

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