

In the former, even people classed as 'unemployables' have been made self-supporting. In India he suggests a start could most easily be made with an educational co-operative colony in which young persons could work and receive their education. Elderly persons might also be included to act as leaders, or to work in departments of their own. In order to start a fund for experiment on the lines advocated by Capt. Petavel, the Mayor of Karachi has announced that he will give Rs. 5,000 and 50 acres of good land near Karachi.

Re-equipment of Collieries and Steelworks

IN the supplement to the *Daily Telegraph* of March 19, Dr. A. H. Railing says that the need for the reorganisation of certain of the basic industries of Great Britain is urgent. As a result of recent applications of scientific knowledge, great advances have been made in developing new plant for the economic mining of coal and the manufacture of iron and steel products. In recent years the grouping of collieries makes it possible to use large turbo-machines and thus considerably lowers the cost of generating electric power. This solution of the problem of the handling and transport of coal will contribute greatly to the economic success of the undertaking. A colliery equipped with a modern coal-cleaning installation can command higher prices for its output. Loss and waste due to the breakage of coal can now be reduced to a minimum by using anti-breakage devices. By grouping together iron and steel works it would be possible to utilise the by-product gases of the iron and steel industry. An installation of large turbo-generator units in such a station would enable it to have a thermal efficiency as high as that obtained in the largest modern power station. The by-product gases from the industry would in this way acquire the same heat value as the coal used in coal-fired power stations. Many of the rolling mills in Great Britain have been installed for very long periods and their retention in service militates against securing the high quality of product demanded to-day. An electrically driven rolling mill of modern design can be regarded in the light of a precision tool, capable of an output of material possessing the highest degree of accuracy obtainable in rolling practice. The electric furnace also opens out great possibilities. One of the valuable properties of the high-frequency electric furnace is that, when operating, it gives rise to an automatic stirring action which secures a uniform product.

Street Traffic Signals, 1868-1934

IN 1868 the City of Westminster introduced a method of mechanical signalling to help the police to control the traffic. A semaphore, having a red and green gas lamp for night use, was employed, but unfortunately an explosion put an abrupt end to this experiment. Early in this century, road signals similar to railway signals were used for controlling a few tramways and also the traffic on Tower Bridge. So far back as 1918, colour light signals were used to control street traffic in New York. The Siemens and

General Electric Railway Signal Co. (S.G.E.) installed the first modern British traffic signal at a busy road junction in Wolverhampton in 1926. The most recent development of the vehicle-actuated signals is the 'Autoflex' system of the S.G.E., a full description of which is given in the Engineering Supplement of the *Siemens Magazine* for April. It was first brought into use in November 1933 and there are now several installations giving very satisfactory service. In this system vehicles approaching a road junction pass over pneumatic detector mats, installed in the paths of the various traffic streams, and so notify their movements to an electrically operated controller. The mats are equivalent to the eyes and ears of a traffic policeman. If vehicles leave the intersection on the wrong side of the road the mats are insensitive. The top of the mat is rounded and projects slightly above the road level presenting a good striking face, so that it is not possible for high-speed vehicles or caterpillar tractors to ride over it without registering. If no suitable gap occurs within a predetermined time, the continuous stream is arbitrarily interrupted and the right of way transferred. There is no necessity for long 'amber' periods since signal changes take place only when the intersection is clear; two or three seconds are generally sufficient. The power required for a controller is only about 30 watts, which is less than that required by an ordinary lamp.

Crystalline Structure and Failure of Metals

THE eighth Edgar Marburg lecture of the American Society for Testing Materials was delivered by Dr. H. J. Gough, his subject being "Crystalline Structure in Relation to Failure of Metals—especially by Fatigue". Dr. Gough dealt almost exclusively with the results of X-ray examination of metals, and the paper contains what is probably the fullest résumé yet given of the subject. Some indication of the ground traversed will be obtained from the fact that the bibliography contains no less than 175 separate references. Starting off with a general discussion of the nature of the atomic bond and of the structure of solids in connexion with the basic problem of failure under stress, the methods of preparation of single crystals of metals, and crystal structure as revealed by X-ray investigation, Dr. Gough then proceeded to consider more specifically the distortion of single metallic crystals under simple static stresses, the influence of the crystal boundary upon strength and distortion and the effects of cold-working upon single crystals and multicrystalline aggregates. Coming to the subject of failure under 'fatigue' conditions, Dr. Gough dealt with metals crystallising in the face-centred cubic, in the close-packed hexagonal (discussing incidentally the twinning of zinc), in the body-centred cubic, and in the face-centred rhombohedral lattices. Finally, he considered the behaviour of single crystals as compared with that of multicrystalline metals. Dr. Gough's conclusions are not yet everywhere accepted, but whatever the individual opinions of readers of the lecture may be, it will be universally welcomed as providing, in a readily accessible form, an almost

ideal summary of work dispersed throughout a multitude of different publications.

Aerial Surveys for Town Planning

THE urgent necessity for modern town plans required under the Town Planning Act has raised the possibility of meeting the demand by aerial survey. In most cases, less than two years remain for the completion of these plans. The Ordnance Survey at its existing strength cannot hope to meet this demand. A scheme outlined in the *Times* of May 5, however, promises to meet the situation, and the Ordnance Survey has promised its co-operation if local authorities make immediate revisions by air survey. The scheme would admit of the 16,000,000 acres of town planning areas in England and Wales being covered within two years. The country would be divided into sixteen units, of which eight would be photographed concurrently. On the reasonable assumption that 30 days in the year would be suitable for vertical photography, the work could be done in the two years available. Local authorities would be supplied with prints on a scale of 1 : 5000 and a set of transparencies on the same scale as the Ordnance sheets. The originators of the method are Messrs. H. Hemming, Ltd., and Economic Air Surveys, Ltd. The fully revised Ordnance sheets would follow later.

Aerial Surveys in the United States

AN extended scheme of aerial mapping in the southern States is planned under the United States Geological Survey in co-operation with the Shore and Geodetic Survey, the Census Bureau and other Federal bodies. The area to be covered, according to a report issued by Science Service, of Washington, D.C., is 40,000 square miles, selected from agencies in the States of Alabama, Arizona, Arkansas, California, Georgia, Louisiana, Mississippi, New Mexico, South Carolina, Texas and the District of Columbia. The maps will be used primarily in connexion with the agricultural census to be made in November next, but will have a permanent use as State records and for other purposes. The need for a more systematic land survey is indicated by the fact that air reconnaissances have already revealed the existence of vacant farms and waste lands not under cultivation hitherto unrecorded and consequently in some instances escaping taxation. There may be an extension of the scheme later to cover 1,000,000 square miles. As at present planned, it will take seventy days to complete at a cost of 650,000 dollars. The aeroplanes will have the co-operation of link-men on the ground under observation, and altogether 500 engineers with 1,500 assistants will be employed. The scheme is part of the programme of the Civil Works Administration for the relief of unemployment.

Records of the Maya

STUDENTS of American archaeology will welcome the publication by the Carnegie Institution of Washington of "The Book of Chilam Balam of Chumayel"—the Book of Balam the Prophet, which,

giving an account of certain matters pertaining to ritual and belief as recorded by the ancient Maya in their own language, is one of the most important pieces of documentary evidence relating to the early history of Yucatan known to scholars. The book has been edited by Mr. Ralph L. Roys, who for the first time has applied the principles of classical scholarship to the establishment of a standard text. The text is accompanied by a translation and annotations by the editor. There are several versions of the Book of the Prophet Balam, each known by the name of the village to which it belonged originally, such as that of Tizimin, Ixil, or Nah. That of Chumayel, with those of Tizimin and Mani, have the greatest value for the study of Maya civilisation. Chilam Balam, whose prophecies are recorded among the matter in his book, lived at the end of the fifteenth century and the beginning of the sixteenth. The Chumayel version dates only from 1782; but there is little doubt that the greater part of it has a pedigree as an authentic copy going back to the sixteenth century when the Maya wrote down in the European script, but in their own language, prophecies, chronicles, rituals, myths, calendrical matter and medical treatises, much of which would appear to have been transcribed directly from the hieroglyphic manuscripts afterwards destroyed and proscribed by the Spaniards. The original manuscript of the Chumayel version has disappeared, and the present text has been prepared from photographic copies.

Nature Sanctuaries in Zululand

NATAL possesses five sanctuaries for wild life, and all, with the exception of the bird sanctuary at St. Lucia and False Bay, have special interest on account of the rare mammals they contain—the Umfolosi has the only surviving herd of the southern white rhinoceros. The reserves have been threatened to some degree because of the fear that their mammals preserved a reservoir of the trypanosomes of the cattle disease, nagana. But it may be accepted that the destruction of big game is a futile method of controlling the tsetse-borne disease, and that the reserves may well be retained, since they occupy areas unfitted for agriculture on account of endemic nagana, malaria, insufficient rainfall or poverty of soil. Indeed, in a pamphlet on "Natal's Nature Sanctuaries in Zululand" E. K. du Plessis urges that they should be properly established and made statutory, that they should be provided with suitable approaches to encourage tourist traffic, and that they should be surrounded by a three-mile buffer-zone, to prevent shooting parties from slaying animals on the very border of the reserve. It is further suggested that the shooting season should close at the end of September, since the does are in young by October, and that all-year licences for shooting should be discontinued.

Lancashire and Cheshire Fauna Records

THE issue of the nineteenth annual report of the Lancashire and Cheshire Fauna Committee for the