even the oldest of the English maces", and that the Natural Philosophy (*anglicé* Physics) Department houses the finest extant Elizabethan scientific instrument, Humphrey Cole's great astrolabe (1575). At their best, Scottish professors of chemistry have been men of erudition, and Prof. Read, present director of the Chemical Research Laboratories at St. Andrews, maintains that valuable, if passing, tradition. Not a few who have never heard of terpenes may be inspired by his pamphlet, if they are fortunate enough to see it, to make a post-war pilgrimage to the "little city, worn and grey".

Relation of Meteors to Short-Wave Radio 'Whistles'

A NOVEL explanation of some peculiar whistles audible under certain conditions in short-wave radio receivers is put forward by S. R. Khastgir (*Indian J. Phys.*, 17, 239; 1943). Weak short-lived whistles of rapidly descending pitch have been noticed at the Delhi receiving station of All-India Radio when a receiver is tuned to the carrier wave of the nearby short-wave transmitters. Two possible explanations are offered, in both of which the phenomenon is attributed to the entrance of a meteor into the earth's upper atmosphere. In the first, the meteor is supposed to produce a rapidly moving mass of ionized air at its head. This local Heaviside layer scatters the incident radiation from the transmitter, the rapid descent causing a Doppler change in the frequency of the scattered waves. These then interfere with the ground waves reaching the receiver, and an audible beat note is produced. As the descent is retarded by atmospheric resistance the Doppler shift lessens, and the pitch of the whistle drops. On a carrier wave of 7 Mc./s. a whistle starting at 3,000 c./s. would be caused by a meteor with a maximum velocity component of 64 km./s. towards the receiver—not an unreasonable value.

The second hypothesis supposes that the retardation of the meteor in the ionosphere produces, in some way, an electrical impulse similar to audio-frequency static. The Fourier components of this impulse, transmitted at different velocities through the ionosphere, will reach its lower fringe in succession (the shorter waves first) and will modulate the scattered carrier waves at a frequency which is a function of time. A receiver tuned to the carrier will thus reproduce a whistle descending in pitch at a rate which should depend on the ionization. Test experiments will no doubt distinguish between these hypotheses, but there seems no doubt about the observed facts—that the whistles frequently coincide with observed meteors, and that they occur most often in the early morning, when the number of meteors is a maximum. They are thus likely to be of fundamentally meteoric origin whatever may be the details of their production.

Polish Science and Learning

THE fourth number of *Polish Science and Learning*, the series of booklets edited by the Association of Polish University Professors and Lecturers in Great Britain, is a specially educational issue. Several preliminary articles are contributed by American and British writers. Dr. Maxwell Garnett's theme is English education in relation to international problems. The makers of the Paris Peace, a quarter of a century ago, he says, took no account of education and little of economics, but relied on political pacts, unsupported by the thoughts and feelings of average citizens. All will agree that we must do better this time, though all may not agree with the details of Dr. Garnett's way of doing it. Prof. Powicke's article, though written for a different occasion, is wisely included, because of its explanation of Oxford's peculiar contribution to English life, the claims of mere learning being subordinated to the service which learning can render to English society. We may be amateurs, but we are not pedants.

The main body of the booklet, contributed by Polish authorities, makes sad reading, because every aspect of education is necessarily treated from the pre-war and the post-war points of view. In other words, the writers describe what has been ruthlessly and completely destroyed, and proceed to describe the immense task of reconstruction which faces the Poland of the future. No aspect of education seems to have been omitted by the editorial committee. Among the subjects of the articles are elementary schools, secondary education, the training of teachers, technical schools, university education, scientific and technical research, books and libraries, adult education, art education and physical education. The concluding "Chronicle" is a useful addition to a very comprehensive report on the educational situation of Poland.

Blind Workers in Industry

CERTAIN occupations such as basket-making, massage and telephone-exchange operations have been assumed to be almost the only possibilities for the blind, and the normal factory environment has been dismissed as unsuitable. Since the need for labour during the War, many firms have experimented with a few blind workers, and a study of 215 blind workers employed in different firms has been made by Dr. K. G. Fenelon, of the University of Manchester. The industries included, among others, general electrical engineering, aircraft, metal ware, wood-working. 104 of the workers were trained by the firms themselves on the factory premises, 53 by the Institute for the Blind, 2 by an education committee, 8 in their own homes, while 48 had no specific training but obtained their experience on the job. The firms who have experimented with blind workers report that, while some fall short of the production obtained by the fully sighted workers, yet some are quite up to normal standards and also that they are no more liable to accidents than other workers. Some jobs involve the provision of special aids, but others can be undertaken by them with the ordinary machinery. They are particularly successful in work where delicacy of touch compensates for ability to see. It is therefore important that the jobs selected for them should be suited to their particular abilities. Their concentration on the job in hand is good, and they are in general keen and industrious. One difficulty is that they are apt to get irritated by any hold-up of material. It seems clear even from this limited survey that there is a case for a comprehensive research into the possibilities for the blind. Quite apart from their potential value as workers, it will be an advantage to them to form part of an ordinary community.

Rickettsiasis in Brazil

THE January issue of the *Boletín de la Oficina Sanitaria Pan-Americana* contains an interesting review of this subject by Dr. Otávio Magalhães, member of the Pan-american Typhus Committee.

Most of the information concerns the State of Minas Geraes, Brazil, where Rocky Mountain spotted fever has apparently existed for some time. There are four clinical forms of the disease: inapparent, mild, malignant and fulminating. It seems that there is only one virus, but probably there are various strains which may be differentiated by proper tests. The epidemiological nature of the infection in some regions of Minas Geraes is quite different from that of Rocky Mountain spotted fever in the United States.

Tables of Bessel Functions

THE Committee on Mathematical Tables of the U.S. National Research Council was advised that there was a great need for a modern "Guide to Tables of Bessel Functions", as there is scarcely a single field of applied mathematics in which these functions are not used. After more than a year of preparation, this "Guide" was compiled by Profs. H. Bateman and R. C. Archibald, using material on which the former had been working for many years, and has been published as a special number, occupying 104 pages, of the journal *Mathematical Tables and other Aids to Computation* (1, 205; 1944. Washington, D.C.: National Research Council. 1.75 dollars. London: Scientific Computing Service, Ltd. 10*s*.). There are two parts, one in which tables and graphs are listed with their authors, and another consisting of an alphabetical bibliography of the authors. In some places there are important formulæ with explanations of how to use them. The notation has been chosen so as to agree so far as possible with that used by English authors. In addition to giving full references to all published tables of Bessel functions, the authors endeavoured to add details of every known unpublished table, but unfortunately the comprehensive Liverpool "Index of Mathematical Tables" prepared by A. Fletcher, J. C. P. Miller and L. Rosenhead was not available, even in proof, until it was too late to give more than a cursory reference, and it was then found that the "Index" referred to more than thirty manuscript tables unknown to the "Guide". The second edition of Watson's "Bessel Functions" appeared too late to be mentioned. A valuable feature of the "Guide" is the information concerning all known errors in the tables mentioned. A number of errata lists appear in print for the first time.

Radiant, Dielectric and Eddy-Current Heating

A PAPER on the place of radiant, dielectric and eddy-current heating in the process-heating field was read recently in London before the Institution of Electrical Engineers by Messrs. L. J. C. Connell, O. W. Humphreys and J. L. Rycroft, in which the authors maintain that if the fullest advantage is to be gained from the rapid developments which have taken place in connexion with radiant and high-frequency methods of heating, care must be exercised in the selection of the applications for which they are recommended. Although many processes can be carried out more effectively by the new methods, there is still a very real place for contact and convective heating. The purpose of the paper is to facilitate this selection. The paper first reviews the various methods of heating, indicating the physical laws and practical considerations by which they are governed and the rates of heating which may be obtained. The types of application for which each process is best suited are then classified in terms of their technical requirements. Finally, several applications are considered in some detail, and it is shown that processes having superficial similarity may nevertheless possess features, not at first apparent, which are of sufficient importance to warrant the use of different methods of heating.

The Earthquake at San Juan, January 15, 1944

HORACIO J. HARRINGTON, professor of geology at the University of Buenos Aires, has described some of the effects of this earthquake ("El Sismo de San Juan del 15 de enero de 1944", *Cienciae Investigación*, Jan. 1945). The shock occurred at 19h. 46m. 29s. without any previous warning and attained a maximum intensity in a few seconds, ending suddenly about 15 seconds after the first shock. The first shock was from below upwards, and in a few seconds afterwards a new shock took place in a horizontal direction and of an undulatory nature, from west to east. When the tremors had ceased, some 90 per cent of the buildings in San Juan had been totally or partially destroyed. The depth of focus was 14 km., with a probable error of 3 km., and the epicentre included the zone extending north from San Juan to Chimbas and Albardón. The intensity of the San Juan earthquake was ix on Sieberg's scale, and so was not excessive; nevertheless the destruction was very much greater than would have been expected. Out of a total population of seventy to eighty thousand, about eight thousand were killed and twelve thousand injured; the disproportion between the intensity of the earthquake and the destruction effected is obvious. The loss of life in the San Juan earthquake was due to the buildings being made with unbaked bricks of clay; these should be avoided in reconstruction. In addition, many of the cities of the country are built at the foot of high mountain ranges, and zones of fracture render their existence more or less precarious.

Announcements

SIR JACK DRUMMOND, chief scientific adviser to the Ministry of Food, has been appointed to the post of director in charge of the whole of the scientific research of Boots Pure Drug Co., Ltd. Sir Jack Drummond has resigned the chair of biochemistry at University College, London, which he has held since 1922, but he will not take up his new appointment until the food situation has improved.

THE Council of the University of Sheffield has accepted a gift of £1,000 from Dr. S. B. Bagley, chairman of the Glass Delegacy, to provide a fund for research purposes within the Department of Glass Technology.

The Medical Research Council has offered to establish a Biochemical Research Unit in the University under the direction of the professor of biochemistry, and the University Council has accepted the offer.

The Council has made the following appointments: Dr. B. M. Laing, at present lecturer in charge of the Department of Philosophy, to the newly instituted chair of philosophy; Major F. W. Shotton, to the chair of geology in succession to Prof. W. G. Fearnsides, on the retirement of the latter; Mr. A. M. Woodward, at present lecturer in charge of the Department of Ancient History, to be reader in ancient history and archæology, and head of the Department of Ancient History.