

photograph can be taken at 1/250th of a second. *Dr. W. N. F. Woodland.*—Microscopic preparations and a model illustrating the mechanism employed in the production of the oxygen used to inflate the gas bladder of bony fishes. Most fishes employ oxygen (usually also nitrogen and carbon dioxide) for the inflation of the gas bladder (incorrectly termed "air" and "swim bladder") when this is present. The presence of oxygen is associated with the power of producing relatively rapid variations of the quantity of gas in the bladder, a power required in deep-water fishes which sink and rise, and so experience considerable changes in external pressure. A special gland, the oxygen gland ("gas gland"), and an equally important and very remarkable supplementary apparatus, the rete mirabile duplex, are developed in the bladder wall for the special purpose of producing the oxygen. The reason why oxygen is the gas employed for the inflation and deflation of the bladder is because of its abundance in the blood stream and the facility with which it is dissociated from (the red blood corpuscles undergoing disintegration for the purpose) and reassociated with the hæmoglobin of the blood.

Miss Dorothy Bate.—(1) Fossil remains of the peculiar goat-like animal *Myotragus balearicus*, Bate, from Majorca. (2) Photographs of the locality and caves in which the bones of *Myotragus* were found. Nothing is known of the habits or origin of this peculiar animal, which formerly inhabited Majorca in large numbers. *Myotragus* differs from all other goats, sheep, and their allies in having only two lower front teeth, which are very large and are modified to form a sharp chisel-edge; they grow continuously, like those of a gnawing animal such as the rat or rabbit. It is also remarkable for the shortness and stoutness of its metacarpals and metatarsals, the latter being usually united to the distal row of ankle bones. *Dr. C. W. Andrews, F.R.S.*—Remains of Tertiary mammals from near Lake Victoria Nyanza, British East Africa. The specimens shown are the first remains of Tertiary mammals from Central Africa. They are portions of the lower jaw with teeth, and a calcaneum of a small species of *Dinotherium*, which is very similar to *Dinotherium cuvieri* from the Lower and Middle Miocene of France. The age of the African beds is not yet definitely known, since it is possible that *Dinotherium* may have survived in Central Africa long after it had become extinct elsewhere. The specimens were obtained through *Mr. C. W. Hobley, C.M.G.*, Commissioner of Mines. *Mr. G. C. Crick.*—Models of shells of extinct cephalopods. The models represent the shells of three cephalopods which lived in the Silurian seas and possessed chambered shells like that of the living pearly nautilus, but differed therefrom, among other characters, in the contracted form of the aperture of the body-chamber. *Mr. C. Forster-Cooper.*—Part of a collection of fossil mammals from the Lower Miocene beds of Dera Bugti, Baluchistan. (1) Jaw of a specialised type of primitive *Rhinoceros*; (2) separate lower incisor of primitive *Rhinoceros*; (3) portion of cranium of primitive *Rhinoceros*; (4) upper molar tooth of primitive *Rhinoceros*; (5) astragalus of primitive *Rhinoceros*; (6) mandible of *Aceratherium*, sp.; (7) teeth of mastodon, sp.; (8) upper teeth of *Rhinoceros*; (9) upper and lower teeth of an *Anthracothere*; (10) portion of a mandible of an *anthracothere*.

Nubian Archaeological Survey.—Objects found in the area to be submerged on the raising of the Aswan Dam. (Exhibited by the late Director-General of the Survey Department of Egypt, Captain H. G. Lyons, F.R.S., and the present Director-General, Mr. E. M. Dowson, on behalf of the Egyptian Government.) (1) Decorated pottery and other objects of the early dynastic period in Nubia (Dynasties I. and II. in Egypt, circa B.C. 3000), at which date Nubia was occupied by the Egyptian race. The hand-made pottery differs from that of the same period in Egypt in form and decoration, possibly owing to the geographical position of Nubia and to the rarity of stone vessels, the manufacture of which appears to have checked the development of fine hand-made pottery for funerary purposes in Egypt. (2) Decorative pottery and other objects illustrative of the non-Egyptian culture of the race (C group) which occupied Nubia from about the close of the old kingdom until it was expelled or absorbed by the

military expeditions of the twelfth dynasty and the Egyptian colonies of the early new Empire. The incised pottery and steatopygous dolls show marked analogies with similar objects of the pre-dynastic Egyptian period of nearly 2000 years before.

Mr. Albert Bruce-Joy.—Bronze statue of the late Lord Kelvin by Mr. Albert Bruce-Joy, to be placed in Belfast. The likeness represents Lord Kelvin as he appeared about twenty years ago. The statue will ultimately be placed on a granite pedestal.

SHELL-FISH AND THEIR RELATION TO DISEASE.¹

THE connection between the consumption of edible shell-fish (molluscs) and certain diseases, in particular typhoid or enteric fever, has in recent years attracted the attention of epidemiologists, and several valuable contributions on the subject have been published in this country. In 1894 *Dr. Bulstrode* reported to the Local Government Board on "Oyster Culture in Relation to Disease," in which he concluded that there remains "much to be done before the public can consume oysters, bought promiscuously, with a reasonable degree of safety." The danger of oysters was again brought home to the public by the outbreaks of enteric fever following banquets at Winchester and at Southampton in 1902, on which *Dr. Bulstrode* also reported.

Cockles and mussels have likewise been implicated in the dissemination of enteric fever in and about London and elsewhere.

The matter has assumed such importance that a further report on the subject by *Dr. Bulstrode* has been communicated to the Local Government Board, and brings up to date and extends our knowledge of the relationship between the consumption of shell-fish *other than oysters* and the occurrence of disease among those consuming the shell-fish. The molluscs of chief importance are cockles and mussels, and the beds are found all round our coasts, particularly in the estuaries of rivers, which are frequently liable to sewage pollution; but a part of the supply is obtained from abroad, America and Holland chiefly. In the report, the distribution of the shell-fish is shown on maps, and also the relation of the beds to the neighbouring sewer outfalls. The possibility of contamination is critically surveyed from a consideration of all the local factors, for the proximity or otherwise of a sewage outfall to a bed does not necessarily imply contamination or purity respectively; much may depend, for instance, on tidal conditions, on the absence of water at low tide, on the period at which the sewage is run out, &c. Again, even if the shell-fish beds themselves are remote from sources of pollution, the shell-fish may be brought to polluted waters for cleansing or storing, and several examples are given of this in the report. Bacteriological investigations have been excluded from the report, because it was considered that the topographical test would, on the whole, afford the least conflicting evidence.

Although shell-fish such as cockles are cooked before use, the "cooking" is often a very perfunctory affair, and by no means sterilises. At Leigh-on-Sea, however, owing to definite proof of the conveyance of enteric fever by the fish, the cockle merchants have provided forms of sterilisers or autoclaves in which the fish are exposed to steam under pressure. In the coppers in which the cockles are ordinarily boiled, while the bottom layers may be sterilised, the upper layers very often certainly are not.

The epidemiological evidence connecting the consumption of shell-fish with the subsequent occurrence of enteric fever or gastro-enteritis is detailed in chapters vi.-x. of the report. While in numerous instances it has been possible to connect the consumption of shell-fish with a subsequent direct outbreak of enteric or gastro-enteritis, it is more difficult to connect a part of the ordinary and sporadic incidence of these diseases with the general con-

¹ Report on Shell-fish other than Oysters in relation to Disease. By *Dr. H. Timbrell Bulstrode*. Pp. viii+243. Supplement in continuation of the Report of the Medical Officer. Thirty-ninth Annual Report of the Local Government Board, 1909-10; (London: Wyman and Sons, Ltd.; Edinburgh: Oliver and Boyd, Dublin: E. Ponsonby, 1911.) Price 8s.

sumption of shell-fish. The evidence marshalled by Dr. Bulstrode for this connection must, however, go a long way to dispel any doubt, if such exist, of its reality. The evidence, of course, is largely indirect, and comprises such details as these: the greater incidence of enteric among those who eat shell-fish than among those who do not; diminished incidence of enteric coinciding with diminution in the amount of sewage emptying into estuaries, &c.; the "cooking" of shell-fish diminishing the incidence of disease; reduction in enteric fever prevalence coinciding with limitation of the consumption of shell-fish; and (sometimes) seasonal variations in the shell-fish supply coinciding with seasonal variations in disease.

Finally, one of the most important parts of the subject, the administrative control of contaminated shell-fish, is dealt with. The difficulties in this direction are very great. Ineffective efforts at legislation have been made, and, failing success, the authorities concerned have fallen back on the publicity secured by local posters, &c., which, of course, affects the sale of wholesome, as well as of unwholesome, shell-fish. The Fishmongers' Company and several corporations have done excellent work, and one or two local Acts have been obtained (e.g. by the Corporation of Blackburn in 1908) to deal with the matter, but otherwise practically no control, in a sanitary sense, has been exercised over the beds, laying, and cleansing and storing places. Probably the local application, as required of the powers contained in the Public Health (Regulations as to Food) Act, 1907, would generally suffice.

The whole report is a very valuable one, and should arouse public attention to the necessity for taking definite action to deal with the subject of the contamination of shell-fish. The report is prefaced by a lucid introduction by Dr. Newsholme, the Board's medical officer, from which we have drawn freely in writing the above.

R. T. H.

THE CHEMISTRY OF MUMMIFICATION.

MR. A. LUCAS has rendered a great service to all who are interested in the customs of the ancient Egyptians and in the history of the methods adopted for the preservation of the body by collecting into one convenient volume the results of his investigations concerning the "Preservative Materials used by the Ancient Egyptians in Embalming," which has been issued as Survey Department Paper No. 12 (Cairo: National Printing Department, 1911).

More than seventy years ago Dr. Pettigrew published an exhaustive account of the chemistry of mummies, so far as this was possible at that time, and he had the assistance of Michael Faraday in his investigations. Since then the whole subject of mummification had fallen into the hands of archaeologists, who invented a curious alchemy of their own for the purpose of interpreting the accounts of Egyptian embalming given by the ancient Greek writers; but during the last ten years this era of sensationalism has received its quietus, and a serious attempt has been made to elucidate by recognised scientific means the nature of the methods of mummification.

Recent investigators have had the immense advantage of having many hundreds of mummies of known age and provenance for every unknown mummy that came into Pettigrew's hands; and the enormous strides in chemical knowledge that the last seventy years have witnessed have made it possible to obtain much more information from the material than was possible before. Most of the embalming materials thus rescued have been analysed by Prof. W. A. Schmidt, of the Cairo School of Medicine, and Mr. Lucas, analyst to the Egyptian Survey Department, and the results of their work have been published in various scientific journals published in Egypt and Europe. Mr. Lucas has collected all this scattered information and added to it in this valuable report. He has also given an extensive bibliography, which, though not quite complete, will be of very real service to archaeologists, who in the past have been at a loss to obtain accurate information upon such matters as are discussed in this work.

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AN IMPERIAL BUREAU OF ANTHROPOLOGY.

WE print below a memorial relating to the formation of an Imperial Bureau of Anthropology, received from the Royal Anthropological Institute. The memorial was sent a few days ago to the secretary of the conference, to Mr. Asquith and each of the other Prime Ministers, and to the Colonial Secretary. Though the matter did not appear on the agenda of the Imperial Conference, we learn that the individual members of the conference are cognisant of the facts, and one or two are desirous of obtaining more information. We trust it will be possible for some action to be taken on the lines suggested by the memorial.

Memorial on the Establishment of an Imperial Bureau of Anthropology presented to the Imperial Conference by the Royal Anthropological Institute.

The Council of the Royal Anthropological Institute desires to submit the following facts for your consideration:—

(1) An important and an integral portion of the problem of Empire is that which is concerned with the relations of the Imperial race with dependent peoples whose history, religion, social structure, and habits of life and thought are far removed from ours.

(2) The social characteristics of the dependent races are being profoundly modified by contact with our civilisation, and experience has shown that habits of life and thought, the products of long ages, have a tendency to disappear under modern conditions.

(3) The council urges, also, that on administrative grounds an exact and an intimate knowledge of the mental attitudes and modes of life of these races is essential to those whose duty it is to govern them.

(4) As the body representing the premier scientific institution in Great Britain whose object it is to promote the organised study of mankind, the council is much concerned with the inevitable loss to science consequent on the extension of our civilisation; but the manners and customs of many semi-savage tribes in the Empire still survive, and are worth the serious attention of the scientific anthropologist. It urges, therefore, that the resources of modern science should be thoroughly and systematically employed in order to record those customs which are of such value and interest to the student of anthropology.

(5) Another important problem of Empire is the physical improvement or deterioration of all the races of the Empire. This can only be ascertained by periodic measurement of children and adults. It is obvious that this work must be controlled from a single centre in order to secure uniformity.

(6) The council desires to point out that the scientific study of anthropology at the universities has made great and marked progress in late years, a gratifying fact which is due in no small measure to the efforts and example of distinguished fellows of the Royal Anthropological Institute.

(7) The number of trained investigators is steadily increasing, and every year sees an advance in the accuracy and thoroughness of the methods of anthropological investigation.

(8) While it is the duty of the universities to organise the study of anthropology, it is the task of the Royal Anthropological Institute to coordinate all branches of that study by the exercise of functions in regard to it analogous to those performed for science in general by the Royal Society.

(9) In these circumstances the Council of the Royal Anthropological Institute seeks the support, moral and financial, of your Governments for a scheme to establish in London, in association with the institute, an Imperial Bureau of Anthropology, in order to secure the systematic investigation by scientific methods, according to a uniform plan, of the anthropology of the dependent and independent races within the British Empire.

(10) The council recognises that this project can be carried to success only if local cooperation and support be freely accorded to it. The methods and procedure of investigation very often must be adapted to local necessities of which the investigator on the spot is alone competent to judge. But it is clearly desirable that within limits there should be uniformity of method for the sake of the com-