

to the branchial organs,—perceiving that the structure of the branchiæ was much more dense than seemed consistent with the character of a directly aerating surface, I endeavoured to open out the tubes for the purpose of more minute examination. In doing so, I easily divided the tubular case, but found an inner membrane lining it; by traction, this was completely withdrawn, presenting a perfect cast of the main tube and the small fringed tubules. On reference to Carpenter's *Physiology*, to the *Encyclopædia of Anatomy*, Sibbold's *Comparative Anatomy*, and Jones's *Animal Kingdom*, I can find no allusion to such a membrane, although the illustration given by Mr. Jones, and taken from the Hunterian collection, would lead to the inference that Mr. Hunter knew of the existence of the structure in question. The following is Mr. Jones's account: "Setting out from the heart, we find that the blood goes to all parts of the body through the different arterial trunks, and by the great sternal artery is conveyed to the legs, foot-jaws, and false feet. But from this same artery vessels are furnished to the branchiæ. The branchial arteries, so divided, subdivide into secondary trunks, which ramify through the individual branchiæ and supply all their appended filaments." The blood-vessels could not ramify on the fibrous tube; the inner membrane, therefore, is the bed in which the vessels repose, the outer case being, like the cartilaginous rings of the branchial tubes, organs of support. How, then, is aeration effected under such circumstances? On placing the terminal branchia with the small appended tubules under the half-inch object glass, we find that the surface of each is even, and that the membrane is not perforated by foramina. Comparatively dense, therefore, as the substance is, it yet must permit the passage of gases through it; and, indeed, Professor Draper's experiments with membranes and septa equally dense, afford evidence that such must be the case. In the structure of the breathing organs of this class, we find an arrangement admirably adapted both to terrestrial and aquatic respiration. Living amongst shoals, and therefore liable to be left at times high and dry, the creature would undoubtedly perish, if provision was not made for its safety. The water, therefore, which enters the branchial chamber is retained for the purpose of moistening the branchiæ, while atmospheric air has free access to the inner membrane through openings at the base of the principal branches

Account of an Extraordinary Sudden Fall in the Waters of the Niagara River.

(Communicated to the Canadian Institute, by Major R. Lachlan, Montreal.)

In the paper on the Periodical Rise and Fall of the Lakes, which I had, last year, the honour of presenting to the Institute, I alluded to examples of the almost entire temporary obstruction of the different Lakes, and more particularly of Lakes Huron and Erie: and I proposed appending to that Essay, some account of one remarkable instance which occurred in March, 1848, between Buffalo and Fort Erie, at the head of the Niagara river. Circumstances having obliged me to postpone that intention, I now beg to be allowed to redeem my pledge, by laying before the Association the document in question, as of considerable philosophical interest,—though possessing no literary merit—and therefore sufficiently deserving of being placed on permanent record. And, to add somewhat to the value of such a paper, I prefix thereto, a sketch map of the course of the Niagara River, from its efflux from Lake Erie, to its junction

with Lake Ontario, as likely to make the whole subject more readily understood.

I need only add, by way of further introduction, that, as stated in my paper on the Rise and Fall of the Lakes,* I was so much struck with the notices of this singular phenomenon which appeared in neighbouring local journals, immediately after its occurrence, that I was induced to write to a friend residing in the vicinity, for further information on the subject; and that this paper will consequently be found to consist of two distinct parts: the one composed of the particulars gleaned from the public prints; the other consisting of the additional information acquired from the gentleman alluded to; and that, as done on other occasions, I have allowed my authorities to speak for themselves, in their own language, in preference to putting together any second description of my own.

With regard to the first branch of the subject, my notes proceed as follows:—

I.

The following particulars respecting the extraordinary obstruction of the waters of the Niagara River, in the winter of 1848, were gleaned from a telegraphic despatch, dated Queenston, 30th., and the *Buffalo Commercial Advertiser* and *Buffalo Express* of the 31st of March:

"This morning, (30th March) was witnessed on the Niagara River, an unprecedented spectacle of wonder, long to be remembered in connexion with the Falls. Suddenly, the water fell to a considerable extent, so that the Table rock was sufficiently dry to enable those who were fortunate enough to be in the vicinity, to go so far across the river, as to be directly over the tremendous rock. This truly astonishing feat was accomplished, among others, by ladies; and although the water in some degree returned the same day, a memento of their journey towards the horse-shoe centre, was left, in the form of a pole erected thereon.

"The villagers of Chippewa (about two miles above the Falls) thought they had entirely lost their creek. Off the old Chippewa fort, about one hundred feet beyond the usual low-water mark, was discovered a burning spring, in the bed of the Niagara, which some one had the curiosity to enclose with an old potash kettle, with a gun-barrel knitted therein,† and succeeded in producing flames, and a loud explosion. Several bayonets, muskets, swords, &c., were also picked up. The water returned to nearly its usual level in the course of the day.

"The cause of this occurrence was conjectured to be an accumulation of ice at the egress of the river from Lake Erie having for a time closed up the outlet—and such proved to be the case: it being stated in the *Buffalo Commercial Advertiser* of the 31st of March, that the river at Black-rock (about three miles below Buffalo) fell 3 feet on the night of the 29th, and rose about six inches on the 30th: and that they were at a loss to account for this, unless the ice had been packed in some place, so as to obstruct the stream. There had, however, been no remarkable variation in the harbour; and this fact increased the perplexity. At the Falls there was an unprecedented and most plentiful lack of water. The creek at Buffalo rose about 6 inches on the 31st."

*See Canadian Journal, vol. 2, p. 293 &c.: but more particularly p. 304.

†The hint must have been taken from a somewhat similar plan having been adopted with a gas-evolving spring, well known to travellers in the vicinity of Chippewa.