upon which the float is placed. When the external atmospheric pressure increases upon the surface of the column of water in *G*, more water is forced into *H*, thereby reducing the height of the central column and increasing the compression of the confined air. When the external atmospheric pressure becomes less, the reverse action takes place. In order to prevent variations due to sudden temperature changes, the chamber *H* is buried five feet below the ground level, which in this case is also below the level of the water. The daily reading of the soil thermometer *T* gives a constant record of the temperature at this depth. To facilitate the sinking of the chamber *H* below the surface of the water the confined air was expelled by removing the cap from the small pipe *J*, and pouring water into the central pipe until *H* was filled. After filling in the sand to the top of the chamber *H*, double planking *S* was laid across from shoulder to shoulder of the curbing to prevent any variable strain on the top of H, due to changes of atmospheric pressure upon the earth's surface directly above. To put the barometer in working order the water was all pumped out, then after screwing the cap on the pipe *J*, sufficient water was again poured into the central pipe *G* until it had risen as shown by the dotted lines. To prevent evaporation the top of the column may be sealed by a suitable form of oil. Referring again to the recording portion of the instrumet *I* is a double grooved pulley placed between centres. Upon its smaller grooved circumference rests a line which has one end attached to the barometer float *E* and the other to a counterbalance weight at *K*. *L* is a standard supporting two grooved pulleys *M* and M^1 of similar diameter. Pulley M^1 which is obscured by *M* in the section is connected to the pulley *I* by a fine line kept taut by means of an adjustable spiral spring at *N*. To overcome friction the barograph pen C^1 is attached to a slender aluminum arm, which in turn is connected to a fine aluminum sleeve fitting tightly upon the line in such a manner as to permit a free vertical, but not horizontal, movement on the sleeve. The lake level recording pen *C* is attached in a similar manner to the line which starts from the smaller grooved circumference of the pulley *Q*, and passes over pulleys *P*, *O* and *M*, terminating in the counterbalance weight *R*. To prevent errors due to changes in the length of the line between float and pen, a fine plated steel wire was used from *Q* to *P*, and a special flexible material from this to the instrument. The recording sheet is ruled into one-quarter inch squares. Two feet upon the cylinder is allowed for the barometric range, and one foot for the lake level changes, and as the ratio of movement between pen and float remains the same as previously described (viz., 1 to 4), a range of twelve inches on the cylinder would correspond to a change of water level of forty-eight inches. Both pens are set in line in order that their times will exactly agree, also the barometric pen under increasing pressure is arranged to move up the paper in the same direction as the lake level would assume during a rise of the water. The object of this instrument is not so much to furnish a very accurate measurement of the atmospheric pressure changes, as are now obtained from the more expensive mercurial and aneroid barographs, as to magnify these movements to enable one to study the characteristic forms and extent of the ripples, waves or billows, which have lately been found to exist in our atmosphere during almost all conditions of weather; also as a means of proving conclusively to what extent, and in what manner these atmospheric disturbances affect the waters of the lake. As this appears to be the first instrument of its kind the writer ventures to term it a hydro-aerograph.

(To be Continued)

THE GREAT NORTH.

A railway to the shores of James Bay or Hudson Bay is not only quite feasible, but it is urgently needed to develop the resources of our great North Land. For the past century and a half furs have been the great staple of trade in this region of Canada, but there are many sources of wealth about Hudson and James Bays, and some of these can only be drawn upon by means of a railway. Take the marine products alone. "The salmon," says an official report, "abound in the streams running into Hudson Strait so plentifully that a ship can be loaded with them in a few days. They are pronounced the finest in the world—much better in quality than those in the Pacific or those in the more southern waters of the Dominion." The same is said of the trout. The bay teems with other fish, such as cod, hake, pollock, whiting, etc. For many years American whalers have resorted here, and returns to the United States Fisheries Department show that the value of the "takes" of fifty whaling voyages there have aggregated $1,371,000, or $27,420 per voyage—a statement which ought to attract the attention of some of our Canadian sea fishing men who complain of bad seasons on the Atlantic. United States fishermen in the last ten years have taken out of Hudson Bay in fish oil and whale oil alone an average value of $150,000 a year; while the Hudson Bay Company get over $50,000 a year from the blubber of the whale and porpoise. The narwhal, the walrus and the hair seal form very valuable sources of trade here. Of the porpoise alone, C. R. Tuttle, who accompanied the Dominion Government expedition in 1884, says: "I do not overstate the truth when I say that with proper facilities 4,000 or 5,000 of these oil-bearing animals could be taken at one place in a single season, which means blubber to the value of over $300,000." A railway to James Bay would pay, looking to the development of the fisheries alone, but these are only an element in the case. Countless millions of feathered game can be obtained here, such as wild geese, ptarmigan, curlew, and ducks. There are three or four varieties of wild geese and over a dozen species of duck, among which may be noted the eider duck, which produces the eider down so valuable in commerce. Leaving out of question the fur trade, which is still of immense value, it is to be noted that the country from Michipicoten north to James Bay is rich in minerals, though the real value of the minerals can scarcely be said to have been investigated. From the cursory trips of geologists and travellers we know there are deposits of gold, silver, molybdenum, galena, iron, mica, coal, graphite, asbestos, zinc, fire clay, salt, gypsum, copper and ornamental stones. Dr. Bell was struck with the fine specimens of pure copper pyrites, and of manganese iron ore. It would only be repeating the history of other regions, if the building of a railway would of itself lead to the opening up of new mineral beds not yet known to exist. Vast tracts of the country between the Ontario lakes and Hudson Bay are heavily timbered, and the spruce is of magnificent growth and excellent quality for pulp making. The pulp industry by itself would afford traffic in a few years for such a railway. Lastly, as to agriculture, it may not be generally known that the climate of the region in question is in the main as temperate as that of Manitoba, as the meteorological records at Moose Factory show, and "the gardens of Rupert's House, East Main and Fort George show that potatoes and all the ordinary vegetables thrive well." The Hudson Bay Co. maintain a stock farm at East Main, where cattle and sheep thrive well.