

streets, turning right or left at will into the different buildings.

First amongst the greater buildings of the site is the Sun Temple, which is designed in a series of ascending ambulatories with stone-built cloisters, the sanctuary being found on the highest platform, in the middle. A contemporary representation of the building upon its own walls has enabled Mr. W. S. George, the able architect of the expedition, by comparison with actual measurements, to attempt a reconstruction. In character and situation this temple corresponded to the "Table of the Sun" mentioned by Herodotus. An even larger building is the Temple of Ammon, the main axis of which is 430 ft. in length; the high altar and the special enclosure for sacrificing animals, and other interesting features of the temple, are well preserved. Other monuments excavated include an extensive palace presumed to be of Roman period, two small temples, one of which was dedicated to a lion-deity, an ancient temple of Isis, later reconstructed, pottery kilns of Meroitic times, and several hundred tombs of the necropolis. All these features appear to have been outside the chief, or royal enclosure, and it appears that there is still untouched by the excavators' spades a much larger area than has yet been attacked, including the ancient township itself which abutted against the walls of the royal city. The explorer is of the opinion that without a substantial increase in the annual sum available for this work, which up to the present has been almost entirely privately contributed by a few generous benefactors, it will scarcely be possible to complete the undertaking even in ten or fifteen years.

For the last two seasons the excavation has been almost entirely concentrated upon the royal enclosure, in which remarkable discoveries have been made. In one of the royal palaces a hoard of gold treasure and ornaments was found; and the royal baths adjacent, which are on an extensive scale, illustrate in their details the character of the Meroitic arts better than any other features of the city.

Under the threshold of another public building, carefully buried in sand, amid the débris of a building, there was found a beautiful bronze head of Augustus, which is now permanently deposited in the British Museum. A short distance from the spot are the remains of a small temple of Roman style; and the lecturer believes that this bronze head of the divine emperor had once formed the cult object in this temple. Two passages from Pliny seem to have been overlooked by those who have discussed the possibility of a Roman occupation at Meroë. From these it would appear that the imperial soldiers under Petronius had not only reached Meroë, but had passed up the Nile a further 100 miles. During the past winter a bronze coin of Augustus and an increasing number of small objects were discovered, all of which tend to indicate that, for a brief time at any rate, Roman troops actually occupied the city. In this way the fact and circumstances of the discovery of the bronze head would be satisfactorily explained. When Augustus commanded the Roman troops to withdraw, the head was removed from the temple and carefully buried out of danger of violation.

Two main culture periods are traceable in the history of Meroë previous to the Roman occupation. The first was that of its foundation under King Aspelut and his contemporaries, about the seventh century B.C. In this period Egyptian influence in art is freely apparent. The second phase began with an influx of Greek ideas, which may be roughly dated to the third century B.C., corresponding to a record by the historian Diodorus of great reformations instituted by Ergamenes, who had himself been educated in Greek thought in the schools of Alexandria. It is

the second phase which is the most striking in the history of Meroë, and most of the visible buildings and monuments of the site belong to this period. The Roman occupation left little permanent impress upon the civilisation of the locality, but previous and subsequent to the expedition of Petronius there must have been already some influence of Roman contact, which manifests itself in various ways.

Thereafter the history of Meroë became that of a local and somewhat barbarous civilisation, reflecting only faintly the Greek and Roman culture with which it had been earlier infused. A record of the fourth century A.D. tells us how it was sacked by a king of Axum; but as late as the seventh century it would appear that invaders from the same district (Eritrea) overran the city and threw the statues and pictures of the gods into the river.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LONDON.—An important announcement was published on August 13, to the effect that the President of the Board of Education has appointed a Departmental Committee to inquire and report, after consultations with the bodies and persons concerned, as to the steps by which effect shall be given to the scheme of the report of the Royal Commission on University Education in London, and to recommend the specific arrangements and provisions which may be immediately adopted for that purpose, and as the basis for the necessary legislation. Sir George H. Murray, K.C.B., who was formerly at the Treasury, and later Secretary to the Post Office, has been appointed chairman of the Committee. The other members are Sir Amherst Selby-Bigge, Secretary to the Board of Education, Sir John Rose Bradford, Sec.R.S., Sir William MacCormick, Dr. George Franklin, Dr. Arthur Keith, Mr. John Kemp (one of the secretaries to the Royal Commission), and Mrs. Henry Sidgwick. Dr. Frank Heath, the other secretary to the Royal Commission, is appointed secretary to the Committee.

MANCHESTER.—The council of the University has appointed Dr. A. D. Imms to the newly created post of reader in agricultural entomology. Dr. Imms was formerly professor of biology in the University of Allahabad, and afterwards forest entomologist to the Government of India at the Imperial Research Institute, Dehra Dun. He will be in charge of the researches in agricultural entomology conducted under the scheme approved by the Board of Agriculture and Fisheries. The council, with the assistance of a grant in aid from the Development Fund Commissioners, has provided special laboratory accommodation for these investigations, and will undertake the necessary provision for the work of the department.

A REUTER message from Melbourne reports that a pioneer colonist named Mr. W. Robbie has died at Ballarat, aged ninety-one years, and has bequeathed 30,000*l.* to Aberdeen University to establish scholarships.

THE vacancy in the directorship of the Agricultural College at Cornell University, caused by the resignation of Prof. L. H. Bailey, has been filled for the time by the appointment of Prof. W. A. Stocking, jun., as acting-director for a term of one year. Prof. Stocking is forty-one years of age, and has been a member of the faculty of the college since 1899.

THE Governor of Pennsylvania has, we learn from *Science*, approved the following State grants made at the last session of the legislature:—The Pennsylvania

State College, 248,000l.; University of Pennsylvania, 164,000l.; University of Pittsburgh, 80,000l.; and Temple University, 20,000l., making the total State grant for higher education 512,000l. From the same source we learn that Franklin College, Indiana, has secured pledges amounting to 50,000l. for additional endowment. Three-sixteenths of this amount is from the General Education Board in the United States.

THE Edinburgh Mathematical Colloquium was held during the first week of August in the mathematical department of the University. It was organised by the office-bearers of the Edinburgh Mathematical Society in response to a widely expressed desire on the part of mathematical teachers in England for a vacation course in the mathematical laboratory which Prof. Whittaker was instituting. In addition to five lectures by Prof. Whittaker on the periodogram and harmonic analysis, two other courses were provided. Prof. Conway, of University College, Dublin, lectured on the theory of relativity and the new ideas of space and time, and Dr. Sommerville, of St. Andrews, lectured on non-Euclidean geometry and the foundations of geometry. Nearly eighty members of the colloquium assembled from all parts of the United Kingdom, and two or three from Canada and the United States. The colloquium was in every way a great success, the novel features being the method by which Prof. Whittaker proposed to carry on the practical instruction in numerical evaluation of functions and the treatment of definite data. Each "student" sat at a specially designed desk for facilitating numerical work.

THE calendar of the Edinburgh and East of Scotland College of Agriculture for the session 1913-14 has now been issued. It contains full details of the various courses of instruction which are now available in the departments of agriculture, horticulture, and forestry. The aim of the college is to supply such training in agriculture and the sciences underlying it as is indispensable to all who intend to gain their living from the land as owners, or tenants, or agents. The calendar gives full guidance as to the curricula for the B.Sc. degree in agriculture and in forestry, the college diploma in agriculture, and the college certificate in horticulture. Special note may be made of the new course in horticultural science, which will appeal to young gardeners who have served their apprenticeship in the ordinary way, but desire to make themselves acquainted with the scientific as well as the practical aspects of horticulture. Under arrangement between Edinburgh University and the college there is now provided at Edinburgh a course of training in forestry. The preliminary course is intended specially for those who desire to get a knowledge of forestry for general purposes, and mainly from the practical point of view.

SOCIETIES AND ACADEMIES.

LONDON.

Geological Society, June 25.—Dr. Aubrey Strahan, F.R.S., president, in the chair.—Dr. F. Oswald: The Miocene beds of the Victoria Nyanza and the geology of the country between the lake and the Kisii highlands; with appendices on the vertebrate remains, by Dr. C. W. Andrews; on the non-marine Mollusca, by R. B. Newton; and on the plant-remains, by Miss N. Bancroft. The Miocene beds of the eastern coast of the Victoria Nyanza, south-east of Karungu, form a narrow zone (covered with black earth) at the foot of cliffs of overlying nepheline-basalt, and are only exposed in a few gullies. The whole series is conform-

able, dipping 8° north by west. 1 (Beds 1-12). An upper group (about 70 ft. thick) of grey and brown clays and shales, with occasional current-bedded sandstones containing terrestrial shells (*Tropidophora*, *Cerastus*), as also calcified tree-stems in the uppermost bed. 2 (Beds 13-25). A middle group (about 30 ft. thick) of red and grey clays, with white sandstones in the lower half. No bone-bed, but fragmentary Chelonian and crocodilian remains occur sparsely throughout the series. Persistent horizons are a travertinous marlstone (No. 14) containing *Ampullaria* and *Lanistes*; a thin sandstone (No. 16) yielding Hyracoid jawbones; and a gravel (No. 24) yielding teeth of *Dinotherium*, *Protopterus*, crocodile, &c. 3 (Beds 26-37). A lower group (about 35 ft. thick) of current-bedded sandstones and gravels passing down into clays and marlstones. A conglomerate of calcareous nodules overlies gravelly sandstones (No. 31) containing isolated bones of *Dinotherium*, *Antracotheroids*, rhinoceros, giant tortoises, &c., indicating a Lower Miocene (Burdigalian) age, with *Ampullaria*, *Cleopatra*, and terrestrial shells (*Cerastus*). The vertebrate remains described by Dr. C. W. Andrews include Proboscidea, Hyracoida, Artiodactyla, Rodentia, and Reptilia, and fully support the suggested occurrence of Lower Miocene deposits on the shores of the Victoria Nyanza. A deposit of probably Pliocene age yielded a new (?) species of *Elephas*, also bones of antelopes and baboons. The non-marine Mollusca associated with the Miocene vertebrates are freshwater and terrestrial shells which all belong to existing species.

PARIS.

Academy of Sciences, August 11.—M. J. Boussinesq in the chair.—M. Baillaud gave an account of the recent meeting of the fifth congress of the International Union of Solar Research, held at Bonn.—L. E. Bertin: Concerning the origin of the double oscillograph for the simultaneous registration of pitching and rolling of ships.—A. Lacroix: The cipolin marbles of Madagascar and the associated silicate rocks.—A. Romieux: An attempt at gehyposographical exploration.—A. Guillet and M. Aubert: The direct expression of electrospherical functions; formation of differential equations verified by these functions.—E. Rothé and M. Guéritot: A method permitting the use of apparatus on a reduced scale in wireless telegraphy.—Jean Bielecki and Victor Henri: The quantitative study of the absorption of the ultra-violet rays by some acids of the ethylene series. In the acids studied the double bond produces an increase in the absorption of ultra-violet rays, and this increase is the more marked as the position of the double bond approaches the carboxyl group. Geometrical stereoisomers present different absorptions.—H. Giran: The molecular weight of sulphur trioxide. By the application of Trouton's formula, as modified by M. de Forcrand, the molecular weight of sulphur trioxide has been found to be 80, that is the simple formula SO_3 of the gaseous anhydride.—J. Bougault: Phenyl- γ -oxycrotonic acid.—A. Wahl and P. Bagard: The microscopical examination of coals. The chief difficulty has been the choice of a suitable etching material for the coal sections; pyridine was used with success for bringing out details of structure.—L. Lindet: The influence of calcium chloride on the curdling of milk.

CAPE TOWN.

Royal Society of South Africa, July 16.—The president in the chair.—R. Broom: Some fossil fishes from the diamond-bearing pipes of Kimberley. This paper describes three new types of Palæoniscid fishes now preserved in the McGregor Museum, Kimberley, for