

Island, and that the owner must have been a great "witch," the word used by the Indian—who also informed me that by use of these oblong pieces of bone, the man could kill his enemies—their use from this it would appear was not ornament only, but a charm also.'

"Such is the account of my friend the Rev. Martin Blackmore, and as I was the next person to visit the place though some four years later, I must say that his report tallies in every respect with my own observation. The Indian's account also agrees perfectly with what was told me by Indians to whom I shewed some of the bones and arrows that I myself had collected in the same place. The presence of iron weapons is easily accounted for, as since the reign of Henry VII. the shores of Newfoundland have been visited by British seamen in pursuit of the cod-fishery, and collisions occasionally took place between the natives and the crews of the fishing-vessels—the fishermen, though not allowed to form settlements or raise buildings in the colony, except such as were absolutely necessary for the pursuit and curing of the fish, customarily left such things behind them as could not easily be transported at the close of each season, and the natives watching for the departure of the whites, invariably plundered their depots. The disappearance of the Red Indian of Newfoundland is only of recent date, and many persons now living have come into personal contact with members of the race. They are now all extinct, and the last representative of them (Mary March as she was named,) died some 35 or 40 years ago. She had been taken when a child and brought up in her captor's family as a servant, but had escaped at different times to visit the haunts of her departed race. Through the kindness of my friend Mr. Blackmore, I am enabled to send you the accompanying sketches which I have made from his collection. The lance or spear head of jasper is one found by myself.

"As I know you are much interested in the antiquities of North America, I hope the sketches will not be without interest to you. I must remark in conclusion that several of the bones are much decayed. An extra amount of work has interrupted the travelling which I had mapped out for myself, and my principal having been seriously indisposed has kept me almost a close prisoner,

"I remain dear Sir,

"Yours very faithfully

"ELIAS MARETT."

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### ON NORTH ATLANTIC STORMS.

BY J. L. HURDIS.

MANY years ago, when Redfield and Reid were only beginning their observations on storms, I happened to be a passenger on board a sailing ship, bound in the autumn of the year, from England to British North America. Weary with contending against westerly winds, in mid-Atlantic we were cheered by a fine breeze and promising clouds springing up in the S.E., and speculating on keeping the fair wind for some days at the least, when the skipper, a seaman of experience in those latitudes, chilled our hopes by stating that no reliance could be placed in these easterly winds, which were sure to veer to



to the South and S.W. blowing very hard with rain at the latter point, then “jumping” into the N.W., there ended, leaving you once more to the vexation of a head wind and blue sky—all this, too, it was prophesied, was to happen in the brief space of three or four hours. The skipper was marvellously correct. Several of those minor revolving gales, all alike, passed over us in succession, convincing me that there must be some law of nature regulating these things. After years found me in the Bermudas, a region, I may say of revolving gales, and now I have spent ten years in this country; and when I connect my experience of former years with recent observations, I cannot avoid the conclusion that all the revolving storms of this country, and they are very many, come to us from the tropics of the Western World.

THE following notice occurred in the “*Bermudian Royal Gazette*,” of September 12th, 1865.

“Yesterday was the anniversary of the dreadful hurricane with which Bermuda was visited in 1839. The wind on the 11th September, 1839, as on yesterday, was from the Eastward. It subsequently, however, during the continuance of the hurricane, went to E.S.E.—S.—then S.W. and eventually to W. Though the appearance of the sky yesterday was very unsettled, it did not bear any thing approaching the copper coloured hue which it presented on the eventful day above alluded to.

“The hurricane of 1839 commenced at about 7.p.m., and the storm did not subside till about noon on the 12th. The Barometer fell to 28·3, and soon after the storm subsided, it rose to 30·1. The Thermometer ranged from 85-81, and went down to 71 soon after the weather moderated.

“The melancholy appearance of the Island on the 12th from the destruction which the gale had caused, can never be forgotten by those who witnessed it. Scarcely a house escaped injury; some were levelled, others unroofed and side-walks split to the foundation; trees broken and prostrated, and a number of vessels and boats driven on shore.

“A distressing drought of nearly six months’ continuance preceded the hurricane.”

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This Hurricane of the 11th September, 1839, reached Charlottetown, in Prince Edward Island, 46 N. lat., on the 13th September, at 2 p.m, the wind blowing from the N.E., and freshening rapidly.

I was at that time stationed in the Island, and, at the commencement of the gale, watched the two ferry-boats as they crossed the Hillsborough. At 3 p.m., I returned to my own residence on the north side of Charlottetown, the storm then blowing with sufficient force to hurl sundry loosened bricks from the top of one of my chimneys.

This hurricane was, therefore, forty-three hours in traversing the 983 English miles between the Bermudas and Charlottetown; being at the rate of 22·86, or nearly 23 English miles per hour. The time occupied in passing over the Bermudas was seventeen hours, which, measured by the speed above



mentioned, gives a diameter to the storm of 388 English miles, at that particular period of its existence. Reduce this diameter 28 miles in order to be within bounds, and it will then be 360 Eng. miles in breadth. Now, suppose the extreme height of this hurricane from the surface of the earth, to be two such miles, which is probably beyond the reality, and we shall have a whirling mass of atmosphere and cloud, representing a flattened disk, the width of which would be equal to 180 times its own thickness, or, resembling, in diameter and thickness, the proportions of an ordinary dinner plate. This immense circle would cover an area of 101,787 square miles, and would be quite flat if the surface of the earth presented a dead level; but, moving over a rounded or globular form—the segment of a sphere—the under side of the hurricane would necessarily be concave, and the upper surface convex, to correspond.

In this form, I conceive, did the hurricane of 1839 advance from the Bermudas towards the N. and N.E., revolving upon its centre (which centre passed immediately over those islands) from right to left, if viewed from a standing point in the centre; with what velocity we know not, but if estimated at five times the rate of direct progress, it would give 120 miles per hour. During the prevalence of this hurricane in Prince Edward Island, the wind veered from N.E. to S.E. S.W. and N.W., where it terminated sometime before daybreak on the 14th. A few old buildings were levelled to the ground, and sundry trees of thirty years growth blown down, but, with these exceptions, little material damage was sustained. The outer margin of the gale extended to Bay Chaleur, where H.M.S. “Andromache” was then riding at anchor. In that locality, however, it was not severe.

In Keith Johnston’s Physical Geography for Schools, it is stated that the West India hurricanes commence near the Leeward Islands, travel to the W.N.W., and then round the shores of the Gulf of Mexico, following the Gulf Stream, and are lost between the Bermudas and Halifax. Other writers terminate such storms south of the Island of St. Pierre, Newfoundland.

The hurricane of September 11th, 1839, took a more easterly course, and was certainly not *lost* in the longitude of Bermuda, or St. Pierre, Miquelon.

It is a remarkable fact that in the ten degrees of latitude north of the equator, in the Atlantic, hurricanes are unknown, and that the same exemption extends to every part of the South Atlantic. It is, then, between the 10th and 20th parallels of north latitude that we must look for the commencement of these storms, so ably described by Mr. Redfield and the late Sir William Reid.

The greater number of the so-called West India hurricanes pass to the north, between the Bermudas and the shores of the United States, sometimes in close proximity with the former, and on other occasions sweeping over the seaboard of those States. The hurricane of September 11th, 1839, passed, however, directly over the Bermudas, eastward of the usual track, and we know that it was not *lost* in the longitude of Halifax, N.S., but continued its course into the Atlantic with fearful violence.

A revolving tropical tempest of this enormous extent, high rate of speed, and power, with a wide ocean before it, free from islands, mountains, and other physical obstructions, must, under the circumstances, continue its onward and



irresistible course for hundreds of miles, and thus be found on the European side of the ocean, without exhibiting any material symptoms of exhaustion. Expansion, and a corresponding loss of speed and power, are, I believe, characteristic of these storms, and for this due allowance must be made, to render it possible for opposing winds to offer resistance to its progress. If a north or south wind of less velocity or power than the revolving gale, comes in contact with it, at this period of its career, such a wind would be compelled to give way; not, however, without infringing upon and disturbing the outer circumference of the hurricane, and causing portions of whirling matter to be separated from it. These minor portions of the cyclone would, I conceive, retain their revolving character, and continue their easterly course, somewhat diverging from that of the present storm.

I think it probable that many of our West India hurricanes are broken up by repeated collisions of this nature, and that, from this cause, arise those minor revolving gales which sweep over the British Isles and the coast of France in rapid succession, during the autumn months of the year.

It is likewise evident to my mind that revolving gales of greater diameter and force than these miniature cyclones, occasionally cross the Atlantic and reach the shores of Europe. The gale in which the unfortunate "Royal Charter" was wrecked on the Welch coast, in October, 1859, may be cited as a case in point. The warm temperature of that gale was alone sufficient to distinguish it from a cold straight blowing easterly wind.

Valuable information regarding these mighty storms might assuredly be found in the log books of ships which constantly cross and recross the Atlantic in the latitudes of their occurrence. The steam packets of the Cunard line, on their outward and homeward voyages must have encountered these gales again and again; must have steamed into them and through them, or gallantly held their course as the storm swept over them in its N. E. course.

Now, in regard to the late storms of December 1865, and Jan. 1866, there is no room for doubt; one and all have shewn the same tropical characteristics; revolving and proceeding in a N.E. direction. As to their destructive tendency, the published accounts sufficiently speak. Was the storm in which the "London" foundered, a revolving one or not?

The "Amalia" sailed from Liverpool on the same day the London left Plymouth, following in her track. The Amalia's published account says the storm set in on the 10th January, at noon, with a fresh breeze from S.W.

4 p.m. Gale increasing.

6 p.m. Blowing a hurricane.

8 p.m. Violent hurricane.

9,45 p.m. (Barely 10 hours) Engines stopped, and ship unmanageable.

January 11. Similar weather.

2 a.m. Deck pumps rigged.

9 a.m. Set canvas on ship.

3,30 p.m. Sighted S. Sh. "Laconia."

Midnight. Squally, and high sea.

All this time the ship was sinking—January 12th, 9 a.m., "Laconia's" boats came alongside, crew saved.



I think it most likely she first encountered the storm from the S. then S.W., and so on. The ship sunk in Lat.  $46^{\circ} 31' N.$  and Long.  $8^{\circ} 40' W.$

The Royal Mail Steam Ship "Rhone", Captain R. Woolward, Commander, on her way from Southampton to Lisbon, fell in with the same gale. The Captain says, in a letter to the Secretary of his Company:—"We encountered a severe cyclone on the 11th instant, wind from S.E., veering eastward to north, in which I am sorry to say the two life-boats on the port side, and the cutter were lost, the starboard cutter and mail boat damaged, the rails and deck furniture much injured, two horses killed, and one of the crew had his leg broken. I have never before experienced such a gale. The barometer fell an inch and 11.100 in 12 hours, going as low as 28.34, and although the wind was fair, we were obliged to lie to for ten hours."

This is valuable information, and with that supplied by the crew of the "Amalia," we gain a fair insight into the character of the storm.

Again on the 14th January, the P. & O. Company's Steam Packet "Tanjore," arrived from the Mediterranean, having experienced very heavy weather in the Bay of Biscay, during which "phosphoric balls," as my informant called them, appeared on the extremities of her yard arms. This may, or may not be a characteristic of tropical storms, but whether it be so or not, I mention the fact as one worth recording.

With such evidence before us, I hardly think any one will be disposed to question the revolving character of the late Bay of Biscay storms.

The next consideration is, whether there have been any great tropical storm, or storms, in the centre of the Atlantic, which might be connected with the storms recently experienced on the coast of England and France.

Of this I think there can be little doubt. The "Palinurus," from Liverpool, and the American Ship "Christiana," from London, both bound to New York, found themselves, at half passage involved in a furious hurricane, which crippled the first, and made a complete wreck of the second. Unfortunately, I can obtain no reliable data whereby to fix the locality of this storm upon the map, or to trace it in its progress to England. All my calculations, so far, have failed in any useful result, beyond an impression that the storm was much slower in direct progress than such storms on the western side of the Atlantic.

Thus the Christiana had the storm on the 19th and 20th December—no latitude and longitude given. The Palinurus in longitude  $39^{\circ} 20'$ —no date stated.

Mariners, in describing the storms that have recently passed over this part of the world, almost invariably allude to the presence of a heavy *cross sea*, as one of the great difficulties they had to contend with.

A gale, blowing in a straight line, will cause the ocean swell to roll in one direction only; and, if two straight gales should meet from opposite points, or at right angles, a cross sea would be the result.

These cross seas are very perplexing if not dangerous. In my December voyage across the Atlantic, the vessel I sailed in, was unfortunately becalmed in a very heavy cross sea, and the awful wildness of the extraordinary scene I shall never forget. Huge waves were rolling in different directions and



coming into collision with each other, the two united sometimes rising to a peak, and representing what our skipper was pleased to term a "church steeple." Great attention was paid to the compass during this commotion of the sea, and the astonishment of the skipper, and of an old sea captain who was a passenger, is still fresh upon my memory; as a mighty wave upon the starboard beam swung the ship half round the compass, and a cross sea, or seas, from the opposite direction, completed the circle, the passenger captain exclaiming, "zounds, why she has gone completely round the compass on her heel, never saw such a thing before in my life." It was not pleasant to be knocked about for two hours in such a cauldron, and I was heartily thankful when a fine fair wind set in and enabled us to extricate the ship from her dangerous position. Cross seas had certainly much to do with the destruction of the London and Amalia, flooding the between decks, quenching the engine fires, and ultimately causing both these overloaded ships to founder.

With regard to the "phosphoric balls," seen on board the "Tanjore," let me observe that the phenomena is by no means a common one, many an old seaman never having seen it. I believe it is called "*St. Elmo's fire*"—" *Corpus sanctum*,"—and a variety of names which appear to be corruptions of the latter. I am happy to say I once witnessed this concentration of the electricity of the atmosphere upon the rigging of a ship. It was on the same December voyage from Prince Edward Island, our little brig, the "Eliza," not quite two hundred tons register, was making her *debut* upon the ocean, and had been scudding before a severe gale during the eight hours of daylight which we enjoyed at that late season of the year. The darkness of night had come upon us, but with two good men at the wheel, and our skipper, a superb seaman, conning the ship and steering by the stars, all proceeded well. Wearied in body by watching the progress of the storm all day, I seated myself upon the cabin floor, in front of a bright fire in the stove, placing one arm round the leg of the cabin table to secure my position, and here I was rocked to and fro to the hoarse music of the winds and waves, until half asleep, when a seaman entered to say the captain wanted me on deck immediately. The mandate was instantly obeyed. Pointing to the main-top-gallant-mast head, the captain called my attention to a bright light upon the copper vane spindle. It was like a brilliant star in the dark heavens, and was mistaken for one by the skipper before sending for me; a heavy lurch bearing the light with it convinced him of his error. This light, during my presence on deck, was brilliant for a full minute or perhaps longer, when it disappeared altogether.

Some weeks later I happened to mention this circumstance to a relation residing at Abbeville, in France, when he related to me, as a singular coincidence, that two French gentlemen of his acquaintance, had recently travelled together, on horseback, from Amiens, and night having overtaken them upon the open plains, they were quietly proceeding along the road, in conversation with each other, when one of them exclaimed with surprise, "do you see that light upon my horse's ears!" Hardly had the observation been made than the light also appeared upon the eartips of his companion's horse.

St. Elmo's fire, old mariners affirm, usually appears on the extremities of



the lower yard arms, first, then removes to the top-sail yards, and so on till it reaches the mast head. An old officer of the *ci-devant* East India Company, tells me, that on one of his voyages the look-out man proclaimed, "a light ahead," and on some officers proceeding to ascertain whence it emanated, they were astonished to find this electric light in possession of both ends of the spritsail yard.

Reverting to the subject of Atlantic revolving storms, let me add in conclusion, that I consider their usual course, indeed their never varying course, is from the West Indies northwards between the Bermudas and the North American coast to latitude 30, where they head to the north-east, and passing Nova Scotia and Newfoundland, rush onwards towards Europe. Bermuda thus represents a sort of turning point, round which these storms describe their course, but at such a distance as most frequently to avoid coming into collision with the spot. Exceptions of course take place, especially in the winter season, when Bermuda gets a full share of these revolving gales. Now, from Nova Scotia to the meridian of 30 west, these gales must have prevailed during December and January, for in that longitude their violence was something terrible to contemplate—witness the wreck of the "Christiana," the "Jane Lowden," and a host of other ships, all crumpled up in the open sea, in a manner truly marvellous. These storms were *moving* to the north-east, and most assuredly did not *commence* their motion in that longitude, but far away in the tropics; generated by that great motive power, *heat*, the source of all motion, if I mistake not. Well, from longitude 30 to our own shores, the track of these storms is only too distinctly marked out by the dismal amount of ships and cargoes that have been strewed in fragments upon the surface of the sea, and to which brave men have too often clung in the vain attempt of saving their lives. The rest we know and will pass over for the present.

Bear in mind that in the Indian Ocean, north of the equator, where no cold Arctic current is known, its revolving storms move in the same direction, turn in the same latitude, and obey the same laws as those of the Atlantic. Also, that none but straight winds belong to the temperate regions of the earth; that the coast of Africa lies almost entirely within the tropics, where trade winds always prevail; and that whenever a revolving storm appears in the north, we may safely set it down as a tropical wanderer. I cannot for a moment entertain the idea that revolving storms can be generated to the north of the tropics.

Fourteen years of isolation in the Bermudas made me somewhat familiar with the winds of the Atlantic, and I can confidently assert that no hurricane or revolving gale, great or small, ever came upon us there except from the south or south-west. Taking all these circumstances into consideration, could we otherwise conclude than that the revolving storms which annually speed on their destructive course over the wide waters of the North Atlantic, originate in the region of the tropics.