

by increases of grant sufficient for their gradual reduction. Considerable items of capital expenditure still call for the Ministry's contribution on a pound for pound basis; but if possible, smaller items should be met out of a margin provided by an adequate annual grant.

As a measure of security for the proper use of the suggested increased grants, the report proposes that annual visits should be paid to colleges and farms by responsible officials and technical officers of the

Ministry. It also recommends that members of the county committees should periodically visit any college to which a grant is made, with the view of increasing the co-operation between colleges and counties.

If the suggestions outlined above are put into force, the position of the agricultural colleges of Great Britain will be greatly strengthened, and they will be enabled to make a much greater contribution towards improving agricultural practice throughout the country.

International Longitude Operations

THE Observatory of Zi-Ka-Wei, which took part in the International Programme of Longitude Operations in October and November 1933, in addition to transmitting its results to the Commission of the International Astronomical Union responsible for the general reduction of the whole work, has published its own observations in its *Annales* (t. 20).

The Observatory kept its own time with two pendulums, Leroy 1227 and 1338, working at constant pressure and a temperature controlled by a thermostat. Meridian observations were made with two transit instruments, the Zi-Ka-Wei instrument used in 1926 and a similar instrument which was brought from Nice by M. Fayet. Observations with both instruments were secured on twenty-eight nights by four observers, each of whom used both instruments. The maximum difference between the clock errors deduced from the two instruments on the same night was 0.04^s , and the difference was generally less than 0.02^s . Wireless time signals were received from a number of stations, including DFY (Nauen) and FYL (Bordeaux). Time lags in the reception of the wireless signals were determined by a method due to M. Jouast, and it is hoped that their effect has been eliminated. The longitude of Zi-Ka-Wei minus Paris is found to be $7^h 56^m 21.962^s$ in 1933, as

compared with 21.975^s in 1926. The difference between the two determinations is thus 0.013^s (the equivalent of 17 ft. on the earth's surface) which is presumably scarcely outside the limit of accidental error; but it is of interest from the point of view of continental drift to note that observations of this kind would certainly have shown up a drift of seventy feet on the earth's surface during the seven years that elapsed between the two determinations. It is certain that the reality or otherwise of continental drift will be settled by these precise longitude observations, when a long enough time interval has elapsed.

The director of the Zi-Ka-Wei Observatory directs attention to a puzzling periodic variation from the mean longitude with an amplitude of 0.05^s and period of one month. This is shown by the 1933 observations as well as by those made in 1926. He concludes that it is not possible to incriminate either the meridian observations or the reception of the time signals, and is inclined to attribute these fluctuations to a periodic deformation of the earth's crust. One is reminded of a somewhat similar effect in the longitude difference Washington minus Greenwich, which has been pointed out by Loomis and Stetson. The precise nature of the cause of this variation is obscure.

Biology and Variation of *Ceratium*

THE introductory report* (No. 1) to the Carlsberg Foundation's Oceanographical Expedition contains an article in memory of its late leader, Prof. Johannes Schmidt, by Martin Knudsen, with portrait, a foreword by P. Jespersen and Å. Vedel Tåning, a list of stations and, finally, the results with detailed tables of the echo-soundings, with introductory remarks by Sv. Greve. There are also seven maps showing the stations.

This was the last and the greatest of the many expeditions in which Schmidt personally took part, from June 14, 1928, until June 30, 1930. Like all those which he conducted, it was planned and con-

ceived in every detail by himself. He took care that the investigations were as many-sided as possible, and maintained his interest in discovering connexions between the biological and physico-oceanographical conditions. The principal features in the biological-zoogeographical methods of work and the plans for the Expedition were drawn up by him in the following summary:—

(1) With the aid of the most efficient apparatus to obtain a very large material, rich in individuals, of the pelagic life in the different depths and the various oceans.

(2) With the aid of simultaneous, methodical investigations on the physical and chemical composition of the different water layers, to obtain data which would permit us to conclude under what environmental conditions each single one of the millions of pelagic organisms, taken in the nets, may live.

* The Carlsberg Foundation's Oceanographical Expedition round the World 1928-30 and Previous *Dana* Expeditions under the Leadership of the late Prof. Johannes Schmidt. *Dana-Report No. 1. Introduction to the Reports from the Carlsberg Foundation's Oceanographical Expedition round the World 1928-30.* Pp. 130+7 plates. 16s. net. No. 4. *Untersuchungen über die Verbreitung, Biologie und Variation der Ceratien im südlichen stillen Ocean*, von E. Steemann Nielsen. Pp. 87. 8s. net. (Copenhagen: C. A. Reitzel's Forlag. London: Oxford University Press, 1934.)

(3) By means of the large pelagic material to subject a number of important oceanic species or genera to a finer analysis, with reference to classification, than has previously been possible with the frequently somewhat scanty material available from the distant waters.

The Expedition was successful in every way, and the results of the investigations now being published show its extreme value. It is to be regretted deeply that Schmidt did not live to see more of the fruits of his carefully planned work. The reports now being published are to appear in parts. No. 2 (Deep-Sea Angler Fishes (Ceratioidea)), by C. Tate Regan and Ethelwyn Trewavas, was published in 1932. Dr. Nielsen, who took part in the Expedition, now contributes an important monograph (No. 4) on the Ceratia in the southern Pacific Ocean. The genus is taken as representative of the phytoplankton and the whole work touches on many vital problems.

The *Ceratium* material is from two Danish Expeditions of the steamer *Dana*. In January 1922 in the Gulf of Panama and in September 1928-March 1929 on the present Expedition, through the Pacific Ocean from Panama to New Zealand-Australia, 68 stations were sampled, and in all the oceanic stations the Nansen closing net was used. Whilst on the first Expedition samples were taken at other depths, in 1928-29 the catches were almost wholly made at the depths 200-100 metres, 100-50 metres, 50-0 metres. The surface net was only used at shallow coastal stations where a vertical separation of species of *Ceratium* would be unimportant. Sixty species were recognised besides several sub-species and variations.

The larger part of these *Ceratium* species are oceanic, but a few are typically inhabitants of coastal waters, that is, neritic. The author's main conclusions are that temperature, currents and oceanic-neritic waters are the chief factors influencing the horizontal distribution of the *Ceratia*, the variation

in the species depending on the first and the last. He finds that a rising temperature tends to lessen the size of the cell, and, in some species, there is a lengthening of the horns at the same time. Under a neritic influence the cells are usually large and there is almost always a lengthening of the horns. The case of *Ceratium fusus* is striking, for in neritic waters it is nearly double the size of that in purely oceanic conditions. The cause of this large size is evidently not the better nourishment of the cell, since the *Ceratium* population in the eutrophic east equatorial stream where the neritic influence is much felt are no greater than in the oligotrophic oceanic stations with the same surface temperature. The author is of the opinion that the dearth of *Ceratium* species in purely neritic waters compared with the large numbers in the oceanic stations is to be attributed to the accumulation of the waste products from the breaking down of the many organisms in neritic regions where the water is only renewed very slowly, these substances being usually poisonous to the sensitive oceanic species.

There is a striking agreement of the *Ceratium* populations in the Pacific and Atlantic Oceans, few species being peculiar to one or the other.

It is shown that the genus has a very characteristic depth distribution. About a third of those found in the Pacific are so-called 'shadow' species. In the plankton-poor water these were found chiefly in the samples below 50 metres, whilst most of those where the plankton was rich were chiefly above this depth. The 'shadow' species are all oceanic. They require only a moderate light intensity, but in those waters where there is abundance of plankton this moderate light intensity is nearer the surface. All *Ceratium* species which have a very broad flattened body or in some other way have the assimilation surface enlarged are 'shadow' species. In those regions where they live, the nutrient salts are always considerable.

Genetics at Cold Spring Harbor, N.Y.

THE latest annual report of Dr. C. B. Davenport for the Department of Genetics at Cold Spring Harbor is contained in Year Book No. 33 of the Carnegie Institution of Washington for 1934. It covers the usual wide range of investigations bearing on genetics in plants, animals and man. Only a few of these researches can be cited here. Demerec has surveyed the X-chromosome of *Drosophila* for minute deficiencies or cell-lethal mutations produced by X-rays. In 12 out of 13 cases the deficiency of a single locus caused cell death, which supports the view that nearly all the genes take a vital part in the functioning of every cell. In *D. virilis*, a gene producing intersexes has been found.

Blakeslee and Bergner find that, in *Datura discolor*, five of the twelve pairs of chromosomes have exchanged segments in comparison with *D. stramonium*, and these species when crossed give a ring of 10 chromosomes in the hybrid. Older seeds are shown by Cartledge to have a higher mutation rate than young seeds, and it was found that bad pollen could be used as an index of the mutation rate in aged seeds, which produced mutations at thirty times the rate of the controls.

Problems of leukaemia and immunisation in mice are investigated, and an account is given of Dr. Riddle's work on hormones, especially in pigeons. The antepituitary secretion has been most studied, both in pigeons and in cattle, some of the results receiving clinical application. It is shown that the gonad-stimulating hormone in rabbits also causes ovulation, but conclusive evidence is obtained that a separate pituitary principle stimulates the thyroid, also affecting the basal metabolism. The shaker mouse is found to show a defect in the *area striata* of the brain, and a circling mouse mutation is probably due to two recessive genes with variable expression. In the parasitic wasp, *Habrobracon juglandis*, Whiting has obtained sixty mutations. Some are sex-linked and form the basis for a theory of sex inheritance in this species with haploid males.

In human genetics there have been studies of growth in children, of the errors of physical anthropometry on the living subject, racial growth differences of Indians, Negroes and Dutch, and researches by Laughlin on immigration policy.