

agency of the Columbia Broadcasting System of America, which has a representative with the expedition giving regular talks to listeners in the United States. The signals from the expedition's transmitting station at the Bay of Whales were received in South America, relayed to New York and thence to England and several other European countries. In addition to announcements by the representative mentioned above, members of the party gave a brief account of the prevailing meteorological conditions and of the scientific work being carried out by the expedition. The average daily temperature was stated to have been between -20° and -60° C., while a thirteen days' blizzard had been experienced recently. Admiral Byrd's advance party is located at about 123 miles nearer the South Pole than the main base at Little America. The brief programme included a musical item by members of the expedition and concluded with the singing of the British national anthem. Although reception was marred to some extent by distortion and a fairly high noise level, this broadcasting achievement showed in an interesting manner the possibilities of modern radio communication, and demonstrated that the isolation of polar expeditions is a thing of the past.

Broadcasting over Wires

At a meeting of the Wireless Section of the Institution of Electrical Engineers on April 11, a paper entitled "Principles of Audio-Frequency Wire Broadcasting" was read by Mr. P. P. Eckersley. It is well-known that too few wave-lengths are available for the purposes of wireless broadcasting, a limitation which makes it impossible to give all listeners both a variety of choice of programme and good quality reproduction. These limitations have stimulated an interest in alternative methods of distributing programmes to listeners, and broadcasting over wires has certain basic technical and economic advantages over wireless broadcasting. Wire-broadcasting technique has been extensively applied in Holland, where 50 per cent of the Dutch listeners have their programme service laid on to the house by a wire connexion. Relatively slight developments of the same nature have taken place so far in Great Britain, although a number of companies are in operation for the re-diffusion of the ordinary wireless programmes.

THE commonest form of such re-diffusion takes place at audio-frequencies; the ordinary wireless broadcasting programmes are picked up by a receiver located where reception conditions are favourable, and the audio-frequency output of this receiver is of sufficient strength to energise at once a thousand or more loud-speakers connected to it by a line network. It is usual to connect each subscriber by two lines to this network so that a choice of two programmes is provided. Mr. Eckersley's paper dealt with the technical problems encountered in the design and construction of such a network in order to give a good quality service. An analysis was made of the effects set up by the interaction of the reactances and resistances composing the network and the loud-

speakers, and it was shown that the received level, particularly towards the ends of the lines, varies with loading and frequency. Certain generalised rules have been evolved to indicate how the distortions incidental to this form of wire-broadcasting may be minimised or even eliminated.

Commercial Production of Heavy Water

THE recently discovered 'heavy water', which has created so much interest in popular as well as scientific circles, is to be produced commercially in England. Plant has been developed at the Billingham works of Imperial Chemical Industries, Ltd., which is capable of producing a continuous supply of heavy water of approximately 30 per cent purity at the rate of 5 gm. per day, while approximately pure 'heavy water' will be produced at a somewhat later date. I.C.I. anticipate that they will be able to meet any commercial demand that may arise. Urey and Washburn, in the United States, discovered that the residual water in old electrolytic cells contained a larger proportion of heavy hydrogen than the normal. It was further found that by continued electrolysis, the concentration of the 'heavy water' was enriched, ordinary light hydrogen being given off preferentially, and 'heavy water' accumulating. This gave the key to a successful method of preparing 'heavy water' in quantity, and the electrolytic method is the one in use at Billingham. Large-scale production of 'heavy water' is only possible where exceptional resources of power and raw materials exist together. At Billingham, not only ordinary hydrogen in large quantities, but also residues in which 'heavy water' has accumulated, are readily available. These resources, together with cheap power and convenient research facilities, make Billingham a logical centre for the large-scale production of the new compound. Since its discovery in the United States, its probable uses are becoming more evident, and it is eloquent testimony to the vitality of British chemical technique that in so short a space of time it should have been translated from a scientific curiosity to a marketable commodity.

The 24-Hour Time System

THE British Broadcasting Corporation will adopt the 24-hour system of expressing time from April 22, when 'summer-time' commences in Great Britain. The system will be used in all announcements over the microphone, in the journals published by the Corporation and in correspondence. No statement has been made as to the duration of the trial of the system, but it will doubtless be sufficiently long for the public to become thoroughly familiar with the system and for the extent of public approval or disapproval of the system to be gauged. As already announced in NATURE, the Postmaster-General will await the result of this experiment before coming to a decision on the question of the adoption of the system in the Post Office. It is proposed by the B.B.C. that a time such as 17 h. 15 m. shall be announced as 'Seventeen-fifteen hours'. This terminology would be inaccurate and undesirable, and it is

to be hoped that such a designation will not be used ; otherwise this phraseology may soon become stereotyped. The expression 'seventeen hours fifteen minutes' is accurate but long : 'seventeen hours fifteen' is a contraction analogous to 'seventeen pounds fifteen' for £17 15s. 0d. But 'seventeen fifteen' (analogous to the present 5.15 p.m., but with the now unnecessary p.m. dropped) should be quite sufficient. At the exact hour, 17 hours can be used as simpler than 17.00.

Origin of Tektites

THE suggestion first made in NATURE (131, 117 ; 1933) by Dr. L. J. Spencer that tektites have been formed by the fusion of terrestrial rocks by the fall of very large meteorites has given rise to an interesting discussion, but, being unexpectedly novel, it has not met with general acceptance. Prof. F. E. Suess of Vienna, in whose classical paper of 1900 the name tektite was introduced and the meteoritic theory first proposed, has returned to the subject and he gives a recent review in *Die Naturwissenschaften* (21, 857, Dec. 8, 1933). Here, and in a private letter, he admits that the Darwin glass of Tasmania may have been formed by the fusion of terrestrial material. Some of the silica-glass from the meteorite craters at Wabar in Arabia is, in fact, exactly like Darwin glass in every respect, and at both places the material is present in thousands of tons. But from Tasmania no meteoric iron or craters have been recorded. For other tektites (australites, billitonites, moldavites and 'indochinites'), Prof. Suess still holds to the meteoritic theory. He points out that they have a much wider distribution than the silica-glass found around meteorite craters, and also that they usually bear no relation in chemical composition to the underlying rocks. The same arguments are also put forward in a letter to the Editor from Mr. T. Hodge-Smith, of the Australian Museum, Sydney, who has given an account of the tektites recently found in the Philippine Islands. These arguments, however, overlook the fact that tektites are usually found in alluvial deposits and that they are often water-worn and corroded, indicating that they have been transported from their place of origin. In the case of australites found scattered on the surface of the ground over wide areas, it is conceivable that they have been transported by the natives.

The 200 inch Reflector

It was reported in the *Times* of March 27 that an accident had occurred during the pouring of the twenty tons of glass into the mould of the two hundred inch mirror for the new reflector for the California Institute of Technology. Part of the mould came loose and floated to the top of the molten glass. As soon as the pouring was completed, the cores were fished out of the molten mass. According to a message issued by Science Service, Dr. Hostetter, who was in charge of the operations, said that this mishap would not affect the success of the mirror, which has now been set aside to cool very slowly. After the months of cooling have elapsed, it

will take several years to grind the surface of the mirror. Our readers will join with us in expressing the hope that it will be found that the incident of the break-up of the mould will not have spoilt the present pouring of glass.

Refrigeration Exhibition at the Science Museum

SIXTY years ago mechanical refrigeration was just coming into existence, and yet to-day it is an essential part of everyday life, not only in its well-known application to the transport and storage (including domestic storage) of perishable foodstuffs, but also in many of the industries upon which Great Britain depends. Of its lesser-known uses mention may be made of the manufacture of bread, biscuits, chocolate, margarine, artificial silk stockings and cinematograph films, the brewing of beer, the curing of bacon, the refining of oil and the sinking of mine shafts and wells. These are a few of about three hundred industries in which its use is either essential or in which it improves the quality of the product. With the object of illustrating the part played by refrigeration, and of showing the public the principles on which the several types of machines operate, a special exhibition has been arranged at the Science Museum, South Kensington, and will remain open until the end of August. It consists mainly of models, working exhibits and demonstrations. The exhibits have been supplied by the manufacturers and users of refrigerating machinery and the Museum has had the wholehearted co-operation of the British Association of Refrigeration, the National Physical Laboratory and the Low Temperature Research Station. A small Handbook has been prepared and will be on sale at the price of 6d. (by post 7d.): copies may also be obtained from H.M. Stationery Office. Anyone who is interested in the subject may obtain from this Handbook in a concise form an idea of the modern science and practice of mechanical refrigeration: the handbook also contains a brief outline of its historical development. In addition, a bibliography on refrigeration has been prepared in the Science Museum Library and will also be on sale.

Models of Tidal Estuaries

At the Friday evening discourse held at the Royal Institution on April 13, Prof. A. H. Gibson discussed "Tidal Estuaries: Forecasting by Model Experiments". During recent years much work has been done on models reproducing the flow of water over weirs, through sluice gates, etc., and it has been found that, if suitable precautions are taken, the model results give a reliable indication of the behaviour of the original. River flow models are now being extensively used to investigate the erosion and deposition of bed materials and the effect of works designed to improve the navigable channel. The technique of such investigations is not yet fully developed, different methods being used in different laboratories. Chronologically, models of tidal estuaries were used before those of uni-flow rivers, the first tidal models (of the Mersey Estuary) having been constructed by Osborne Reynolds in 1885.