

SUGGESTIONS ON THE IMPORTANCE OF CONTINUOUS
METEOROLOGICAL OBSERVATIONS.

(*Read Nov. 5, 1867.*)

INDICATIONS so unmistakably exist of great changes in the physical condition of the surface of the earth, that it becomes an interesting and not unimportant enquiry, whether the existing physical condition of the countries we inhabit are likely to be permanent, and if not, at what rate, and in what direction change is likely to occur.

The materials for such an enquiry can be obtained only by a careful registration of continuous observations for a long series of years, and comparison of the mean results.

There can be little doubt that the habits, feelings and characteristics of the various races of men who differ so widely from each other, have, to a considerable extent, been produced by the nature of the countries they inhabit; and that a change of locality, or a change of physical condition, must tend to modify the character of any given race of men.

That the Arctic lands—now the desolate region of perpetual ice—once enjoyed a climate suited to the growth of forest trees, is no less certain than that the warm, wine-producing districts of Southern Europe, were at one time a rugged waste surface of ice and snow. The period occupied by such great changes can hardly be estimated, but it seems probable that some of them have taken place since the first appearance of man on this earth.

It seems also probable that the causes of these changes are still in operation, and that variations in the temperature and physical condition of many parts of the world, are now in progress.

To watch for the signs of such changes, to discover in what direction they tend, and to attempt to estimate the influence they may exercise on the habits and character of our descendants, cannot but be both an interesting and important subject for consideration.

It will be easy, for instance, to imagine how serious an effect would be produced by a change of a few degrees in the mean temperature of the winter months in Nova Scotia.

If the temperature were lowered, the harbour of Halifax would probably be closed, or nearly so, for some months, and the commerce of that city seriously impeded. Most of the smaller harbours would be rendered entirely inaccessible except during the short summer. The commencement of all agricultural operations would be deferred for some weeks, and the autumn season abridged to the same extent. The increased length of winter would enhance the trouble and cost of keeping live stock, and no doubt many species of wild flora and fauna would become extinct. The effect too, which severe frost has on the rocks and surface soil would be so increased and extended as, in the course of a few years, to alter the appearance of the country and modify the relative proportions of land and water.

If on the other hand, the change were in the other direction, it would bring direct and substantial benefits to all the inhabitants of the country. The harbours would remain permanently open, and all farming operations would be facilitated and lessened in cost. It is however probable that increased temperature might, by diminishing the rainfall, and increasing evaporation, so decrease the depth of water in the lakes and the volume of the rivers and streams, as to lead to important changes of the surface of the country, and perhaps ultimately to exercise a prejudicial effect on agricultural operations.

It might even be possible to estimate approximately the amount of pecuniary loss or gain which change of temperature would cause to the country, and to reduce degrees Fahrenheit to an equivalent in dollars!

In addition however to these merely theoretical considerations, there are practical advantages of great importance to be obtained from meteorological observations.

The state of the weather has immense influence on all our operations even on land, but to all engaged in maritime pursuits the weather has an importance which cannot be over-estimated. And if it be possible to foresee the approach of good or bad weather, and to warn the farmer to save his crops and the seaman to make for or remain in port, such a faculty will enable us to prevent the loss of immense wealth and invaluable human life.

That the state of the weather depends (as do all other operations of nature) on invariable and ascertainable laws, is certain and incontrovertible. But it is equally certain that these laws are as yet unknown or very partially known to us, and that they can become known only by the accumulation and generalization of an immense body of facts.

To contribute even in a small degree to bring on the day when the weather can be predicted with tolerable certainty a week or so in advance, is an object worthy of the attention of a Scientific Institution.

In England as in the United States, this subject continues to occupy the careful attention of scientific men, and though much remains to do, very valuable results have already been attained.

I need only point to the weather "forecasts" of the late lamented Admiral Fitz Roy as an example. Receiving by telegraph each morning the state of the Barometric column at many parts of the coasts of the United Kingdom and of the continent of Europe, the Admiral communicated his expectations as to the weather to most of the ports frequented by shipping, and a simple system of signals indicated the probable approach of a gale and the point from which it might be expected.

Although not in every instance correct, there is no doubt that these signals have been the means of saving life and property to a large extent.

With these few remarks I venture to urge on the Institute of Natural Science the importance of promoting careful and continuous records of the meteorology of the country, and to submit for consideration a few suggestions as to the mode of taking observations.

The instruments should be by the best makers, and all carefully compared with a standard instrument, either at the Royal Observatory, Greenwich, or at one of the United States Observatories.

All the instruments (not self-registering) should be read at stated times—say at 9 A. M. and 3 P. M., and oftener if possible; but if by any accident the observation cannot be taken within a few minutes of the prescribed time, the reading should be omitted altogether.

Observations, as to the correctness of which there is any doubt, are worse than useless.

At least six thermometers should be used, four of them self-registering; one to give the maximum temperature in the shade, and one in the sun; one to give the minimum temperature, about four feet from the ground, and one on the surface (if possible) of grass. A pair of thermometers, one with a wet and the other with a dry bulb, should also be suspended about four feet from the ground, and from these instruments all the observations necessary for calculating, the hygrometric condition of the atmosphere may be obtained.

There is, I believe, an efficient aurmometer fixed in an admirable position at Halifax, and I have no doubt that the results obtained from that instrument would be placed, by the courtesy of the Royal Engineers, at the service of the Institution of Natural Science. The estimate of the amount of rain-fall in the year would be attended with some difficulty, owing to the low temperature of the winter months and the consequent

necessity for melting the snow and ice collected in the guage ; but the results, if carefully obtained, would, for that very reason, be peculiarly interesting and useful, and would fully repay the trouble of obtaining them. I have no doubt that the ingenuity of members of the Institute would devise an apparatus for this purpose, suited to the difficulties of the climate.

Careful and regular readings of the barometer have a peculiar value and utility. The time may not, perhaps, have yet arrived when a regular system of "forecasts," such as was introduced by Admiral Fitz Roy, can be adopted in Nova Scotia. But I venture to point out how admirably Halifax is situated for such a purpose, as the state of the Barometer could be known by telegraph from Newfoundland, Cape Breton Island, Boston and New York, as well as from other points, and the direction and force of air currents thus ascertained. If it be premature to attempt at present so extensive an arrangement, I would suggest that in a port so much frequented as Halifax is, it would be of great use to shipping to indicate daily, by a simple semaphore placed in a conspicuous position, the height of the barometric column, and whether it be rising or falling.

I beg to subjoin a table giving the means of a number of observations of temperature taken in the Naval Yard, Halifax, during the years 1863, '64, '65, '66.

I am not disposed to place much value on these results as it is probable that the instruments were faulty, nor can I be sure that the observations were taken with care, but I lay them before the Institute, as I presume no other observations are in existence for the same period.

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