

the possibility of forecasting any short-period variations in the rainfall. Inasmuch as we are bound to regard the tropics as the first stage in the translation of solar variation into weather, it seems a pity that the result obtained in what is probably the best known region of the tropics in regard to meteorological statistics should appear so meagre and wanting in definiteness. Similar work in temperate regions may well be discouraged, but there is still an enormous mass of data.

W. W. B.

Insects of Arctic Canada.

THE insects of various orders—as well as a few spiders, mites, and centipedes—collected by members of the recent Canadian Arctic Expedition (1913-18) have been recorded and described in vol. iii. of the Report (Ottawa, 1919-20). The lists contain much information of value to students of zoological geography. Among the Lepidoptera (described by Arthur Gibson) it is interesting to see varieties of such well-known British butterflies as *Pieris napi*, *Papilio machaon*, and *Vanessa antiopa*. Most of the Coleoptera (by J. M. Swaine, H. C. Fall, C. W. Leng, and J. D. Sherman) belong to species already known in North America, and the same remark applies to the bees described by F. W. L. Sladen, who points out that bumble-bees are “particularly well adapted to Arctic conditions,” and records the capture of five nearly full-fed *Bombus* larvæ on Melville Island (75° N. lat.) on June 21, 1916. The sawflies, described by A. G. MacGillivray, are mostly new species, and, as might have been expected, willow feeders. Among the Diptera (by C. P. Alexander, H. G. Dyar, and J. R. Malloch) there are some interesting details of larvæ as well as descriptions and records of flies, which are relatively numerous in species. The occurrence of larvæ of *Oedemagena tarandi*—the warble-fly of the European Reindeer—in Barren-ground Caribou at Bernard Harbour is noteworthy. Mosquitoes of a couple of species of the genus *Aedes* were observed (and felt) in swarms. As regards wingless parasites, Prof. G. H. F. Nuttall records that head-lice (*Pediculus capitis*) from the Copper Eskimo of Coronation Gulf show no varietal distinction from members of the species found elsewhere. Dr. J. W. Folsom enumerates a dozen species of springtails (Collembola); two only of these are new, but his figures of structural details, drawn carefully from Arctic specimens of common and widespread northern forms, will be welcome to students of this order.

G. H. C.

Earthquake Waves and the Elasticity of the Earth.

DR. C. G. KNOTT delivered a lecture on “Earthquake Waves and the Elasticity of the Earth” before the Geological Society on June 9. He pointed out that seismograph records of the earth-movements due to distant earthquakes proves that an earthquake is the source of two types of wave-motion which pass through the body of the earth, and a third type which passes round the surface of the earth. Before earthquake records were obtained, mathematicians had shown that these three types of wave-motion existed in and over a sphere consisting of elastic solid material. Many volcanic phenomena, however, suggest the quite different conception of a molten interior underlying the solid crust. At first statement these

views seem to be antagonistic, but there is no difficulty in reconciling them. Whatever be the nature of the material lying immediately below the accessible crust, it must become at a certain depth a highly heated fairly homogeneous substance behaving like an elastic solid, with two kinds of elasticity giving rise to what are called the compressional and distortional waves. The velocities of these waves are markedly different, being at every depth nearly in the ratio of 1.8 to 1. Both increase steadily within the first thousand miles of descent towards the earth's centre, the compressional wave-velocity ranging from 4.5 miles per second at the surface to 8 miles per second at depths of 1000 miles and more; the corresponding velocities of the distortional wave are 2.5 and 4.3 at the surface and at the 1000-mile depth respectively. At greater depths these high velocities seem to fall off slightly; but the records fail to give us clear information as to velocities at depths greater than about 2500 miles. Down to this depth the earth behaves towards these waves as a highly elastic solid. The elastic constants, which at first increase with depth more rapidly than the density, become proportional to the density, for the velocity of propagation becomes practically steady. About half-way down, however, the material seems to lose its rigidity (in the elastic sense of the term), and viscosity possibly takes its place, so that the distortional wave disappears. In other words, there is a nucleus of about 1600 miles radius which cannot transmit distortional waves. This nucleus is enclosed by a shell of highly elastic material transmitting both compressional and distortional waves exactly like an elastic solid.

University and Educational Intelligence.

ABERDEEN.—Dr. R. D. Lockhart has been appointed a lecturer in anatomy.

It has been decided to institute a full-time lectureship in bacteriology in the department of pathology.

BIRMINGHAM.—It has been decided that the fees payable by new students entering the University next session shall be increased by 25 per cent. The reasons given for the increase are: (1) The great rise in the cost of administration, materials, maintenance, taxation, and the wages of employees; and (2) the necessity for improving the payment of the academic, particularly the non-professorial, staff.

The Vice-Chancellor (Sir Gilbert Barling), according to the *Birmingham Post*, states that “it is absolutely necessary to increase the stipends of the staff for two reasons: the present salaries are quite inadequate to maintain the teachers in a reasonable state of comfort; and, secondly, because without such increase they will be attracted to other places where stipends are more commensurate with their capacity and worth.”

CAMBRIDGE.—The Balfour Memorial Fund studentship will be vacant on October 1 next. Applications are invited for it. Candidates should apply by, at latest, September 15 to Prof. J. Stanley Gardiner, Zoological Laboratory, Cambridge.

On July 29 the honorary degree of Doctor of Law was conferred upon Dr. A. L. Lowell, president of Harvard University; Prof. J. J. Abel, professor of pharmacology, Johns Hopkins University; and Prof. H. Cushing, professor of surgery at Harvard University.

OXFORD.—The fear expressed in some quarters that the application by the University for a Government grant would check the liberality of private benefactors has proved to be groundless in at least one con-