

### Archæology and Surveying in Southern Rhodesia.

WE have at times had occasion to refer to difficulties placed in the way of archæological and ethnological research owing to vexatious regulations imposed by the governments of the countries in which research is to be prosecuted. It is not often that the other side of the picture is presented, and that an accredited expedition is known to have abused the privileges that have been granted. Our attention has been directed to a particularly flagrant case. The official report of the Debates of the Legislative Assembly of Southern Rhodesia for May 7 records a reference to the case of Dr. Frobenius, who, it will be remembered, conducted an expedition in Rhodesia in 1929 and communicated some of the results of his investigations at Zimbabwe and elsewhere to the South African meeting of the British Association in that year. Dr. Frobenius, it is stated, was in receipt of substantial assistance from the Government of Southern Rhodesia. A money grant of £92 : 4 : 0, representing half the costs, was supplemented by an equivalent share borne by the railways, and, in addition, a native commissioner was granted six weeks leave on full pay to assist him.

Notwithstanding the fact that, in return, Dr. Frobenius entered into an agreement to share any finds equally with the Government and to submit any specially valuable find to arbitration, the whole of the relics found were removed from the country without the knowledge of the Government. When this was condoned on the condition that they were divided up at Cape Town, they were removed to Germany. Since then Dr. Frobenius has returned such objects as he considers the share of the Government, and has refused either to return or to submit to arbitration the only gold object stated by him to have been found within the Colony. The Colonial Secretary, in making a statement on the matter, was good enough to contrast the action of Miss Caton-Thompson, on behalf of the

British Association, in returning all her finds to the Colony.

According to the official report of the debates in the Legislative Assembly of Southern Rhodesia, in the debate on the estimates the deletion was moved of the item "Geodetic and Secondary Triangulation, £5000." In defending the appropriation the Minister of Agriculture and Lands pointed out not only that every self-respecting colony undertakes work of this kind as early as possible in its history, but also that had Southern Rhodesia started it earlier a great deal of money would have been saved. It would appear that much of the present cost of the Geological Survey is due to the fact that, before the Geological Department can pursue its legitimate work of mapping the geological formations, much preliminary work has to be done, which is made necessary by the fact that there is no Ordnance Survey to which reference can be made. Indeed, it was stated by another member that the surveyors who are engaged in the work of triangulation often have to refer to the Geological Survey for information. The Minister also referred to the position in the Union of South Africa. In the Boer war it was found that the maps of the country were utterly defective and a reproach. Immediately after the Union a triangulation of the whole country was begun, and the expenditure now stands at £20,000 a year. The result is that, as the Director states, the triangulation of the Union, which is just about completed, is as fine as any in the British Empire. The motion to delete the appropriation was withdrawn.

In the same debate reference was made to expenditure on afforestation, in which Southern Rhodesia is also pursuing a forward policy. Indeed, throughout the debates it is encouraging to note that the members of the Legislature are fully alive to the advantages of the application of science to the development of the colony, even if not immediately remunerative.

### Exhibition of British Optical Instruments.

THE Loan Exhibition of British Optical Instruments which was opened at the Science Museum, South Kensington, on Aug. 28, will remain on view until the end of October, and will provide the public with an opportunity to see collected together in a comparatively small space representative exhibits contributed by most of the important optical firms in Great Britain.

Binoculars are very adequately represented by the exhibits of Messrs. Ross and Messrs. Barr and Stroud, among those of the former being a three power prism binocular telescope with objective aperture of 60 mm. Telescopes are exhibited by Messrs. Ross and Messrs. W. Ottway and Co., the latter firm showing also a selection of stainless steel mirrors. Photographic objectives designed for special purposes, such as aerial photography, the projection and taking of cinema pictures, etc., have received considerable attention by British manufacturers in recent years, and these are included in the lenses shown by Messrs. Ross and Messrs. Taylor, Taylor and Hobson. A portable cinematograph, taking standard size films, is notable amongst Messrs. Ross' exhibits.

Among the surveying instruments is the Tavistock theodolite, reading to one second of arc, which is made by Messrs. Cooke, Troughton and Simms, who are also exhibiting a 45° prismatic astrolabe. This instrument has been designed for the accurate determination of

latitude and longitude on shore, and has been used with marked success by the Hydrographic Service of the Admiralty. Messrs. E. R. Watts and Son are showing a selection of 'constant' bubbles, the air-bells of which remain the same length over a wide range of temperature, a vertical magnetic force variometer, and various surveying instruments. A selection of 'Heath' sextants is shown by Messrs. W. F. Stanley and Co.

The collection of microscopes includes a new binocular instrument made by Charles Perry, according to the design of Prof. D. M. S. Watson, of University College, London, and a new model Vickers projection microscope. The latter, which is of very robust design, taking objects up to 50 lb. in weight, can be used for opaque or transparent objects at magnifications of from 3 to 5000 diameters, and is fitted up for demonstration. Other firms exhibiting microscopes are Messrs. J. Swift and Sons, Messrs. C. Baker, and Messrs. W. Watson and Sons. The last-named firm is exhibiting also a selenium densitometer, designed by the British Photographic Research Association, for determination of the density of photographic negatives.

An aerial camera, of a type which has been used all over the world, is exhibited by the Williamson Manufacturing Co. This takes 100 photographs (9 in. × 7 in.) with one filling. Topographical stereoscopes designed for use in examination of aerial photographs



for surveying purposes are shown by Messrs. Barr and Stroud.

A small model Hilger interferometer for the correction of prisms and lenses is fitted up to show the optical imperfection of a piece of glass, and a strain viewer by the same makers is arranged to show strain in a glass tumbler. In addition to a spectrographic outfit for metallurgical analysis, Messrs. Adam Hilger are exhibiting an outfit for spectrophotometry in the ultra-violet region of the spectrum. Messrs. Bellingham and Stanley also are showing a spectro-photometry outfit. This apparatus assumes a special interest just now in connexion with the spectral test employed by Dr. Bendien in his experiments on cancer diagnosis. This consists of a spectrograph with quartz optical elements, and a photometer of the sector type driven by an electric motor; the photometer design is based partly on the suggestions recently made by H. J. McNicholas in the *Bureau of Standards Journal of Research*, vol. 1, pp. 942-949. Absorption measurements are obtained by taking a number of exposures, each with a different opening of the variable sector. On the resulting photograph, positions are found in each spectrum where the amount of light passing through the tube of solution is equal to that passed by the variable sector, and from the data obtained an accurate absorption curve can be obtained. Polarimeters for use in the visible and ultra-violet are shown by both these makers.

A rangefinder by Messrs. Barr and Stroud, specially adapted for short ranges in the Museum, is fitted up for demonstration. The internal construction of a rangefinder and various optical parts used in the construction are also shown.

Price catalogues of the instruments in the exhibition are available to the public.

The exhibition is on view during the normal opening hours of the Museum, namely, Mondays, Tuesdays, Wednesdays, Fridays, 10 A.M. to 6 P.M.; Thursdays and Saturdays, 10 A.M. to 10 P.M.; Sundays, 2.30 P.M. to 6 P.M.

### Evolutionary Tendencies in the Jaws and Teeth.

**D**URING the recent International Orthodontic Congress in London, Prof. Elliot Smith delivered an address on "Evolutionary Tendencies in the Jaws and Teeth". He pointed out that, in the human child, there is a delay of four years after the milk teeth have erupted before the permanent teeth commence to appear, and a further ten to fifteen years are required to complete its dental equipment. Up to the seventh year, that is, during the pause between milk and permanent teeth, the child is growing a very large brain, and, again, for a further period of fifteen years or so, when his dental affairs are relatively sluggish, he is learning how to put his complicated cerebral equipment to its fullest biological uses. During this period he develops a chin, because the growth of the tooth-bearing part is restrained by the long delay in the eruption of his teeth. The delay in tooth and jaw development is undoubtedly due to the growth of the brain and the subsequent development of its full functions, which disturbs the orderly process of uniform growth of the jaws and eruption of teeth.

In the apes, the process of eruption of the second teeth follows more closely on that of the first teeth; the second permanent molars erupt before the deciduous molars are replaced by the premolars. Dr. Degerøl, of Copenhagen, has recently pointed out that, in Neanderthal man, the simian type of sequence

was still retained in the eruption of his teeth. There are reasons for inferring that the defective chin development of Neanderthal man may be associated with this fact—that the precocious cutting of his teeth permitted the tooth-bearing part of the jaw to keep pace more nearly with the growth of the rest of the jaw and preclude the development of a chin.

In the evolution of man from his simian ancestors the two fundamental structural advances were the great growth of the brain and the changes in the facial region culminating in the development of a chin. To the consequences of these evolutionary changes must be ascribed the origin of the problems of orthodontia. There is no just reason for the belief that the reduction or absence of the third molar is a sign of the early disappearance of this tooth in the human species, or that dental troubles, such as crowding and displacement of teeth, are due to evolutionary changes now active.

### University and Educational Intelligence.

**CAMBRIDGE.**—At St. John's College the following research exhibitions have been awarded: for biochemistry, M. C. Franklin, Canterbury Agricultural College; for experimental physics, R. H. Sloane, Queen's University, Belfast.

**THE** City and Guilds of London Institute gives prominence in its report for 1930 to the work of the South London Technical Art School established at Kennington in 1879 for training persons engaged in the art industries of the locality, which were chiefly modelling from terra cotta, and for the study of architectural decoration. The school occupies a unique and useful place and has trained the majority of the leading sculptors and some of the foremost painters in Great Britain. The Engineering College was attended by 522 students, a larger number than in any of the four preceding years, and the number of first-year diploma and undergraduate students and of special and post-graduate students was larger than in any year since before the War. The number of candidates examined at the Institute's technological examinations in Great Britain and Ireland and overseas (chiefly in India and Ceylon and New Zealand) increased, respectively, to 14,721 (more than in any year since the War) and 1608.

**SOME** trends in recent scientific research in America are reflected in statistics of the doctorates conferred in the sciences in American universities. These have been tabulated year by year since 1919 by the National Research Council, the annual bulletin of which on the subject constitutes a useful index to the relevant theses. The total number of these doctorates has increased every year, rising from 336 in 1921 to 1055 in 1930. Of the subjects of the 1055 theses on which science doctorates were conferred last year, about one-third are, as usual, in the field of chemistry. Next comes zoology with 100. Psychology has dropped from 112 to 92 and physics from 101 to 89. All previous records were broken in botany (81), mathematics (74), geology (63—previous record 45), engineering (49), physiology (46), geography (17), whilst the following universities conferred more science doctorate than they have ever done before: Wisconsin (86), Cornell (80), Michigan (55), Ohio State (50), Massachusetts Institute of Technology (29), Pittsburg (15), Virginia (12), Indiana (11), Kansas (11).