

The idea of a photograph of a thunder wave is a pleasing fancy, at all events.

It seems to me that it will be impossible to formulate even a reasonable guess as to the cause of these dark flashes until a good many pictures are brought together for comparison, and as much testimony as possible secured as to the appearance of the flashes to the eye. Personally I have seen very few of the pictures, and never the original negative.

My intention in writing this letter is not so much to advance theories accounting for the phenomenon of the dark-flash as to reawaken an interest in the subject, and bring out ideas from persons qualified to treat the matter.

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### Tides in the Bay of Fundy.

IN the last report of Mr. W. Bell Dawson on the Survey of Tides and Currents in Canadian Waters, the results are given of an investigation of the tides in the Bay of Fundy. The information in Mr. Dawson's report is interesting, as these tides are frequently credited as having the greatest range of any in the world, and in some books of physical geography are stated as having a range of 120 feet,<sup>1</sup> or more than double that which actually prevails.

As a matter of fact the range of the tides in the Bay of Fundy does not exceed that which occurs in the Bristol Channel, where the extreme recorded difference between high and low water at Chepstow is 53 feet, being the same as the "Saxby," or record tide in the Cumberland Basin, Nova Scotia. The rise above the mean level of the sea in both cases is about the same, or from 22 to 23 feet.

In the Bay of Fundy the range varies considerably at different localities. Outside the bay at Portland on the north side the range is 9½ feet, and at Cape Sable on the south side 8½ feet. In the Atlantic, on the south side of Nova Scotia, the range is from 6 to 7 feet. At the mouth of the bay at Yarmouth the range is 16 feet, and at Seal Island 18 feet. Further up, at Digby, on the south side, and St. John on the north, it increases to 27 feet. Where the bay divides above Black Rock the range is 36 feet. In the Minas Basin it varies from 41 feet at Parsboro to 48 feet at Horton Bluff and 50½ feet at Noel Bay. In the Chignecto Channel in Cumberland Bay the range is 45½ feet.

From observations obtained by tide gauges fixed at different stations, and information collected in the localities, Mr. Dawson gives the range of spring tides as follows.

The highest recorded tide is known as the "Saxby tide," which occurred in 1869. The low water mark for that tide is not given, but taking the lowest low water level recorded, the range of that tide in Cumberland Bay was 52·80 feet; the ordinary spring tide range there being 45·80 feet. The Admiralty tide tables give this as 45½ feet.

At Moncton, the Saxby tide rose above the lowest recorded level, 38·34 feet; the next highest recorded tide being in 1887, 31·91 feet. An ordinary spring tide rises 30·25 feet above mean low water of spring tides. The Admiralty tide tables give the range at Moncton Railway as 47 feet. Mr. Dawson points out that this is misleading, this range being that above low water at the mouth of the river, from which the low water line has a considerable inclination towards the head of the estuary.

At Parsboro, in the Minas Basin, the ordinary spring tide range is 41 feet, and the extreme 47 feet; the Admiralty tide tables giving the ordinary range as 43 feet.

Mr. Murphy, the Provincial Engineer of Nova Scotia, in a paper contributed in 1867 to the Institute of Natural Science, on the tides in the Bay of Fundy, gave the range of spring tides at the head of the bay as 22 feet above mean sea level, and as varying from 50 to 60 feet above extreme low water.

Having a few years since to report on some proposed embankment works in the Bay of Minas, I made inquiries in the locality from those best able to furnish me with information as

<sup>1</sup>In Sir J. F. Herschell's "Physical Geography of the Earth," fifth edition, 1875, it is stated that: "In the Bay of Fundy the tide not uncommonly rises 50 feet, and, as is said, on some occasions to more than double this height." Robinson, in his "Mechanical Philosophy," in the article on Tides, says, "In the Bay of Fundy, in the harbour of Annapolis Royal the tide rises 120 feet."

to the rise of the tides there, and came to the conclusion that at Horton the greatest range to be dealt with was 48·50 feet.

The difference in the range of the tides in Cumberland Bay, at the head of the Bay of Fundy, and in Verte Bay, Northumberland Straits, in the Gulf of St. Lawrence, is worth recording. The length of the isthmus which separates the two bays along the line of the proposed Chignecto Ship Railway is eighteen miles. The range of ordinary spring tides on the one side of this neck of land is 45·80 feet, and of the highest known tide 52·80 feet; and on the other side 13·40 feet and 5·60 feet respectively, the mean level of the sea being only 0·26 feet higher in the Cumberland Bay than in Bay Verte.

It is interesting to compare the tides in the Bay of Fundy with those in the Bristol Channel. At Bude Haven and Pembroke, at the mouth of the Channel, the rise of an ordinary spring tide is 23 feet; at the mouth of the Avon it is 40 feet; at Chepstow the range is 50 feet, and in extreme tides 53 feet, the rise above the mean level of the sea being 23½ feet. From levels taken across the land from Portishead in the Bristol Channel to Axmouth in the English Channel, with a mean tide rising 35½ feet at Portishead and 10 feet at Axmouth, the mean level of the sea was found to be 9 inches higher at the former than at the latter place.<sup>1</sup>

There is a tidal bore in the Bay of Fundy, but it is not so strongly developed as at some other places. It shows itself at Moncton, 19 miles from the mouth of the Pettediac River, where the estuary consists, at low tide, of mud banks and flats, with a low water channel about 500 feet wide, and having at high water a width of half a mile. The run of the rising tide first breaks into a bore at Stoney Creek, 8 miles below Moncton, and continues to the head of the estuary at Salisbury, 13 miles above, the total distance traversed being 21 miles. Mr. Dawson describes the noise made by the approaching bore as that of a distant train, which increased to the hissing and rushing sound of broken water. The bore arrived at the point of observation eleven minutes after the sound was first heard, having the appearance of a front of broken and foaming water 2 to 3 feet in height. The mean velocity was 8·47 miles an hour, the maximum being 9·61 miles. The greatest rise of water after the bore passed was 3 feet in ten minutes. The greatest recorded height of the bore is 5 feet 4 inches.

The only other place in the bay in which a bore has been observed is in the upper part of Cobequid Bay.

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### ETHNOGRAPHICAL COLLECTIONS IN GERMANY.

THE question of the representation of primitive culture in our national museums is rapidly becoming an urgent one, not only on account of the growing importance of anthropology, but also because primitive culture itself is disappearing before civilisation. The wild man is dying out or being transformed, and the hours during which we may question him about himself are already limited. Those nations therefore which take the utmost advantage of the opportunities which remain will have something in the nature of a monopoly when primitive culture is actually extinct; and it is to them that the students of the twentieth century will have to apply for their facts.

If her present rate of progress is maintained, Germany will soon have so far distanced all other European countries as to place herself in a position of permanent and unassailable superiority. It cannot therefore but be a matter of importance to cast a glance at the present state of ethnographical museums in Germany, in order that we may form some notion of the relative position of our own.

Almost all the large cities in the German Empire possess ethnographical collections, and in such places as Leipzig, Dresden and Hamburg, these are of first-rate

<sup>1</sup>"Tidal Rivers." (Longman's Engineering Series, 1893.)