

particularly of prehistoric times, is of less importance to the student than the geography of the world as it is to-day. The geographer can make a definite contribution to the solution of many urgent problems of the day in colonisation, trade, transport and agriculture. Scientific surveys of every aspect of man's environment are much needed and the basis of all this work must be an adequate map. Prof. Mason urged that the appointment of a trained geographical adviser in the government of any country would be invaluable in its development and control.

Lord Bledisloe's Cawthron Lecture

NEW ZEALAND is singularly fortunate in having in its Governor-General, Lord Bledisloe, a keen and distinguished agriculturist, thus representing in the highest governing and administrative circles one of the most important industries of the Dominion. On October 3, Lord Bledisloe delivered at Nelson the annual Cawthron lecture, his address being entitled "A Conspectus of Recent Agricultural Research with Some Reflections Thereon". This is the first time that a Governor-General of a Dominion has delivered within it the chief scientific oration of the year, and as one would have expected, in collating the agricultural research of the past three years, as Lord Bledisloe did in the lecture, the economic importance of agricultural research has been emphasised from an essentially broad though authoritative point of view, thus taking into consideration not only the British Empire, but also other countries. The amount of detailed facts, with commentaries, concerning agriculture which have been assembled into this lecture is scarcely short of amazing. Lord Bledisloe has left no stone unturned in his search for data. Every aspect of agricultural and horticultural research is reviewed and there is scarcely a research department, institute or station within the British Empire which is not considered and its recent work discussed. Other countries outside the Empire, such as Denmark, Germany, the United States, Holland, Finland and others, have been combed for results and duly considered. Apart from the general consideration of horticulture, arable and dairy farming and apiculture, and their more detailed aspects such as the study of the constitution of wool, vitamins, etc., researches in connexion with more specialised Empire products such as sugar and tobacco are also reviewed. The lecture has now been published and may be obtained from Messrs. Whitcombe and Tombs, 3 Addle Hill, London, E.C.4, price 1s.

Expansion of the Universe

At the Friday evening discourse on November 25 at the Royal Institution, Dr. Knox-Shaw discussed the observational evidence for the expansion of the universe. The nebulae lying beyond our galaxy stretch away into space farther than our present limit of penetration. Most of them can be studied only with our largest telescopes, and for our knowledge of their distances and motions we are indebted largely to the work of Dr. Hubble at the Mount

Wilson Observatory. In some forty nebulae he has been able to detect individual stars, and in a few cases to identify them as belonging to types already known in the galaxy. From the apparent luminosities of these stars he has derived distances for the nebulae in which they are involved. In all other cases the distances are based on the apparent brightness of the nebulae themselves. The scale of distance thus constructed is still very uncertain. The absorption lines in the spectra of the extra-galactic nebulae are shifted towards the red in a way that suggests that they are all moving away from us with velocities which increase with the distance. Whether there is an alternative explanation of these shifts is a question for the physicist rather than for the practical astronomer, but if we assume that they actually indicate motions of recession, we find that the velocities of the nebulae are proportional to their distances from us, as would be required in a uniformly expanding universe. Hubble's value for the rate of expansion, an increase of 560 km. a second for each million parsecs of distance, must be regarded as liable to revision as further observational material becomes available. A cluster of very faint nebulae in Gemini, so remote that its light has taken some 135,000,000 years to reach us, has recently been photographed at Mount Wilson, and seems to be moving away from us at the immense speed of 24,000 km. a second.

Slaughter-Houses in Great Britain

THE eleventh Benjamin Ward Richardson memorial lecture was delivered, under the chairmanship of Sir James Crichton-Browne, before the Model Abattoir Society on November 30 by Mr. T. Topping, who chose for his title "The Slaughter-House Problem". He commenced by saying that had local authorities more generally carried out the advice given by Richardson when he founded the Model Abattoir Society fifty years ago, there would have been no slaughter-house problem to-day, and there would have been greater benefit for other public health protective measures. As it is, there is a very real problem owing to the fact that the slaughter-house provisions of the Act of 1847 are still the principal law on the subject to-day. No advance was made by the Public Health Act of 1875, so that many buildings quite unsuitable for the purpose came into existence as private slaughter-houses. The Rural District Council (Slaughter Houses) Order of 1924 gave State recognition to and largely increased the capital value of hundreds of unsuitable buildings that had been erected as slaughter-houses prior to the order. Thus for nearly sixty years, most local authorities steadily increased the financial difficulties of providing for the only effective means of supervision of slaughter-houses and of securing hygienic preparation of carcase meat. According to Mr. Topping, there are only about 110 slaughter-houses in Great Britain where the buildings and arrangements are satisfactory, whereas in a large percentage, complete supervision and inspection is extremely difficult if not impossible. As a solution of the problem, he suggested first that the Ministry

of Health should obtain either directly, or indirectly through the county councils, information as to the condition of all the private slaughter-houses in the country, particularly as to deficiencies in meat inspection and their cause, and secondly, that abattoir provision should be on a county basis, instead of allowing each local authority to have its own abattoir.

Ultra-Short-Wave Wireless Communication

In his Friday evening discourse at the Royal Institution on December 2, the Marchese Marconi described the important results of his recent investigations into the properties and behaviour of very short electric waves. Numerous distance tests and a few official demonstrations have been given from time to time, and each has proved the availability and practicability of these waves for the purposes of radio communications. Soon after a duplex demonstration over a distance of twenty-three miles between Santa Margherita and Sestri Levante, the Vatican authorities decided to adopt the new system for telephonic communication between the Vatican City and the palace of the Pope at Castel Gandolfo, a distance of 20 kilometres entirely over land, and screened by intervening trees. In connexion with the establishment of this service, successful tests took place towards the end of April this year; during one of these tests waves had to pass through all the masts and aerials of the high power radio station of the Italo Radio Company at Terranuova. Following a series of experiments with waves of the order of 50 centimetres length conducted between Marconi's yacht *Elettra* and the station at Rocca di Papa, near Rome, the most outstanding result was the successful establishment of communication from Rocca di Papa to Cape Figari, Sardinia, over a distance of 168 statute miles (275 kilometres) on a wave-length of 57 centimetres. All previous distance records of communication by means of wave-lengths less than one metre were thus far surpassed, and it was effectively demonstrated that these very short waves can overcome the supposed obstacle presented by the curvature of the earth, the distance between the two stations being considerably in excess of the optical range. A new technique is thus developed which is bound to extend very considerably the already vast field of the applications of electric waves to radio communications. The new system is unaffected by fog, and offers a high degree of secrecy, by virtue, principally, of its sharp directive qualities.

Radio Equipment for Cross Channel Air Services

In March 1931 a demonstration was given by the International Telephone and Telegraph Laboratories of radio telegraphic communication across the English Channel on a wave-length of about 17 cm. (see *NATURE* of April 11, 1931, p. 564.) According to a note in the *Electrician* and the *Electrical Review* for November 18, a somewhat similar equipment to that used in the above demonstration has been ordered by the Air Ministry for use in connexion

with cross-Channel flying services. This equipment will be manufactured by Messrs. Standard Telephones and Cables Ltd. in their Hendon factory, and it will operate on a wave-length in the neighbourhood of 15 cm. The oscillations corresponding to this wave-length will be generated by special valves and will be led to the transmitting aerial, which is less than one inch long, situated at the focus of a circular reflector about 10 ft. in diameter. This reflector will be focused on to a similar reflector at the receiving station. The equipment ordered by the Air Ministry will be located at the Lympne air-port, near Hythe, and will operate in conjunction with a similar equipment ordered by the French Air Ministry to be situated at St. Inglevert aerodrome, nearly seven miles south-west of Calais. It will be used for announcing the arrival and departure of aeroplanes that are not fitted with radio, and for routine service messages. An interesting feature of this new service will be the use of teleprinters for both receiving and transmitting messages. In this way typewritten messages will actually be sent across the Channel by radio, thus providing a permanent record at each end. It is expected that the station will be in operation early next spring and its use will relieve the volume of traffic at Croydon and Lympne radio stations very considerably.

Scientific Expedition to Yunnan

In the spring of 1932 a joint botanical and zoological expedition was sent to eastern Yunnan by the Fan Memorial Institute of Biology, Peiping, starting from western Szechuan and exploring the bordering regions of Szechuan, Kweichow and Yunnan. The party expects to spend the winter in Yunnanfu. The botanical staff will endeavour to explore regions formerly not thoroughly worked over and collect also specimens in the type localities. Besides collecting flowering plants, special attention will be devoted to mosses, liverworts, ferns and other cryptogams. The zoological staff will collect birds, fishes, other lower vertebrates and land shells. News has been received that the party succeeded in penetrating the forbidden territories of Ta-Liang-Shan Lolos, where probably no white man has ever entered before. These Lolos are very warlike tribes. They frequently kidnap Chinese and make them slaves. By a curious chance the present powerful chieftainess is the sister of the military governor of Yunnan, and hence much more enlightened in her view toward the purpose of scientific expeditions. The party was welcomed as honourable guests by the chieftainess. Oxen and pigs were slaughtered in their honour, and an elder of the tribe has been handed over to the district magistrate as the pledge of their safety. As two years ago the lamentable death of the eminent young Chinese palæontologist, Ya-Tseng Chao, at the hands of bandits had cost the district magistrate of Chao Tung Hsien permanent dismissal from office, such precaution is carefully taken by his successor. The party plans to explore the south-eastern part of Yunnan next year.