

migration period, nor does a cold spell mean a lengthening of the time over which the migration extends. Table 10 shows the difference of temperature of the migration day and that directly preceding it, and purports to prove that it is the temperature of the moment, not that which went before, which incites birds to migrate. It seems, however, as if the author had somewhat confused the issue; it cannot be the temperature at the point of arrival which incites the bird to begin its migration in spring. After this we have the various migration dates compared for Switzerland, Hungary, Bavaria, and Württemberg, though as the last has only three entries we think it might have been omitted.

In conclusion, the author indicates his conviction, which is probably shared by most ornithologists, that the real incentive to migration is not to be found in outward circumstances, but must be sought in physiological conditions. The outward conditions, including food, do undoubtedly have some effect upon it, but do not produce the necessary impulse. Though there is perhaps nothing startlingly new in this pamphlet, yet it is a welcome addition to the literature relating to migration; it shows much careful work, and the fact that Dr. Bretscher refrains from drawing more than very tentative conclusions adds to, rather than detracts from, its value. He realises that it is not possible to come to any definite solution of the problem he is studying without observations—and, we would add, meteorological data—made over a much wider field.

W. E. C.

CONTRIBUTIONS TO EMBRYOLOGY.¹

NO money given by Mr. Carnegie for the furtherance of scientific research is likely to yield better interest than that invested in the Department of Embryology in the Carnegie Institution of Washington, D.C. The nucleus of the department was formed by the collection of human embryos assembled by Prof. Mall when he held the chair of anatomy in Johns Hopkins University, Baltimore. It took Prof. Mall ten years to collect his first hundred specimens; five years to collect the second hundred; three years for the third; and two years for the fourth hundred. Since his collection was taken over by the Carnegie Institution four hundred specimens have been gathered each year. The collection of material is now the most extensive and the equipment the best of any embryological department in the world. Specimens are being gathered from all parts for the study of "racial embryology"—an untouched field of research. New technical procedures are being introduced to enable workers to reconstruct the different parts of the embryo with much greater accuracy than had been previously possible.

The two volumes here noticed contain an account of recent researches carried out by workers attached to the department of which Prof. Mall is the director. The director himself contributes

¹ "Contributions to Embryology." Vols. iv. and vi. (Carnegie Institution of Washington, 1916-17.)

two papers—one on the origin of the "magma reticule," which is present in normal embryos, but is particularly abundant, as Giacomini had noted, in pathological human embryos. His second paper is a description of the condition of cyclops as seen in early stages of human development. Mr. R. S. Cunningham describes the development of lymphatics in the lung—a paper which is interesting not only from a theoretical, but also from a practical point of view. Dr. Florence Sabin gives an account of a prolonged series of investigations concerning the origin of blood-vessels, and reaches some unexpected conclusions regarding the earliest blood channels which appear in the head and brain. Certain channels which at first serve as veins appear afterwards to be converted into arteries.

All the papers represent a high grade of workmanship, and no pains or expense have been spared to obtain accuracy and finish of illustration.

A. K.

NOTES.

THE succession of M. Painlevé to the Premiership of the French Government ought, even in this country, to excite the interest and friendly sympathy of the scientific world. The new Premier is a member of the Paris Academy of Sciences, and a mathematician of world-wide reputation; besides contributing to the literature of his subject, he has held, until quite lately, two of the most important mathematical chairs in France. To construct a similar case in our own country, we should have to suppose our Prime Minister to be a man like the late H. J. S. Smith, or Sir William Ramsay; could anything more improbable be thought of? Yet the evidence is steadily growing that men of the so-called professorial type may show themselves eminently capable of directing public affairs; President Wilson is a conspicuous example, and as time goes on the number of such cases is certain to increase. We feel that, on behalf of English men of science, we may congratulate, not only M. Painlevé, but even France herself, on this appointment; and we confidently hope that the sequel will justify it, and help to make average citizens understand the value, in all national affairs, of a strictly scientific habit of mind.

UNDER the heading of "New German Chemical Discoveries," the *Times* of September 14 quotes from the *Neue Zürcher Zeitung* a review of German activities in technical matters in the field of war economics. It is stated that by the use of liquid sulphur dioxide viscous golden-yellow mineral oils are being extracted from coal; the yield, however, is small, 5 kilos. per metric ton. This is equivalent to about 1¼ gallons per imperial ton, and is a striking commentary on the shortage of such oils in Germany. The refining of petroleum oils by this solvent had already been placed upon a commercial footing under the Edeleanu patents, but the outbreak of the war interrupted the development of the process, which depends on the preferential solvent action of the liquefied gas on certain classes of hydrocarbons and sulphur compounds, enabling the removal of those which give rise to a smoky flame, together with the objectionable sulphur compounds. In a series of Howard lectures (Roy. Soc. Arts, 1916) Prof. Brame suggested the use of this solvent as being the most promising for the extraction of certain constituents of coal in future investigations; it is therefore of some interest to find that commercial application of liquid sulphur dioxide is now yielding these hydro-