

being closed down some years ago. It was hoped that geophysical methods would lead to the discovery of new reefs beneath the cover of Cretaceous sandstones, laterite and alluvium. The methods used—electromagnetic, self-potential, magnetic—are described, and here the electromagnetic was found most successful and disclosed numerous good conductors considered to arise from reef-channels at depths corresponding approximately to water-level. The Survey was empowered to carry out shallow tests but not drilling, and so further work is left to private enterprise.

Report No. 17 of the Northern Territory on the Fletcher's Gully Area, Daly River, may be selected as illustrating a type of history all too common. Traces of gold were discovered in 1905 in almost uninhabited country 100 miles south of Darwin. A 'gold rush' of about thirty miners followed, but in three months only two remained—working stream tin—and the claims were soon abandoned. In 1909 a group of Chinese got 183 ounces of gold by steady work, but in 1910 the area was declared a 'goldfield' and the Chinese had to leave. The field was again

abandoned after a few months. In 1912 the Chinese returned. In 1918 a new serious start was made by erecting a battery, but it apparently was never used. In 1926–29 there was a little spasmodic working by a few old Chinese. Now the Survey discloses small sub-horizontal reefs, some possibly with payable values, but does not encourage further work.

In some reports comes the thrill of new discoveries. Queensland No. 12 deals with an area in Cape York Peninsula, proclaimed a goldfield in October 1936 and surveyed in the following months. Even there the old type of prospector had penetrated so long ago as 1878 and may have assessed the true value of a mineral field, which now promises to be more important for its iron ore.

It is impossible, in the course of a brief review, to do more than indicate the existence of these valuable reports and to congratulate all concerned on the solid work they have carried out—especially Sir Herbert Gepp, the director, Messrs. Ball, Forman and Pye, his executive committee, and Messrs. C. S. Honman, P. S. Hossfeld, K. J. Finucane, R. F. Thyer, E. L. Blazey and their assistants, of the field staff.

BROADCASTING OVER WIRES

THE idea of conveying speech and music programmes over a wire network is by no means new in Great Britain, for so early as 1895, the Electrophone Company provided a service to telephone subscribers by special connexion to theatres, music halls and churches. Until a few years ago, however, no serious development had taken place owing to the indifferent quality of the service, the absence of suitable loud speakers and amplifying equipment, and the lack of public demand resulting from the relatively high cost involved. The introduction and success of radio broadcasting, accompanied by revolutionary developments in technique and equipment, have caused renewed attention to be given to the possibilities of diffusing programmes over wire networks. For some years past a number of relay companies have been re-distributing the ordinary broadcast programmes over special wire network systems to subscribers who prefer this mode of reception to that involving the use of a normal receiver.

On March 30, 1939, the Postmaster-General announced that the Post Office was contemplating the introduction of a system of distributing broadcasting programmes over the line telephone network, as a service additional to that of the existing relay companies (see NATURE, April 8, 1939, p. 592). In a paper read before the Wireless Section of the Institution of Electrical Engineers on March 7, Dr. T. Walmsley gave an account of the technical progress made in this subject up to the outbreak of the War, by the Wire Broadcasting Branch of the General Post Office. After referring to the fact that the wire broadcasting system is likely to be relatively free from the various types of interference to which radio broadcasting is subject, the paper presented a detailed consideration of both the principles and the technique involved in distributing over wires at either audio or radio frequencies.

While the audio frequency system of distribution could make use of existing telephone lines, consider-

able interference with other telephone circuits would result if the electrical energy were transmitted over the lines at a sufficient level to operate loud-speakers direct. Thus either the energy level must be reduced and an amplifier used on the listener's premises, or a special wire network must be employed. The latter system is the more satisfactory and has been more widely used up to date. Two arrangements of the scheme are possible; the first provides a separate pair of wires for each programme from the distribution station to a selector switch at the listener's premises; while the second provides several programmes over one pair of wires to the listener, who, by means of a special switch, is enabled by remote control to select one of several programmes available at the distribution station. Which of the two is the more suitable depends largely upon local conditions, the geographical distribution of the subscribers, and the relative costs of the switching systems and the installation of the necessary lines. The remote switching system has many interesting technical features, which are fully described in the paper.

The chief attraction of the distribution systems involving carrier or radio frequencies lies in the fact that the existing electricity supply or telephone networks may be utilized, with a consequent saving in line plant costs. The fact that the electricity supply networks in Great Britain are connected to a larger number of premises than the telephone network constitutes the chief advantage of their utilization for distribution of programmes at carrier frequencies. This advantage has, however, limitations set by technical problems such as insulation, so more attention has been given to the use of telephone lines for this purpose. By choosing the carrier frequencies to be within the normal radio broadcasting band, the subscriber can conveniently use a normal commercial broadcasting receiver, the various programmes available over the telephone system being selected by tuning the receiver to certain assigned radio

frequencies. The switch at the listener's premises is naturally provided with a change-over position in which the receiver is connected to a suitable aerial for reception of other broadcast programmes in the usual manner.

Dr. Walmsley's paper described the technical development of the equipment which has resulted in this method being placed on a satisfactory and

practical basis. The reading of the paper was accompanied by a demonstration of the reception of both normal broadcasting and of special programmes over the standard Post Office telephone lines, using both the audio and radio frequency methods described. In the latter case, the reception is unimpaired by the use of the subscriber's telephone for a call and conversation in the usual manner. R. L. S-R.

RITUAL IN TIKOPIA OF THE SOLOMONS*

IN the first volume of his account of the ritual cycle known as "The Work of the Gods" in Tikopia, an isolated community in the British Solomon Islands Protectorate, Prof. Raymond Firth has confined himself mainly to giving an ethnographical account, reserving for later publication the major part of theoretical interpretation. In his introductory remarks, however, after pointing out that this, the most spectacular of his discoveries, had been mentioned only by the Rev. H. J. Durrad and Dr. H. R. Rivers without any hint that they were anything more than isolated performances, he goes on to indicate its basic significance for the understanding of Tikopia, while its analogies with rites in Hawaii and Tonga suggest interpretations of these latter, which cannot be inferred from the existing fragmentary and obscure accounts.

The rites fall into several main divisions: a symbolic set to initiate the cycle; a resacralization of canoes; a reconsecration of temples; a series of harvest and planting rites for the rain; a sacred dance festival; several memorial rites and the rites of vanished temples; and in the trade wind season, the ritual manufacture of turmeric. The rites are one of the most elaborate expressions of the system of rank and of the religious beliefs of the people; it has important economic aspects, is related to the institution of marriage, sets the formal seal on fundamental forms of recreation, and provides sanctions for many of the most basic values.

The concrete title "The Work of the Gods" embodies two concepts: first that of a religious sanction, and secondly that of the ritual as a series of obligations involving the expenditure of goods and time. The religious sanction lies in the fact that the ritual cycle is believed to have been instituted primarily by one deity, the principal god of Kafika, who at the same time is worshipped by the chiefs of the other three clans; but into the scheme are drawn also other gods and chiefly ancestors. There is no elaborate mythology to explain how the ritual cycle came into being. There is a strong reverence for the ritual and the sacred objects connected with it.

The important matter of fixing the exact day on which the rites shall begin throws a significant light on the calendrical system and astronomical knowledge of Tikopia. The people have no fixed calendar and no names for the months or for the days or nights of the month. They count moons or nights of the moon for specific purposes, as in estimating pregnancy or periods between events. The term *tau*, meaning a 'measurement' or 'count', is used for a

season, or sometimes a year as a whole, but without precision. Sometimes a *tau* has six months, sometimes seven. It is a seasonal period rather than a calendar period and refers primarily to the most marked climatic phenomenon in the island, namely, the alternation of the trade wind with the monsoon season. The seasonal changes, which are accompanied by changes in economic pursuits such as fishing, are the main basis for the seasonal ritual, as shown by the terms "The Work of the Trade Wind" and "The Work of the Monsoon". The trade wind begins to blow at about April and dies down in October, when the monsoon season begins.

Although the main index for the beginning is thus given by seasonal change, it is correlated with and corroborated by other factors. Though the Tikopia have no sidereal calendar, they use astronomical observation to a certain extent in time reckoning. Thus when the Pleiades rise, "the ocean has begun to bite", that is, the fish rise and are plentiful. It was said that when the Pleiades appeared above the sea in the east at dawn, it was the signal for the work of the trade wind to begin. At this time Taro, another star, stood high up at dawn. The work of the monsoon is also so guided. When Manu, a bright star, has passed the zenith in the evening, it is time to throw the firestick, for the season's work has arrived. Saraporu, another prominent star, stands midway in the western heavens in the evening at this time, but towards the end of the festival, when the dance festival begins, Saraporu has gone below the horizon. Tokens of the approach of the work of the monsoon season are also given by the migrations of birds and changes in vegetation.

The order of the rites of the Work of the Gods is traditionally fixed, though the space between them to some extent is at the discretion of the Ariki Kafika. But any ordinary Tikopia knows the sequence, and the full cycle in the traditional form shows that any man, not responsible for the organization of the rites, can carry in his memory a sequence of more than thirty days.

The Christianization of the Ariki Kafika, who took precedence over the other three chiefs in the rites, has brought about certain changes and adjustments. In the course of generations, such variation may become part of the traditionally accepted practice. This with the conserveration of other variations and causes of variation suggests the reflexion that "Polynesian culture must not be regarded as a static arrangement resting upon an original fusion of diverse elements, but as a dynamic arrangement with a tendency to variation perceptible in each generation, and with a selective process by which some at least of these variations are built into the cultural system"

* The Work of the Gods in Tikopia. By Raymond Firth. (Published for the London School of Economics and Political Science.) Vol. 1. (Monographs on Social Anthropology, No. 1.) Pp. vi+188+3 plates. (London: Percy Lund, Humphries and Co., Ltd., 1940.) 7s. 6d.