Britain. (Some of the results of these measurements have since been published; see *Nature*, **170**, 916; 1952.)

The study of solid reactions is probably one of the main applications for radioactive tracers in physical chemistry; and in Session 26, on chemical applications, the first paper, by Dr. R. Lindner, dealt with this subject. Another interesting paper in this Session, by members of the Kodak Research Laboratories, was on the determination of silver in photographic images using radioactive iodide (iodine-131). Where a large number of analyses is required, the radio-iodination method has a distinct advantage over the potentiometric method and is to be preferred where only a small image is available, as in X-ray crystallographic patterns, or when the optical density is low.

The remaining four Sessions (27–30) were devoted respectively to ion exchange, non-destructive testing, static elimination and radioactivation analysis. Mr. K. Fearnside, of Isotope Developments, Ltd., Aldermaston, described four instruments: the transmission beta-ray thickness gauge used in paper, plastic sheet and metal foil production; the reflexion beta-ray gauge for the measurement of the thickness of coatings and liquid films; the gamma-ray thickness gauge applied to thick or hot-rolled metal strip; and the package monitor used to check the contents of sealed packages as they leave the packaging machine. Mr. G. Syke dealt in more general terms with the problem of inspection and gauging with ionizing radiations. Fog-making on certain kinds of fabrics due to static electricity forming on the fibres can be prevented by dissipating the static when it occurs before it has time to become a nuisance. The static may be made to leak away either through the textile itself or through the surrounding air. Ionizing the air by means of a radioactive substance is a most successful method; and in his paper on radioactive static eliminators for the textile industry, Dr. P. S. H. Henry, of the Shirley Institute, discussed thoroughly the question of static on textiles and the relative merits of alpha- and beta-ray static eliminators. Finally, Mr. A. A. Smales gave some indications of the scope of radioactivation analysis, the essential basis of which is that an element is detected and determined by the formation of a radioactive nuclide which is then subjected to radioassay, and Prof. G. Chaudron described some work on the analysis of traces of sodium and copper in high-purity aluminium by pile activation.

BREEDING-BACK OF THE TARPAN

BEFORE the existence of human culture a number of different kinds of wild horses existed in Europe and Asia. Of these only one is extant to-day. This one was discovered by the Russian Przewalski in the desert-like steppes of Zungaria in western Siberia. Like most steppe-dwelling animals, the Przewalski wild horse is red-brown in colouring and light underneath. As a legacy from its forbears it still carries zebra-like stripes at the backs of the legs which show up very clearly in the summer coat. The discovery of the last remaining species of wild horse was followed by the news that in the 1920's it had become extinct in the free state. To-day only a few are left scattered in various zoological gardens, and none is breeding except in the sixteen-head Munich herd. It is on this herd that the hopes of preserving the species must rest.

If the species is not preserved, apart from its own interest, one of the most interesting animals of to-day will have become extinct. One of the European wild horses, the mouse-grey, for which the Russian name of tarpan has been adopted, was, in historical times, still extant over large areas of Europe (*Oryx* (Journal of the Fauna Preservation Society), **1**, No. 7; November 1952).

In the first half of the past century it was still numerous in the steppes of the Ukraine north of the Black Sea. In 1876 it became extinct, leaving few traces of its existence. The tarpan was different from the Przewalski wild horse not only in colouring but also in build. The Przewalski has strong thick bones and an almost disproportionately heavy skull with narrow forehead which, many investigators believe, is the reason why the heavy carthorses of to-day are descended from this type. The tarpan has much finer bones and a short light head and is probably the progenitor of swift riding horses.

Distinguished for his successful efforts in breeding back the wild aurochs, Heinz Heck, director of the Tierpark Hellabrunn, Munich, has also successfully bred-back the tarpan. Mares from Iceland and Gothland that were markedly like tarpans were crossed with a Przewalski stallion; the resultant crosses were mated with one another and, in 1933, from this stock emerged the first foal with a mouse-grey tarpan colouring. Other foals followed, and through resultant crossings there is to-day a considerable stock of back-bred tarpans in the Tierpark, Hellabrunn.

MICROSCOPY OF PLANT ASHES

THE statement that a microscope magnifies four hundred times never quite conveys a true idea of the wealth of detail that can be seen at this magnification. Perhaps only when the incredibly small fragments of material on a cosh, the minute amounts of blood or hair and other such negligible 'small dust of the balance', appear as important items of evidence in criminal proceedings is it realized how valuable is this instrument in the examination of such unpromising material.

One would, however, be pardoned in assuming that even the microscopist would have to admit defeat when dealing with material that had been so thoroughly incinerated that only an ash remained. However, in 1920, the Austrian botanist Hans Molisch investigated the structures left after incinerating plant material and showed that the ash still retained definite structural features. Prof. Gosta Edman, now professor of botany and pharmacognosy in the Royal Pharmaceutical Institute, Stockholm, was then a pupil of Molisch and later set out to investigate these 'ash pictures' systematically and has since published numerous papers on the subject. Recently he was awarded the Hanbury Memorial Medal of the Pharmaceutical Society of Great Britain which, in conjunction with the Linnean and Chemical Societies, periodically makes the award for "high excellence in the prosecution or promotion of original research in the Natural History and Chemistry of Drugs". After receiving the medal, Prof. Edman gave an account of his work on ash pictures (*Pharm. J.*, **170**, 189; 1953).

Naturally, a good proportion of the work has been concerned with powdered or broken vegetable drugs, and Prof. Edman claimed that his method of examination is sometimes more convenient than normal ones. The drug is strongly heated until the bulk of the tissues is completely burned away; the characteristic appearance of the mineral skeletons of the cell walls and the cell contents is then revealed. The method, however, has several other important applications, especially in criminal proceedings involving suspected arson. Further, the examination of prehistoric materials by this method has been of some assistance to archæologists. Thus, the examination of the charred vegetable matter in a Chinese clay-sheard, about five thousand years old, showed it to consist mainly of the remains of the leaf blades of *Oryza sativa*, the same plant used to-day for the production of rice. In the same way, fragments of cereals, medicinal herbs, etc., have been identified in the intestines of Egyptian mummies. Prof. Edman has also examined the ash pictures of about 375 related plant species in relation to their phylogeny and taxonomy and has published many original articles on this subject in the botanical literature. He concludes that extensive silicification of the cell wall is associated with primitive characters.

J. W. FAIRBAIRN

OBSERVATIONS AT THE ROYAL OBSERVATORY, GREENWICH

THE observations made at the Royal Observatory, Greenwich, during 1937 in astronomy, magnetism and meteorology, under the direction of Sir H. Spencer Jones, have been published in a single volume (pp. $A62+B21+C200+D66+E46+40$. London: H.M.S.O., 1951. £6 net), which is divided in five sections, *A–E*, as follows: meridian astronomy, equatorial observations, photo-heliographic observations, magnetic observations and meteorological observations.

The first section includes work on the transit circle and on the time service; in the former are the results of regular observations of the sun, moon, major planets and minor planets Juno, Ceres, Pallas and Vesta, and in the latter is given a short account of the new equipment and advances in the technique since the publication of the "Time Service Results" in 1936. The section on equatorial observations contains a table on the observations of double stars made at the Observatory which includes not only all pairs observed during 1937 but also all previously unpublished measures of earlier years. A systematic difference was found for close pairs between the results of the filar micrometer and of the comparison image micrometer (brought into use towards the end of 1937), and the table indicates which instrument was used.

The second section, on photo-heliographic observations, is by far the largest of the five sections. The positions and areas of sunspots and faculæ for each day during the year 1937 is the first of seven tables in this section, the photographs being taken at the Royal Observatories of Greenwich or of the Cape, and at the Kodaikanal Observatory (a negative transparency for November 3 was supplied by the Mt. Wilson Observatory to fill a gap in the series). The other tables are: a general catalogue of groups of sunspots for 1937; ledgers of areas and positions of groups of sunspots (recurrent groups and non-recurrent groups); total areas of sunspots and faculæ for each day; mean areas of sunspots and faculæ for each rotation and for the year; mean heliographic latitude of spots for each rotation and for the year; and observations of solar flocculi made with the spectrohelioscope.

The introduction to the section on magnetic observations describes the magnetic station at Abinger, with its instruments, methods of observation, magnetic reductions and arrangement of results; these results are listed in fifteen tables, and there are notes for each month of 1937 which briefly summarize the magnetic conditions exhibited by the traces of declination and horizontal and vertical intensity during the year. Finally, a description of the instruments and the meteorological reductions is given in the section on meteorological observations; several changes were made in the 1934 volume as regards the notation for clouds and weather, this being done to bring the symbols into general accordance with those in use at the British Meteorological Office.

All the above-mentioned work by the Royal Observatory, Greenwich, was continued during 1938, and an account of it has now been published; the volume is similar in all respects to that for 1937. Another series of Greenwich observations which has at last been published is Vol. 2 of "Observations of Colour Temperatures of Stars: Relative Gradients" (pp. 115; London: H.M.S.O., 1952; 25*s*. net); this volume covers the years 1933–38 and is a sequel to the observations of 1926–32, published in Vol. 1.

UNITED STATES NATIONAL ACADEMY OF SCIENCES

AT the annual general meeting of the National Academy of Sciences, held in Washington, D.C., during April 27–29, the following officers, new members and foreign associates were elected.

Vice-President: George W. Corner, director, Department of Embryology, Carnegie Institution of Washington, Baltimore, Maryland, for a four-year term.

New Members of Council: Edwin B. Wilson, professor of vital statistics, Harvard School of Public Health, Boston; and Hugh L. Dryden, National Advisory Committee for Aeronautics, Washington, D.C.

New Members: L. V. Ahlfors, professor of mathematics, Harvard University; P. Bailey, professor of neurology and neuro-surgery, University of Illinois School of Medicine; H. A. Barker, microbiologist, University of California, Berkeley; V. H. Benioff, professor of geophysics, California Institute of Technology; J. H. Bodine, professor of zoology, University of Iowa; L. Brillouin, director of electronics education, International Business Machines Corporation, New York; M. J. Buerger, professor of mineralogy and crystallography, Massachusetts Institute of Technology; H. E. Carter, professor of biochemistry, University of Illinois; D. M. Dennison, professor of physics, University of Michigan; J. P. Den Hartog, professor of mechanical engineering, Massachusetts Institute of Technology; J. W. M. DuMond, professor of physics, California Institute of Technology; C. Eckart, director of the Marine Physical Laboratory, University of California, San Diego;