

the importance of the discovery in its bearing on the antiquity of the stone age in America; but it is scarcely necessary to say that identity in type is not an infallible indication of contemporaneity in dating, and in default of support from geological evidence, identities with European implements previously recognised in the south-west have carried little weight in argument.

A Remarkable Whale from Japan

PROF. KYOSUKE HIRASAKA, Department of Zoology, Taihoku Imperial University, Formosa, informs us that he has recently received a letter and a photograph from Mr. T. Iwasaki, chief meteorologist at Ishigaki-jima Observatory (124° 10' E., 24° 30' N.), one of the main islands of the Sakishima Group in the Riukiu Archipelago, describing a marine animal caught off Ishigaki-jima and brought ashore by fishermen on March 8, 1935. From the characteristic form of head and lower jaw, and also its size, nearly 8 ft. long, Prof. Hirasaka believes that it might be a



FIG. 1.

pigmy sperm-whale, *Kogia breviceps*. The only further information available is that it was a dark-skinned animal, and its flesh was of a reddish hue. Prof. Hirasaka points out that this whale was already known from California (Gill, *Amer. Naturalist*, 1871), as well as in its natural home, the Indian and Southern Oceans, and Mr. Francis C. Fraser, of the British Museum (Natural History), informs us that Van Beneden and Gervais, in their "Ostéographie des Cétacés" (1880), describe and figure a specimen of *Kogia* which was received from Japan.

Future of Steam Propulsion

IN the eighth Thomas Lowe Gray Lecture entitled "The Future of Steam Propulsion" and read before the Institution of Mechanical Engineers on January 10, Mr. John Johnson, chief engineer of steamship services, Canadian Pacific Railway, gave it as his opinion that, for such powers as are necessary for ship propulsion, steam plant will ultimately prove to be unsurpassed in reliability, durability and smoothness of working. A few years ago, the Diesel engine was rapidly gaining in popularity; but, with the improvements already made and likely to appear

in the near future, the position is being reversed. It is essential, of course, that the cruder forms of boiler, engine and auxiliary machinery be discarded and be replaced by a system in which each individual part is pre-eminently fitted to give the most efficient service. Boilers in service in the older ships gave an evaporation of 140 lb. of steam per hour per ton weight at an efficiency of 80–82 per cent; with improved water-tube boilers and preheaters, the corresponding figures are anticipated to be 750 lb. and 90 per cent. To reduce costs of cleaning and repairs, Mr. Johnson looks forward to the use of de-aerated water being accepted as fundamentally necessary in boilers, just as a lubricant is in bearings. Equally effective improvements are suggested in the case of steam turbines, condensers and auxiliary plant.

THE long life of turbines, their relative freedom from wear and repair, and the fact that they require no internal lubrication give them an initial advantage over their rivals, and Mr. Johnson proposed that it would be possible to operate a system with a working pressure of 500 lb. per square inch, and an initial temperature of 900° F. giving 7 per cent wetness at exhaust. With a boiler efficiency of 90 per cent, and 29 in. vacuum, the fuel consumption would be as low as 0.48 lb. of oil per shaft horse-power per hour. To obtain the most favourable results, the author pleads for co-ordination between the several interested parties—the coal industry and the individual firms manufacturing boilers, engines and other units—to promote improvements. It is, he says, the lack of this close co-operation that has retarded the full development of the steam engine.

Steam, Oil-Electric and Electric Rail Tractors

ONE of the main purposes of a railway is to transport the products of industry from the place where they are produced to the place where they are consumed. In passenger transportation, a service is performed in conveying the passenger from his starting point to his destination. To serve the needs of a country, a certain number of units of transportation (measured in ton-miles and passenger miles) must be produced every year by the transport system. A discussion of this problem is given by Mr. A. M. Wright in a paper published in the *Journal of the Institution of Electrical Engineers* of December. The principal competitors of the electric tractor are the steam locomotive and the oil-electric tractor. It has to be remembered that it is not sufficient for a transport system to be capable of producing a given number of ton-miles a year. It is often essential that the units of transportation be produced very rapidly. To take advantage of the superior performance of electric tractors, large capital expenditure for track equipment and substations is required.

MR. WRIGHT shows that there is a permissible economic capital expenditure for electrification in pence per ton-mile carried per annum. He works out a hypothetical example of a transport system capable of handling various tonnages of goods traffic. The costs of equipping the track for electric working

are given, and the annual operating costs are compared with those for steam haulage. He proves that when the traffic density is fairly high, railway electrification is economically feasible. A discussion of the various methods of electrification shows that the single-phase system has attractive possibilities. He concludes that if a transport system were developed *ab initio* in an advanced industrial country like Great Britain, electric working would be extremely attractive. But where a railway is already in existence, the capital cost of converting to electric haulage is of prime importance, the reason being that the problem at the moment is not so much economic as financial.

Memorial to Prof. T. Eric Peet

As the result of the appeal issued in 1934, the sum of £1,010 15s. 9d. has been contributed for the purpose of a memorial to Thomas Eric Peet, who was, at the date of his untimely death, professor of Egyptology in the University of Oxford. This sum, it is announced by Prof. J. P. Droop in a letter in *The Times* of February 7, has been paid over to the Council of the University of Liverpool for investment. The income from the endowment thus created will be used for the quinquennial award, on the recommendation of the executive committee of the University of Liverpool Institute of Archaeology, of a fellowship, tenable for one year by a graduate of a British university, who proposes a course of study either in "The Ancient Egyptian Language and Egyptology" or "The Pre-history of the Mediterranean Lands and/or the Near East". Unless the dispensation of the executive committee is obtained, four months of the year of tenure must be spent out of England. Awards will be made in the month of June of the year of award, and one half of the value of the fellowship (£150) will be paid on award, the balance being payable on receipt of a satisfactory report on his work from the fellow at the close of the first six months. It is within the competence of the Council to vary the terms of the award, so long as the provisions as to the qualifications of candidates and the subjects of study are observed. The first award will be made in 1941.

Immunity in Protozoal Disease

THIS was the title of the presidential address delivered by Lieut.-Colonel H. E. Shortt to the Section of Medical and Veterinary Research of the twenty-third Indian Science Congress, Indore (Jan. 2-8). After a brief survey of the subject of immunity in general in infective diseases, Colonel Shortt proceeded to discuss the mechanisms that may exist for the production of immunity in the protozoal diseases trypanosomiasis, malaria, leishmaniasis and piroplasmiasis, and concluded that they are very similar to, if not identical with, those which are operative in immunity against bacterial diseases. In the case of malaria, it might be thought that no immunity develops, for individuals may suffer not only from numerous relapses during the course of an attack, but also may be repeatedly re-infected. In

the case of natives dwelling in a malarious district, however, it would appear that the community does acquire a relative immunity after about twelve years exposure to infection. One of the factors limiting immunity in protozoal diseases is the development of strains of the parasite immunologically different and distinct from the original infecting strain, and a relapse or a re-infection may be caused by a strain immunologically different from the original one. Thus, it has been shown with the trypanosomes that a mouse, incompletely cured of its infection twenty times, produced seventeen immunologically different relapse strains. A full and useful bibliography is appended to the address.

Co-ordination of Botanical Research in the British Empire

THE Report of the third Imperial Botanical Conference (see NATURE, 136, 402; 1935) held in London on August 28-30, 1935, has recently been issued (Royal Botanic Gardens, Kew, price 1s.). Apart from the various discussions reprinted from NATURE, Sir Arthur Hill, president of the Conference, made an eloquent plea for the furtherance of the scheme for the creation of liaison officers from the Dominions and Colonies, thus ensuring closer co-operation with the National Herbarium at Kew. Since 1883, an assistant for India has been working at the Kew Herbarium, supported by the Government of India. The Government of the Union of South Africa similarly maintains an assistant for Africa at Kew. As in these cases, there are preserved in the Kew Herbarium most of the early collections of Australian and New Zealand plants and many from Canada. Naturally, these historic collections cannot leave the country, and it is highly desirable that young botanists from the Dominions should be given the opportunity of working on these collections, of getting into touch with botanical colleagues, and of acquiring a knowledge of methods of work in large British and Continental herbaria and libraries at present out of their reach. A resolution was therefore passed at the Conference that the authorities be asked to appoint liaison officers and exchange officers from Australia, New Zealand and Canada. It was also resolved that the "exchange both of members of the staff and research students between the Universities and Research Institutions and relevant Departments of the Empire" should be encouraged, and the establishment of a permanent committee for this purpose be recommended.

Chemical Engineering Congress

PROVISIONAL programmes of the business which will be discussed by the twelve sections of the Chemical Engineering Congress of the World Power Conference in June next have just been published. The Congress will meet at the Central Hall, Westminster, on June 22-27; with it will be associated visits to works and opportunities for social intercourse in the form of receptions and a banquet. During the course of the Congress, the British Chemical Plant Manufacturers' Association will hold its periodical exhibition of British chemical plant at