are supplemented yearly by a publication giving the location of epicentres of all earthquakes of which any trace is registered at Ottawa. Data are gathered from all the reporting seismological stations of the world.

Regular research work in seismology is carried on at Ottawa where the full time of two seismologists is given to the work of earthquake study alone. The reports are issued in the publications of the Dominion Observatory, Ottawa.

The natural and instrumental data for each station are as follows:—

Halifax.—Lat., 44° 38′ N.; Long., 63° 36′ W.; Alt., 47·3 m. Substrata, carbonaceous slate. Equipment:—Small Mainka Pendulum Seismograph, Mechanical registration. Components N.S., E.W. Mass of each 139·3 kgm. Period of each, 10 sec. Damping ratio of each, 6:1. Magnification of each, about 60. Time is checked automatically each hour by signal from Western Union Telegraph and is to be depended on to one or two seconds.

Ottawa.—Lat., 45° 23′ 38″ N.; Long., 75° 42′ 57″ W.; Alt., 82 m. Substrata, boulder clay over limestone (Ordovician). Equipment:—(1) Bosch Horizontal Seismographs. Photographic registration. Independent components, N.S.,E.W. Mass of each 200 gm. Period of each, about 5·5 sec. Damping ratios, N.S., 2:1, E.W., 18:1. Magnification of each, 120. (2) Milne-Shaw Horizontal Seismographs. Photographic registration. Independent components, N.S., E.W. Mass of each, 1 lb. Period of each, 12 sec. Damping ratio of each, 20:1. Magnification of each, 250. (3) Wiechert Vertical Seismograph. Mechanical registration. Mass, 80 kgm. Period, 6 sec. Damping ratio, 20:1. Magnification, about 160. (4) A deformation Instrument. Photographic registration. Components, N.S., E.W. Mass of each, about 20 gm. Period of each, about 36 sec. Undamped. Used for determination of tilt. The time service at Ottawa is that of the Dominion Observatory and the registration on the record is kept correct to within 0·2 sec.

Toronto.—Lat., 43° 40′ N.; Long., 79° 24′ W.; Alt., 115·5 m. Substrata, sand and gravel on boulder clay to a depth of about 15 m. then shale over crystalline rock (Laurentian) to a depth of about 335·5 metres. Equipment:—(1) Milne Seismograph. Photographic registration. E.W. component. Mass, 0·23 kgm. Period, 18 sec. No damping. (2) Milne-Shaw Horizontal Seismographs. Photographic registration. Independent components, N.S., E.W., Mass of each, 1 lb. Period of each, 12 sec. Damping ratio of eacn, 20:1. Magnification of each, 150.

Time markings by Toronto Observatory clock. The registration has an error of 2 sec. The time is checked by meridian transits.

Saskatoon.—Lat., 52° 08′ N.; Long., 106° 40′ W.; Alt., 515 m. Substrata, clay and sand. Equipment: Small Mainka Pendulum Seismograph. Mechanical registration. Components, N.S., E.W. Mass of each, 139·3 kgm. Period of each, approximately 9 sec. Damping ratio of each, 5:1. Magnification of each about 60.

Time by local clock, checked occasionally by telephone with train time.

Victoria.—Lat., 48° 24′ 50″ N.; Long., 123° 19′ 28″ W.; Alt., 67·6 m. Substrata, igneous rock. Equipment:—(1) Milne Seismograph. Photographic registration. E.W. comp. Mass, 0·23 kgm. Period, 18 sec. No damping. (2) Milne-Shaw Horizontal Seismographs. Photographic registration. Independent components, N.S., E.W. Mass of each, 1 lb. Period of each, 12 sec. Damping ratio of each, 20:1. Magnification of each, 250. (3) Wiechert Vertical Seismograph. Mechanical registration. Mass, 80 kgm. Period, 5 sec. Magnification, 70.

Time service of the meteorological station. Registration correct to ± 1 sec.

IV.—THE FLORA OF CANADA.[1]

Introduction.—It is a well known fact that, at a geologically recent period, practically the whole of Canada from the Rocky mountains east was covered with glacial ice which, slowly advancing southward, reached as far as Central Missouri. Whatever vegetation may have flourished in Canada before the glacial period was gradually forced to migrate southward as the ice advanced. During this retreat many species were no doubt wiped out of existence, but a certain number, belonging perhaps largely to types which now are found in the arctic regions, managed to survive. In fact, we must surmise that, during the glacial period, the vegetation immediately in front of the continental ice was arctic in character and that, when the glaciation reached its maximum, those parts of the United States which were immediately to the south of the ice had a flora similar to that now existing in the far north.

With the return of a warmer climate and the gradual recession of the continental ice, vegetation began to move back northward, with the arctic types as a vanguard

[1]This article, reprinted in slightly abbreviated form from the 1921 Year Book, is a revised and popularised edition of a paper, entitled "Flora of Canada," by the late Mr. J. M. Macoun, C.M.G., F.L.S., and M. O. Malte, Ph. D., published in Canada Year Book, 1915, and also as Museum Bulletin No. 26, Geological Survey, Department of Mines, Ottawa, 1917.