

most remarkable finds were a hanging lamp and a gaming board. The former is described by a correspondent of the *Times*, who gives an account of the discovery in the issue of Oct. 7, as "the finest bronze which has yet come to light in excavation in Ireland". It is a pointed oval, with three hanging chains attached to animal heads, and is decorated with rosettes and an acanthus scroll. It will be interesting to hear Mr. Kendrick's analysis of its relation to the British hanging bowls, from which descent is claimed for it. The wooden gaming board has forty-nine holes and is bordered with carved Celtic patterns, said to be the finest Viking object known from Ireland.

#### Television Broadcasting

THE transmissions from Broadcasting House, London, of television by the Baird process have fulfilled the expectations of the radio engineers. Some think that this may lead to the revival of the 'puppet' show which was very popular about two hundred years ago. The London transmissions have been seen well in Scotland, a distance of more than 400 miles. At present two bands of radio frequencies are required in the overcrowded ether, one for the visual and another for the sound signals. In *Television* for September A. P. Peck describes a new system of broadcasting developed by the Columbia Broadcasting Company of New York which uses only one wave for both sight and sound signals and thus makes a smaller demand on the available channels in the ether. A low-powered 45 kc. (kilocycle) oscillator is used in the first instance for the sound signals, the wave being modulated by the sound programme coming from the television studio. The sound modulated current includes frequencies up to 5 kc. on each side of the carrier wave. The wave with the television signals occupies the band on the frequency spectrum ranging from 2750 to 2850 kc. The sound signal is actually radiated on two sub-carrier waves with frequencies of 2755 and 2845 respectively. With this arrangement the Columbia engineers have got satisfactory results. Not only does the method save space in the ether but it also saves equipment at each end. It is a great advantage to the average 'looker in' to have a receiver for both sight and sound which is compact, not easily damaged and simple to operate.

#### Revised Standard Frequency Radio Transmissions

THE modern extensive use of radio communication of all types demands for its success that each transmitting station shall keep very exactly to its allotted wave-length or frequency, so that interference with transmissions on neighbouring wave-lengths may be reduced to a minimum. At the present time the majority of commercial radio transmitting stations on land, including those employed for broadcasting purposes, use in their installation a source of oscillations the frequency of which is accurately controlled by means of a tuning fork or piezo-electric crystal. In order that the administrations to which these stations belong may be able to measure and adjust

their wave-lengths very accurately, it is necessary that their controlling apparatus may be frequently checked against some national or international standard. It was to meet this need that on behalf of the Radio Research Board of the Department of Scientific and Industrial Research, waves of accurately known frequency have been transmitted for some years past from the wireless station at the National Physical Laboratory for checking the calibration of wavemeters and other apparatus.

THE programme of transmissions has recently been revised and the main standard now employed consists of a single frequency of 1,000 cycles a second. This frequency is derived from an installation which is maintained in continuous operation, day and night, at the National Physical Laboratory and serves as the national standard of Great Britain. This low frequency standard is emitted in the form of a modulation on a carrier wave the nominal frequency of which is 360 kc./s. (wave-length 830 m.). A regular monthly programme of such transmissions is now maintained by the National Physical Laboratory to enable all those desirous of doing so, to receive the transmission and to make a comparison between their own frequency standard and that of the Laboratory. In addition, a second quarterly programme of standard frequency transmissions consisting of a controlled carrier wave of frequency 1785 kc./s., is still maintained by the Laboratory, largely for the benefit of amateur experimenters. Those interested in this work can obtain a copy of the programmes of transmissions on application to the Secretary, Department of Scientific and Industrial Research, 16 Old Queen Street, Westminster, London, S.W. 1.

#### Pharmacy and Recent Advances in Science

THE opportunities which the present rapid advances in science offer to the student formed the text of the address delivered by Dr. C. W. Kimmins at the opening of the School of Pharmacy of the Pharmaceutical Society of Great Britain on Oct. 5. For the scientific research worker there are all sorts of important problems awaiting solution. A student of organic chemistry frequently encounters puzzles such as this: a substance is known as a natural product of great medicinal value; the chemist works upon it and finds that a substance can be produced synthetically apparently exactly similar, yet the physiological properties may differ in a marked degree. Many of these problems of the different action of synthetic and natural substances have been solved, but delightful fields for research remain. Even in a limited field, to have extended the bounds of human knowledge must ever be a source of intense gratification to the worker. To take another example, in physical analysis, scientific workers at one time concentrated exclusively on the elements of the visual spectrum; but of late years a great transformation has taken place. Men of science are concentrating on the larger wave-lengths on one side and the smaller wave-lengths on the other, with the relative neglect of the intermediate wave-lengths. When the ultra-violet part is successfully



charted and carefully studied it will cast a wonderful flood of light on physiological processes, especially upon the growth of plants, so many of which are materially affected by stimuli associated with minute wave-lengths. With such advances in science and the solution of previously apparently insolvable problems, it is not to be wondered that the enthusiastic student of to-day has developed a spirit of adventure unknown in former days.

#### The Giant Horntail Borer

A SHORT time ago a cinema picture of the giant horntail borer (*Sirex noctilio*) and its parasite (*Rhyssa persuasoria*) was shown in the theatres of New Zealand. This picture was of especial interest to the Dominion, since it was upon the researches into the biology of these insects in England on behalf of the Cawthron Institute, Nelson, that the picture was based. Owing to the widespread establishment of *Sirex* in the exotic coniferous forests, particularly of *Pinus radiata*, in New Zealand, Sir Guy Marshall, of the Imperial Institute of Entomology, was approached by Dr. D. Miller, and as a result, the former arranged with Dr. Thomson, of the Empire Marketing Board's Parasite Laboratory at Farnham Royal, for a study to be made of the parasite *Rhyssa* in order that supplies might be secured and sent to New Zealand. This has been done and the parasite liberated in its new environment. The actual life-history studies on *Rhyssa* were undertaken by Dr. Chrystal, of the School of Forestry at Oxford, where the picture was made. It is work of this nature, especially when presented to the public in picture form, that forcibly demonstrates how dependent the overseas Empire States are upon the assistance of such institutions as the Imperial Institute of Entomology and the Farnham Royal Parasite Laboratory.

#### Antiquities from the Thames

A QUESTION of considerable interest to archaeologists was raised at a meeting of the Thames Conservancy Board on October 10 in connexion with a report by Prof. Elliot Smith on a human skull and bones of late bronze age which had been dredged from the bed of the Thames below Hampton Court Bridge. A letter was presented from the Council of the London and Middlesex Archaeological Society asking that articles of archaeological interest from the bed of the Thames should be deposited with the museums of the county in which they were found, and suggesting that objects found in Middlesex should be deposited at the Brentford Museum. The decision of the Board was to refuse the request on the ground that it was felt that all relics from the Thames should be together in the possession of the Board. The opinion of a majority of archaeologists would probably be in favour of the claims of local museums in this matter; but there is much to be said for the single collection, in view of the character of the Thames as a highway of culture from very early times. This argument, however, loses force when it is remembered how many antiquities from the Thames already lie scattered in various museums and collections. The most cogent consideration is the

accessibility of the material for purposes of study. Apart from the suggestion of loans to museums from time to time, Lord Desborough, as chairman, could only hold out the vague hope that the Conservancy might be able to display its collections at some indefinite future time when space might become available. It is very desirable that the collection now in the possession of the Thames Conservancy should be accessible to students. A statement from the Board as to how far this is possible, and if at all, in what conditions and under what regulations, would be welcome.

#### Industrial Organisation

ARRANGEMENTS have been made by the Governing Body of the Imperial College of Science and Technology for the delivery during the present session of a series of special lectures on various of the productive industries by lecturers whose experience will enable them to speak with authority. The lectures will be given in the Huxley Building of the Royal College of Science, Exhibition Road, S.W.7 on certain Thursdays at 4 p.m., and will be open to all members of the College staff and students. The lectures during the autumn term will be by Dr. Herbert Levinstein, on the chemical manufacturing industry (Oct. 27); Mr. Austin Hopkinson, on the advantages of the small industrial organisation (Nov. 17); Mr. Maurice Solomon, on the electrical industry with special reference to the advantages of the large industrial organisation (Dec. 1); and Mr. G. M. Burt on the building industry (Dec. 15). Particulars of the lectures during the spring term will be announced later; but they are expected to treat of (a) the heavy engineering industry, (b) the textile industry, and (c) the steel industry. It is intended to publish the seven lectures in a volume.

THE immediate object of the lectures is to give Imperial College students, many of whom enter manufacturing industries after graduation, an idea of some of the bigger problems, of whatever nature, which confront manufacturers at present, and to suggest what the future may have in store, either in the way of technical improvements, or as a result of national and international developments. In taking this step the Governing Body has been prompted by the feeling that, in this time of world depression, the considered views of the manufacturer have not been sufficiently heard. The lecturers have accordingly been chosen from distinguished men in control of particular branches of the productive industries, and able therefore to speak with authority upon the subjects with which they will deal.

#### Training in Industrial Management

THE increasing complexity of industrial management, together with the intensification of world competition, seems to call for the more effective training of managers and industrial executives than has been usual in the past. To meet the special requirements of 'industrial scientists', a course of training in industrial management is to be started by Mr. W. R. Dunlop at 57 Gordon Square, London. The aim is to supplement the basic scientific training