

it possessed characteristics which have not been alluded to by Mr. Murray.

In concluding these imperfect notes on the interesting phenomena of the lakes, we have merely to express our entire concurrence in the views which are entertained by many, that the annual variations are the result of climatic irregularities, and consequently, entirely dependant upon waste and supply. The local variations are unquestionably due chiefly to the influence of winds, and in a far less degree to sudden variations in atmospheric pressure, which produce the phenomena of *seiches*, as described by Col. Jackson, on page 27 of this *Journal*. The violent and local convulsions which have been witnessed near Cobourg, and elsewhere, appear to result from causes far more obscure, but yet not altogether inexplicable. We shall return to the consideration of these remarkable phenomena at some future period. The very great difficulty of obtaining authentic information respecting "lake convulsions," or any phenomena of a local character which may have been observed and recorded, induces us warmly to solicit from the members of the Institute, or the readers of this journal, the communication of any facts or information which they may think worthy of transmission.

The following paper, from the rural economy of J. B. Bous-singault, on 'the Influence of Agriculture on Climate in Lessening Streams,' contains matter of much interest, which can already be appreciated in many ways by the people of Canada, and of the shores of the great lakes.

The Influence of Agriculture on Climate in Lessening Streams, etc.

(FROM THE "RURAL ECONOMY" OF J. B. BOUSSINGAULT.)

A question of great importance, and that is frequently agitated at this time, is, as to whether the agricultural labors of man are influential in modifying the climate of a country or not? Do extensive clearings of woods, the draining and drying up of great swamps, which certainly influence the distribution of heat during the different seasons of the year, also exert an influence on the quantity of running water of a country, whether by lessening the quantity of rain which falls, or by promoting the more speedy evaporation of that which has fallen?

In some districts it has been held, that the streams which had been used as moving powers, have very sensibly diminished. In other places, the rivers are said to have shrunk visibly; and in others, springs that were formerly abundant, have almost dried up. Observations to this effect appear to have been principally made in valleys, surrounded by mountains; and it is generally asserted, that the falling off in the springs and streams had followed close upon the period at which the woods, scattered over the surface of the country, were cleared away without any kind of reserve.

The lakes which are met with in plains, and at different levels in mountain ranges, seem to me peculiarly calculated to throw light on this subject. Lakes may, in fact, be received as natural gauges of the running waters of a country. If the mass of the water contained in the lakes undergo change in one direction or another, it is obvious that this change, and the direction in which it has occurred, will be proclaimed by the same or mean level of the lake or lakes, which will differ for the same reason that it does at different seasons of the year, viz. as drought or rain prevails. The mean level of the lake or lakes of a district will, therefore, fall, if the quantity of water which flows through that district diminishes; the level, on the contrary, will rise, if its streams increase; and it will remain stationary if the afflux and efflux of the lake continue unchanged. In the following remarks,

I shall attach myself particularly to observations upon lakes which have no outlet, by reason of the facility with which any, even slight, change in the level of these must be discovered. I shall not, however, neglect those lakes which have an exit by a stream or canal, because I believe that the study of these may also lead to accurate enough results; the only point requiring preliminary remark is the sense in which the words, change of level, are to be taken.

One of the most interesting portions of Venezuela is, undoubtedly, the valley d'Aragua. Situated at a short distance from the seaboard, possessed of a warm climate, and of a soil fertile beyond example, it combines within itself all the varieties of agriculture that belong in peculiar to tropical regions; on the hillocks, which rise in the bottom of the valley, are seen fields which bring to mind the agriculture of Europe. Wheat succeeds pretty well upon the heights which surround La Vittoria. Bounded on the north by a chain of hills, which run parallel with the sea-board, and to the south by the range which separates it from Llanos, the Aragua Valley is limited on the east and west by a series of lesser elevations, which shut it in completely. In consequence of this peculiar configuration of country, the rivers which rise in its interior have no outlet to the ocean; their waters accumulate in the lowest part of the valley, and form the beautiful lake Valencia. This lake, which M. de Humboldt says exceeds the lake Neufchâtel in size, is raised about 1300 feet above the level of the sea; it is about ten leagues in length, and about two leagues and a half where it is widest.

At the time when M. de Humboldt visited the Aragua Valley, the inhabitants were struck with the gradual diminution which had been going on in the waters of the lake during the last thirty years. It was enough to compare the statements of older writers with its condition at this time, to obtain conviction that the waters had, in fact, very much diminished. Ovidio, for instance, who visited the valley frequently towards the end of the sixteenth century, says, that the town of New Valencia was founded in 1555, at a distance of half a league from the lake; in 1800, M. de Humboldt ascertained that the lake was upwards of 4549 yards, or upwards of 3½ miles, instead of about 1½ mile from its banks.

The appearance of the surface also gives new proof of the fact of the recession of the water; certain hillocks which rise in the plain still preserve the title of islands, which, undoubtedly, they formerly received with propriety, when they were surrounded by water. The land which had been left by the retreat of the lake, soon became transformed into beautiful plantations of cotton-trees, bananas, and sugar-canes. Buildings, which had been erected on the banks, were left, year after year, further and further from them. In 1796, new islets made their appearance. An important military position, a fortress built in 1740, in the *Isla de la Cabrera*, was then upon a peninsula. Finally, in two islets of granite, M. de Humboldt discovered, several yards above the level of the lake, a bed of fine sand mixed with fresh water shells. These facts, so certain, so unquestionable, did not pass without numerous explanations from the wise men of the country, who, as if by common consent, fixed upon a subterranean exit for the waters of the lake. M. de Humboldt, after the most careful examination of all the circumstances, did not hesitate to ascribe the diminution of the waters of the lake Valencia, to the extensive clearings which had been effected in the course of half a century in the Aragua Valley. "*In felling the trees which covered the crowns and slopes of the mountains,*" says this celebrated traveller, "*men in all climates seem to be bringing upon future generations two calamities at once—a want of fuel and a scarcity of water.*"*

* Humboldt, vol. v. p. 173.