

the instruments which Struve designed sixty years ago still do the finest work of any in the world, he tells us that the air there "is remarkably clear; the entrance to St. Petersburg, ten or twelve miles north, is distinctly visible; and Struve told me that during the Crimean war he could see, through the great telescope, the men on the decks of the British ships besieging Kronstradt, thirty miles away." Towards the latter part of these reminiscences, Prof. Newcomb mentions his meeting with Hansen, "who was at odds with him on a scientific question," the question being that Hansen was the author of a theory that the further side of the moon is composed of denser materials than the side turned towards us. We must, however, leave our readers here to study this article for themselves for further details, as we have already extended this note beyond the usual limit.

THE CAPE OBSERVATORY REPORT.—Dr. Gill's report to the Secretary of the Admiralty of the work done at the Cape Observatory during the year 1897, shows the great state of activity which has pervaded the whole atmosphere of the observatory during the past twelve months. It will be remembered that Mr. McClean last year made a stay at the Cape to complete his spectroscopic survey of all stars down to 3.5 magnitude; his 20-degree prism being fitted on to the 12-inch astrophotographic telescope. Unfortunately Mr. McClean's magnificent gift to the observatory did not arrive from Dublin during his stay, as was expected, so that he was deprived of the pleasure of witnessing its erection. The observatory for this instrument is completed as far as possible, and is only now waiting for the arrival of the heavy portions of the telescope. The rising floor and its hydraulic machinery have been set up, and, as Dr. Gill says, "the whole has been admirably designed by Mr. McClean and Mr. Osbert Chadwick, . . . it was erected here under my personal supervision by Cape workmen, and acts to perfection." The plans for the new transit circle and observatory have been settled in complete detail, and both will be executed with as little delay as possible. The transit circle has been employed chiefly for observations of standard stars required for the reduction of measures of the Catalogue photographic plates. A system of double watches with this instrument was organised so that the observers would be ready to take up the fundamental meridian work with the new transit circle in 1900. Both the equatorials have been employed, and the 7-inch was chiefly used by Mr. Innes for observing the stars in four lists forwarded by Prof. J. C. Kapteyn. In this work a star of the eighth magnitude was discovered "having an annual proper motion amounting to nearly 9" of arc on the great circle, *the largest proper motion yet known.*" Besides several uncatalogued nebulae, Mr. Innes has found no less than 128 new double stars. Many of our readers may not be aware that Mr. Innes is secretary, librarian, and accountant to the establishment, but "has applied himself to the revision of the Durchmusterung and other extra-meridian work (which he has performed as a labour of love), in addition to the thorough discharge of his official clerical duties." To refer to the work accomplished and proposed for the heliometer, the observations of the zenith telescope, the state of current reductions, publications, time service, would make this note too long, so we will only confine ourselves, in conclusion, to the fact that proposals have been sent forward for erecting a suitable building for a physical laboratory and accommodation for records and astrographic work.

ZOOLOGY AT THE BRITISH ASSOCIATION.

ALTHOUGH the foreign zoologists who had attended the International Congress at Cambridge a week before did not stay on for the British Association meeting, as had been expected, still the attendance at Section D was good, and many of the papers were of an interesting character. The number of papers was not large, so the Section did not meet on Saturday and Wednesday.

Prof. Weldon's presidential address gave a useful popular discussion of some of the principal objections which are urged against the theory of Natural Selection, and showed (1) that the law of chance enables one to express easily the frequency of variations among animals; (2) that the action of Natural Selection upon such fortuitous variations can be experimentally measured; and (3) that the process of evolution is sometimes so

The Section did not sit in the afternoon, but a Biological Exhibition at the Clifton Zoological Gardens was opened at three o'clock by Sir John Lubbock.

Friday, September 9.—The following papers were taken:—Prof. E. B. Poulton, on the proof obtained by Marshall that *Precis octavia-natalensis* and *P. sesamus* are seasonal forms of the same species. The specimens were exhibited.

Mr. F. Galton, on photographic records of pedigree stock. This was for the purpose of urging the systematic collection of photographs and information as to pedigree stock. Galton's ancestral law proves the importance of a much more comprehensive system of records than now exists. A breeder ought to be in a position to compare the records of all the near ancestry of the animals he proposes to mate together in respect to the qualities in which he is interested. More especially he ought to have access to photographs, which indicate form and general attitude far more vividly than verbal descriptions. Mr. Galton considers that every important stallion or bull should have a pamphlet all to himself, with photographs of his ancestry and with appropriate particulars about each of them. Mr. Galton, finally, proposes a scheme for the consideration of societies which publish stud books.

Mr. W. Garstang, on the races and migrations of the mackerel. From the examination of a large number of mackerel Mr. Garstang is able to distinguish the following three races:—(1) American, (2) Irish or Atlantic, and (3) North Sea and Channel. Each of these races, he considers, does not wander far from its own coast in winter, and does not mix with the other races, but merely moves out into deeper water. Mr. Garstang also gave, along with Mr. H. N. Dickson, an account of the connection between the appearance of mackerel and the changes of sea temperature in spring and autumn. Whether the movements of the mackerel are determined directly by the temperature or indirectly through food was left unsettled; but the authors proposed a more detailed biological and physical investigation of the English Channel.

Prof. A. B. Macallum gave a short paper calling attention to points in the microchemistry of cells. A report was presented by the Committee on Zoological Bibliography and Publication, and also one by the Index Animalium Committee, giving an account of Mr. Sherborn's work at the Natural History Museum. The Canadian Biological Station Committee, appointed last year at Toronto, reported in favour of a floating station to be established in the Gulf of St. Lawrence for five years. Their application to the Dominion Government for an appropriation for construction and maintenance has been granted.

The report from the Plymouth Marine Biological Laboratory contained an account by Mr. G. Brebner of his algal work, by Mr. F. W. Gamble on his investigation of the nerves of *Arenicola*, *Nereis*, and other Polychaetes by the methylene blue method; and by Prof. Hickson on the embryos of *Alcyonium* collected by Mr. Wadsworth.

The Committee on the Zoology of the Sandwich Islands stated that work was in progress, and that they hope to be able soon, with the aid of the Royal Society and the Bishop Museum in Honolulu, to publish a volume of investigations.

Dr. Arthur Willey's paper "On the phylogeny of the Arthropod amnion" stated that the importance of the problem lies in the fact that the principle which will account for the amnion of insect embryos is the same as that which has been applied by Prof. Hubrecht to the mammalian amnion. The insect amnion is not cenogenetic and is not due to mechanical causes, as is the prevailing impression, but it is of paligenetic significance. The material which supplied the necessary data for coping with this problem consisted of the embryos of a species of *Peripatus* (*P. nova britannia*) which Dr. Willey found in New Britain last year. These embryos possess a remarkable trophic organ, the epidermal layer of which is called the trophoblast, and the latter is the forerunner of the serosa of insect embryos—the serosa being the essential structure in connection with the embryonic membranes of insects, the amnion being accessory or incidental to the serosa.

The report from the Naples Zoological Station, in addition to the usual statistical information as to the progress of the station, contained accounts by the three naturalists who have occupied the British Association table during the year as to their special work. Mr. J. F. Gemmill investigated the pseudobranch and the intestinal canal of Teleosteans. Mr. H. M. Vernon writes on the relations between marine animal and vegetable life in