of life, often surviving the most severe wounds. Their habits are very interesting. When on shore they live in families, each male attended by several females.

The young at twenty days are nearly white, and those who have partaken of their flesh, pronounce it equal to that of sucking pig. When the males are old they are deserted by the females, and living apart from the rest, become exceedingly fierce. In their encounters they inflict on each other wounds like sabre thrusts, and after their engagements throw themselves into the sea to wash away the blood. The hunting of this species of seal is not without its dangers. They often turn upon their pursuers, and will sometimes ward off a blow, seize the club in their tusks and escape.

The common *harbour seal* is a constant dweller on the Island. In May their new-born whelps may be found sleeping on the sand in velvet coats, or riding the surges on their mothers' backs.

LIGHTS.

In 1873 the Government erected two powerful lights—one on each end of the Island—at a cost of \$80,000, the propriety of which has been very much questioned.

Nearly every government that has come into power has had the subject of light houses on Sable Island before them, and as often has it been opposed by sea-faring men, who maintained that it would render navigation more dangerous than before. Their argument being that were no inducements offered to approach the Island, vessels would keep at a sufficiently safe distance from it; whereas, in the hope of making the light, they would be drawn near the bars, thereby increasing the risk and danger.

Some maintained, on the other hand, that if two powerful white lights were exhibited—one *fixed* the other *revolving*—they would be visible twenty miles, which would be quite far enough to warn vessels of their danger, and enable them to define their position. Mr. HOWE, in his report of 1848, stated that although Capt. DARBY and Mr. CUNARD entertained the belief that a light would induce vessels to run for the Island, and lure them amid shoals and sand-bars, it was, in his opinion, strongly advisable that a light should be erected near the central

station, and that vessels not bound for the Island, nor driven there by currents or stress of weather, would no more run for it than they do now,—that they would, in fact, keep clear of it, it having no harbour of refuge; and that vessels outward bound would not require a new point of departure, while those homeward bound had all the coast before them; and if made to revolve E. and W., it would show in which direction the bars lie, and to government vessels it would be of great service. But, as before, no further action beyond debating the matter took place—at that time.

Foremost among the dangers surrounding this Island is that arising from the irregularity of the marine currents that sweep its shores. To trace the origin of which let us turn our attention for a while to the course of the gulf stream and polar current.

By glancing at Maury's Physical Chart, it will be seen that the gulf stream, after discharging its heated waters through the channel formed by the coast of Florida on the one side and Cuba and the Bahamas on the other, follows the trend of the American coast northward until approaching the shoals of Nantucket, where it swerves to the N. E., passing south of Sable Island to the tail of the great bank of Newfoundland, and then stretching over to Europe in a due east direction.

In opposition to this, we have the cold, ice-laden current of the North, one portion of which, after leaving the Arctic ocean, passes southward along the eastern coast of Greenland, where being joined by another branch coming from Baffin's Bay and Davis' Straits, it passes along the coasts of Labrador and Newfoundland to the great banks, where it is met by the northern edge of the gulf stream. At this point a division of the polar current takes place,—one portion, from its greater density, sinks below the warm current of the gulf stream and continues its course southward as a sub-marine current. This has been doubted. In the Transactions of this Institute for 1865, is a letter from Admiral MILNE to the President of this Society, concerning the currents on the N. E. coast of North America, in which he says: "This polar current passes along the east coast of Newfoundland as far as Cape Race, where a western part runs round it into St

Mary's Bay, but the eastern part becomes lost. It is probably checked by the northern limit of the gulf stream, and turned into a more N. E. direction."

In that same year, however, it is recorded by CARPENTER, that while laying the Atlantic cable in lat. 51° N., and lon. 38° W., a heavy storm came down upon them, and they were obliged to cut the cable. A red buoy was attached to it by a long wire rope, which, however, soon after broke loose and drifted away. Seventy-six days after this buoy was seen by a West India mail steamer in Lat. 42° N., lon. 40° ; having travelled due south 600 nautical miles, a rate of about eight miles a day, directly against the gulf stream and prevalent winds, which can be only accounted for by the fact of the great length of wire rope that was hanging in the deeper polar current.

This has been further demonstrated by deeply-submerged icebergs being carried into and *across* the gulf stream, and being seen repeatedly as far south as 36° lat., by which it is inferred that the deeply-immersed portion offered more resistance to the lower current than to the shallow surface current, and was thus borne southward *across* the gulf stream.

The other portion of the polar current, when it impinges on the gulf stream at the great bank, becomes deflected to the westward, partially by contact with the great bank, and in its course its northern edge sweeps around Cape Race, into St. Mary's and the other bays north, until losing momentum it falls back and joins the main body of the current. This portion, sweeping around and into those bays, is commonly called the indraught by mariners, and to it, being accelerated by certain storms, is attributed the loss of the "Cedar Grove," at Canso, and the Cromwell boats at Cape Race.

The southern edge interlaces the gulf stream, and carries western bound vessels at such a rate as frequently leads mariners to miscalculate their position with reference to this island; to which fact are attributable many of the wrecks.

Capt. DARBY, a former superintendent of the Island, in a letter to Blunt's Coast Pilot, with regard to the strength of this polar current says: "The most of the wrecks occurring here

arise from error in longitude. I have known vessels from Europe that had not made an error of one-half degree in their longitude until they came to the banks of Newfoundland, and from there in moderate weather and light winds have made errors from 60 to 100 miles." It is difficult to understand how that commanders of vessels, making voyages to and from this country for so many years, should be apparently so ignorant of the strength of these currents, unless, as it would seem, they have periods of comparative quiescence and activity.

Then, again, we have a third current—a portion of the polar current, which, becoming detached at the southern end of Labrador, and sweeping through the Straits of Belle Isle, is joined by the vast flow of the St. Lawrence, and forms what is known as the Gulf of St. Lawrence current. This combined current skirts the east side of Cape Breton, passes south, and strikes obliquely in the vicinity of Sable Island that portion of the polar current which is deflected westward by contact with the banks of Newfoundland.

To these opposing currents, then, must be attributed those dangerous marine disturbances off our coast, of which Sable Island seems to be the centre. Capt. CLOUE, of the French navy, remarked that during his survey of the Quero bank, adjoining that of Sable Island, nothing surprised him more than the strength and uncertainty of the currents, which often set in a contrary direction to the prevailing winds, and change all round the compass in 24 hours.

This, of course, is in accordance with well-known law. Currents of water, like currents of air, meeting in opposite directions, produce eddies and swirls of the most conflicting character.

In February, 1803, the first superintendent, having had three months of anxiety from the rapidity with which the Island had washed away in the vicinity of his house, and having lost much of his provisions from the depredations of rats, and fearing that *want* would stare him in the face before relief would reach him in the spring vessel, built a dispatch boat and sent her out crowded with sail before a S. E. gale, in hopes that she would reach the main land, or be picked up by some inbound vessel that

would carry the dispatches to the Government, and acquaint them of the starving condition of those on the Island. To his surprise, in 13 days *after* she returned to the beach, six miles above where she set out from.

This swirl motion around this Island is very marked. In calm weather an empty barrel or cask will make circuit after circuit of the Island, and this experiment is often resorted to for testing the velocity of the current. Again, bodies from wrecks have often made the same circuit, and it is quite customary for the surfmen to search on the opposite side for things which in consequence of an off-shore wind, have been carried thither by the current, and deposited upon the beach. During the prevalence of stormy weather these currents become terribly conflicting, and if accompanied by high tides, often remove by their eroding action, hundreds of feet from the embankments. Then again, danger often arises from the lowness of the shores.

Being *treeless*—with the exception of the light house having nothing to distinguish it from the surrounding ocean which it so resembles in colour—vessels have been known in a stiff breeze and clear weather to run *directly* for the Island, without the slightest knowledge of its proximity, until their attention has been arrested by the red ensign flung to the breeze from the flagstaff at one of the stations. Often sailing vessels and mail steamers are seen from the Island in positions clearly showing that they were unaware of its presence.

Fogs of a density seldom experienced elsewhere are prevalent all the year round, and accompany all winds from N. E. round by south to S. W. The warm, moist air from above the gulf stream meeting the cold air above the polar current, is condensed into fog which gives but little warning of approach, and contributes in a marked degree to the dangerous surroundings of this Island.

Another danger arises from its proximity to the gulf stream. Ask the mariner where he most dreads to encounter the storm, and perchance he will answer on a lea shore or the northern edge of the gulf.

MAURY, who made a life study of the stream, says: "With

such elements of atmospheric disturbances on its bosom, it follows that storms of the most violent character would accompany it in its course. Accordingly the most terrific that rage on the ocean have been known to spend their fury on its northern border."

There have been some memorable tempests here which have marked, as it were, *periods* in the history of this Island,—nights of terror never to be forgotten. The inhabitants of this lonely, desolate sand-bar have often despaired of ever seeing the dawn, and sat speechless for hours, listening, terror-stricken, to the howling of the blast, which threatened every moment to hurl their dwellings from their unstable foundation into the seething ocean. On one occasion, on going forth after such a night, they were horrified to find that, in addition to the transformation undergone around them by the removal of sand-hills, and the creation of others, that a portion equal to 3 miles long, 40 feet wide, and from 20 to 60 feet high, had gone bodily from the north side of their Island. This now forms one of those parallel bars over which the sea in storms breaks in terrific tumult. The awful violence, as well as the suddenness of those storms, which are cyclonic in their character, form one of the most remarkable phenomena of this Island.

The sun often rises clear, giving indications of continued good weather, and, with the exception of the sea breaking high on the bars, and the fretful moan of the surf as it breaks along the shore, there is no premonition of the coming storm. Suddenly a dull, leaden haze obscures the sun: clouds gather from all directions. The sky assumes a wild, unusual appearance. The wind begins to rise in fitful gusts, carrying swirls of sand before it. The darkness increases as the low, driving scud shuts in all distant objects. Now the gale bursts in awful fury, whipping off the summits of the hummocks, carrying before it a cloud of blinding sand-drift. Darkness adds to the horror of the scene, while rain descends in a perfect deluge. No human voice can be heard above the tempest. The crinkled lightning for an instant lights up the mad waves, as they rear and hiss along the beach. Then a sudden calm ensues,—as strange as

calm. A few short gusts at first break this period of tranquility, and in a few minutes the hurricane bursts again from the opposite quarter. The darkness is still intense, relieved only by the red glare of the lightning, which is quickly followed by the crashing of the thunder, as it strives to be heard above the howling of the blast. Gradually the storm ceases, the clouds break and pack away in dense black masses to leeward, and the sea alone retains its wild tumult.

During such a tempest in 1811, thousands of tons of sand were carried from the beach—some from one side and some from the other, as the gale shifted—and strewn over the island, so that vegetation was nearly smothered, hundreds of horses died for want of food, and the outlines of the Island completely changed. Sand-hills that had formed land-marks were tumbled into the sea, and mountains piled where once were valleys; recent wrecks disappeared, and others brought to view of which there is no history.

It is interesting to note that while in several places in Great Britain they are at present making many and successful experiments in the way of lessening the dangers of harbour approach by pouring oil on the troubled waters, the utility of this has been demonstrated at this Island nearly 40 years ago, and although the superintendent, Capt. DARBY, gave every publicity to the circumstances, and pointed out its advantages, we have little evidence of it being adopted until the last few years.

As this oil theory is attracting so much attention of late, in Liverpool and other places, I will give you, in a condensed form, Capt. DARBY'S report of the saving of Capt. HIGGINS and his crew, as follows :

“On the 19th of September, 1846, the Government schr. “Daring,” commanded by my eldest son, came to the Island for the purpose of conveying to Halifax the crew and materials of the wreck of the ship “Detroit,” lately stranded there with her crew and passengers; also the crew of the schooner “Lady Elcho,” lately stranded there. We got the schooner down the north side to the wreck of “Detroit,” about ten miles to the eastward of head-quarters, and commenced shipping her materials, and the work went on with vigour and alacrity. The day was moderate,

with light airs of wind from the eastward. It was a clear and cloudless day, but it had a certain dull appearance about it, that seemed to portend a gathering of the elements together, as if for strife. The sea ran high, although there was no wind, and gave us a good deal of trouble, by often filling our loaded boats in crossing the bars, where it often broke very badly, and rolled along the shore with a groaning and very troubled sound. After the sun passed the meridian the gloom and dulness seemed to increase, the sea rose higher, although but little wind, and the moaning sound of the waters as they broke along the strand, seemed to give strong indications of a coming storm. Our work proceeded successfully, notwithstanding the difficulties we had to contend with;—the property was all shipped, the vessel loaded and ready for sea, and at half an hour after sunset she got under weigh, with our boat and boat's crew to be towed up to headquarters and landed there. The wind was now a fresh breeze from east. I got on my horse to keep abreast of the vessel, which I did until dark. I had ten miles to go to the landing place, I drove to that point as fast as I could, and then rushed on to the beach to watch the arrival of my boat. It was now very dark, with a fresh breeze, and the sea rising very fast. The whole ocean seemed to be in a phosphoretic blaze of light. I soon observed our boat coming directly towards me: I jumped off my horse, and as I always rode with six fathoms of line on my horse's neck, one end I fastened there, and the other end I tied to my leg. I was then able to assist my people in the boat without losing my horse, as she filled and turned over just as she got within my reach. The people reported that the schooner hauled off to sea the moment that the boat left her. We hauled up and secured our boat for an approaching gale, then went to the house, changed our wet clothes, got supper, and set a watch. At midnight the watch reported heavy gale of wind from E. N. E.; at four o'clock the morning of the 20th, a most terrific gale of wind with rain from the N. E.; and at daylight the gale to be still increasing, and the wind veering to the N. N. E. All hands out. The hull of the schooner *Lady Elcho*, that had been wrecked near the landing, could be seen from the look-out house to be floating and knocking about on the beach, and we had to crawl on our hands and knees across the Island to where her cargo of barrels of mackerel was piled up,—the wind being so violent we could not proceed against it in an upright position. We found the cargo in danger of being smashed to pieces by the sea, and we commenced parbuckling it up the bank to a place of comparative safety, and were so occupied until about noon; and it was

this circumstance that brought us all out there in that terrific gale, as if Providence directed that we should all be out and all together so as to be the better prepared for what was going to follow. All of a sudden, we saw an object off the North side dead to windward which we first thought was a large bird, but shortly after discovered that it was a sail distant five or six miles, and that she was running down right before this tremendous gale dead on a lee-shore. We could work no more at the barrels. Our eyes were strained in the direction of the object that appeared to be running to inevitable destruction. My first impression was that it was the schooner *Daring* which had left the Island the evening before, and that they had met with some disaster so as to disable the vessel in the gale, and were going to run her on shore before night to save their lives.

We could see that she was a schooner with a close-reefed main-sail set, steering directly for our flag-staff. I was convinced that it was my son, who with two of his sisters on board, and a great number of other passengers, were taking this method to preserve their lives. The sea was breaking everywhere off the North side as far as the eye could see, and it appeared almost incredible that any vessel could live to come so great a distance through such mountains of broken water. I got a rope prepared, to assist in preserving the people's lives should the vessel be able to reach the beach through the roaring and boiling mountains of water that surrounded her. When she approached within three miles of the land she appeared to be in the heaviest breakers, and we could plainly perceive mountain waves on each side of her that would raise their curled heads as high as the tops of her masts and pitch over and fall with the weight of hundreds of tons, either of which would have been sufficient to have smashed that frail bark to atoms; but, miraculous as it may appear, not one of them touched her. At one moment you could just perceive the heads of her masts between the mountains of waters that were smashing and breaking to pieces all around, but not permitted to hurt her; at the next moment you would see her on the top of a tremendous wave which appeared like certain destruction to her; at another, you would see a mountain sea rising up before her and breaking all to fragments in her path, but when she arrived at the spot the surface was smooth as glass. When she arrived within one mile of the shore she had to pass over what we call the Outer Bar, where every sea broke from the bottom, and our greatest anxiety for the safety of the vessel was at this point. The sea was there breaking with tremendous violence, but that heaven-favored bark passed through untouched,—the

sea became smooth before her, and she left a shining track behind. Now, here was the miracle. I looked on this with wonder, awe and admiration, and not without hope. When she approached a little nearer, I could see one man lashed to the helm and two men forward lashed by each of the fore-shrouds, and by each man a large cask standing on end. We could also see that the two men were making great exertions with their arms, as if throwing something up in the wind. The vessel had now passed the most dangerous place, and her safety seemed certain,—I could breathe much freer than I had done for some minutes. Another half-mile brought her to the beach, and her bow struck the sand. From this spot to the high bank was about fifty or sixty yards over a flat beach, which was always dry except in heavy gales, but was now covered over with water. A number of heavy seas would roll together over the beach, and then recede, leaving it dry. Over this place myself and the men were extended with a rope leading from the bank down to the vessel's bow, on which we held to keep the sea from washing us away; and when the great body of water receded, we could approach as near as the jib-boom end, from which, one by one, the crew lowered themselves by a rope into our arms, and we passed them in safety to the bank.

“The Schooner was the *Arno*, Capt. HIGGINS, with twelve men, from Quero Bank, where they had been fishing. They left the Bank at the commencement of the gale. He had lost all his head sails when at daylight this morning he made the land dead under his lee, with the gale blowing right on shore. The vessel having no head-sail, he could do nothing with her on a wind. He let go his anchor in twenty fathoms of water, paid out three hundred fathoms of hemp cable, and brought the vessel head to wind. In that tremendous sea he held on until noon, when, seeing no prospect of the gale abating, he cut his cable and put the vessel before the wind, preferring to run her on shore before night to riding there and foundering at her anchor. He lashed himself to the helm, sent all his men below but two, and nailed up the cabin-doors. He had two large casks placed near the fore-shrouds and lashed there. He then directed his two best men to station themselves there and lash themselves firmly to the casks, which were partly filled with blubber and oil from the fish. They had each a wooden ladle about two feet long, and with those ladles they dipped up the blubber and oil, and threw it up in the air as high as they could. The great violence of the wind carried it far to leeward, and, spreading over the water, made its surface smooth before her and left a shining path behind; and although the sea

would rise very high, yet the top of it was smooth, and never broke where the oil was. It was raging, pitching and breaking close to her on each side, but not a barrel of water fell upon her deck the whole distance. The vessel was so old and tender that she went all to pieces in a very short time after the crew, with their clothing and provisions, were saved."

With regard to this phosphorescence of the sea, at times there are magnificent displays of it here. Among the early inhabitants it was the cause of much alarm, and augmented the many stories of the supernatural told in connection with the place. Its first appearance to one of the superintendents, is recorded in the journals of the Island as follows:

"Last night a singular phenomenon appeared on the south side. The sea being high, and the night very dark, the breaking of the sea would exhibit at intervals of from 5 to 10 minutes a phosphorescent light. In some places it would be seen through the gulches on the south side. When the beach was low, and the sea broke high, it would rise in a great bright light to the height of 15 or 20 feet, like an enormous fire, yet only to be seen at certain places at a time."

In other places it is spoken of as the sea being on fire.

It generally appears after much southerly wind, and is probably brought by the drift, or surface current, from the Gulf Stream.

In the short time allotted me this evening, Mr. PRESIDENT, I can but glance at the many interesting phenomena of the Island and its surroundings. These facts and incidences are such as I have been able to obtain from available documents, as well as from personal observation. From these facts I have deduced certain inferences, the plausibility of which I humbly submit to the judgment of the Institute.

On some future occasion I hope to present to you in detail what is, perhaps, the most interesting and important feature in connection with this Island, viz.—ITS CHANGED POSITION.