Mr. D. W. Fry spoke on the linear accelerator and synchrotron work being done by the Atomic Energy Research Establishment group at the Telecommunications Research Establishment, Malvern. He described the design, method of construction, and results obtained on a 40 cm. long section of a travelling wave type linear electron accelerator, which is operating at 10 cm. wave-length and gives a peak energy of 0·54 MeV. The effect on the energy spectrum of variations of injection voltage and applied radio-frequency power was also discussed (see *Nature*, September 13, p. 351). To obtain energies of the order of 500 MeV. the outstanding problem to be solved is the production of very high peak powers.

A 4 MeV. betatron has been converted to operate as a synchrotron (*Nature*, September 21, 1946, p. 413) and is giving approximately 0·2 r.p.m. at 1 metre at a peak energy of 15 MeV. It has been found that the output pulse of γ-rays might be as long as 300–350 μsec. duration. Methods of reducing this time to less than a microsecond are being studied in connexion with the 30-, 140- and 300-MeV. machines under development.

Mr. J. Symonds described the progress so far made on the design and construction of a synchrotron for 1,300 MeV. protons at Birmingham. The foundations for the magnet have been laid and the assembly of the yoke has begun. Many difficulties have to be faced in engineering the components of the equipment. For example, the radio-frequency has to be made to cover a frequency-range of 40 to 1, and has to be accurately linked to the magnetic field strength at injection, a tolerance of one part in a thousand being necessary.

Mr. J. G. Rutherglen described an ion source being made at Glasgow, consisting of an all-glass tube with a radio-frequency discharge in a magnetic field, with which a useful beam of 400 microamp. with 60 per cent protons is obtained. Less good results are obtained without the magnetic field.

Dr. S. C. Curran reported that the programme at Glasgow is chiefly concerned with primary reactions produced by electrons and quanta of very high energy. Experiments on Geiger-Müller counters have been made in an effort to meet the new requirements that have arisen in this field. A background count of less than two per minute has been attained with a two-wire counter of rectangular section, and a coincidence arrangement. Counters with the wire divided into 1-cm. sections with glass beads had shown dead times of 5 microsec. for gamma rays from random directions. Counters of this design, in which the pulse height is proportional to the number of sections excited, are to be used to investigate the specific ionizations of electrons and mesons, the pressure being adjusted to give about one ion pair per section. A circuit was described for the investigation of the occurrence of spurious counts.

Dr. D. H. Wilkinson reported that he had considered the mechanism of operation of an argon–alcohol counter, and believed that the photons which proceed from excited argon atoms produce photo-electrons from neighbouring alcohol molecules, and that these photo-electrons then initiate further avalanches if they are far enough from the wire. If the net reproduction factor is greater than unity, the discharge would be self-sustaining. By considering the discharge to be propagated as a series of discrete avalanches and by examining the probability distribution of secondary avalanches near a primary one, he has shown theoretically that the velocity of spread would be virtually independent of alcohol pressure, as observed by Hill and Dunworth.

Dr. E. Glueckauf spoke on "Regularities in the Binding-Energy of α-Particles in Nuclei". In addition to the well-known peak of the α-particle energies ($-E\alpha$) at the proton number $Z = 84$, there is an equally important discontinuity at the neutron number $N = 128$. The best representation of α-energies for the purpose of interpolating unknown data is therefore obtained by plotting contour-lines of constant $E\alpha$ against the co-ordinates Z and N. The approximately parallel $E\alpha$-lines show bulges, representing very sharp minima of the α binding energy, at the mass numbers 8, 19, 39, 59, 99, 146, and around 212. An investigation of the β^+-energies showed that the nuclear radius does not grow continuously with increasing mass number, but increases in definite steps. The nuclear expansions coincide, not with the minima of $E\alpha$, but with the points where $E\alpha$ begins to decrease. The mass numbers where the nuclear radius expands sharply are 8, 16, 36, 56, 90, 140 and 210. The results may be of value in the elucidation of nuclear structure.

Dr. W. E. Burcham gave an account of some experiments performed mainly by C. A. Wilkinson and H. R. Allan in Cambridge on the deuteron-induced disintegrations of a number of elements. Starting with the nucleus X^A of atomic weight A, the nucleus X^{A+1} may be formed either by neutron capture or by a (d,p) reaction. Both methods yield important information about the ground state and excited states of the residual nucleus, but the second is often considerably easier to observe than the first.

In all elements except the very lightest, the proton yield from deuterons of about 1 MeV. is determined principally by the deuteron penetrability: in magnesium, for example, this is about 1 per cent, and ion currents of about 100 μA. are required if ionization chambers are to be used as the detecting instruments. Groups of protons have been found in aluminium, silicon and magnesium, and they have been tentatively assigned to the various isotopes. No alpha groups were observed directly, but some residual radioactive periods were found corresponding both to alpha and neutron emission. Some of the masses now suggested for residual nuclei differ by as much as 200 kV. from previously accepted values.

OBITUARIES

Prof. Hans Fischer

Hans Fischer, to whom we owe most of our knowledge of the chemistry of hæmin, chlorophyll and the bile-pigments, died on Easter Sunday, March 31, 1945, but his death has only recently become known in Britain. He was born in Höchst on July 27, 1881, the son of Eugen Fischer, a director of Kalle and Co. Fischer studied chemistry at Lausanne and Munich, leading to a doctorate at Marburg under Zincke. There followed medical studies at Munich, where his interest in hæmin and the bile-pigments was aroused. He then worked with Emil Fischer before going to Innsbruck (in 1916), to Vienna (in 1918), and finally to succeed Wieland at the Technische Hochschule, Munich, in 1921.

After the difficulties of the post-war times, his application of the Gattermann aldehyde synthesis made possible the systematic preparation of suitable

© 1947 Nature Publishing Group

pyrrole derivatives, and led (1926) to his discovery of porphyrin syntheses. In his work on the natural porphyrins and in much of that on chlorophyll, Fischer could rely on classical analytical methods to determine the nature of the substituents. Their position, however, had to be determined by the synthesis of many isomers, though conversions to reference porphyrins might reduce the number of possibilities. Thus about a hundred and thirty porphyrins were synthesized; this not only made the identifications unambiguous, but also provided the only chemical proof of the structure of the porphin nucleus—the symmetry demanded by the number of isomers. These methods sufficed for the synthesis of many porphyrins, including the copro-porphyrins, hæmin and the simpler chlorophyll porphyrins.

Analytical methods were then greatly extended, particularly to obtain porphyrins from chlorophyll with unmodified or more suitably modified side-chains. Bacteriochlorophyll and protochlorophyll were related to chlorophyll-*a*, and this phase culminated in the synthesis of phæoporphyrin-a_5, and in the elegant oxidations leading to the complete and probably final structures put forward for the chlorophylls.

Fischer's work on the bile-pigments, the vinyl groups of which presented great difficulties both analytically and on the synthetic side, was completed by the synthesis of bilirubin in 1944.

The work in Fischer's laboratory was very dependent upon his organisation, and quantities of costly starting materials appeared as if by magic. 'Gattermann cooks' and research students worked side by side, the former relieving the latter of many repetitive preparations, and thus shortening an otherwise long apprenticeship in the methods peculiar to pyrrole chemistry. The cost of the starting materials, the slight solubilities of the products, and the usually low yields necessitated work with small quantities of material. Though conventional reactions were largely inapplicable, it was sometimes possible to apply those lying on the verge of respectability; more often, entirely new methods had to be found. Work under these conditions would have been quite impossible but for spectroscopic identification and isolation by chromatography, and particularly by ether-hydrochloric acid fractionation. The latter, however, made very heavy physical demands on the students.

There was an atmosphere of unusual jollity in the laboratory, directed in its legitimate expression by Herr Paulus, the store-keeper, and controlled, in its more outrageous excesses, by Fischer's tact and humour. The fledgling 'doctor', returning from his oral examination—a formality—found his bench littered with the starting materials for a celebration and a large blackboard, on which a cartoon and some lines of doggerel reminded him that he was mortal. More rarely, there were occasions in the cellars, and at Christmas the supply of 5-litre flasks was exhausted as all undertook the preparation of 'christmas-pyrrole' by a process which was supposed to render denatured alcohol potable.

Fischer was an enthusiastic motorist, skier and mountain-climber; late in life he married Wiltrud Haufe. His preoccupation with his laboratory was his outstanding characteristic. He never accepted the rectorate, and the forbidding impression he left on some contrasted strangely with that left on his students. He was unique among organic chemists for, though restricting himself to one field, he always succeeded in maintaining momentum by developing new methods. His work was rewarded by a Nobel Prize in 1930. S. F. MacDonald

---

We regret to announce the following deaths:

Prof. Max Planck, For.Mem.R.S., on October 4, aged eighty-nine.

Prof. Tine Tammes, emeritus professor of genetics in the University of Groningen, on September 20, aged seventy-six.

NEWS and VIEWS

National Museum, Ottawa: Dr. F. J. Alcock

Dr. F. J. Alcock, formerly a senior geologist in the Geological Survey of Canada, Mines and Geology Branch, Department of Mines and Resources, has been appointed chief curator of the National Museum, Ottawa. This is the first occasion upon which the Museum has had a full-time director since the death of Dr. William McInnes in 1925. A native of Griersville, Ontario, and a graduate of the Universities of Toronto, Wisconsin and Yale, Dr. Alcock has spent thirty-six seasons with the Geological Survey and has carried out explorations in northern Manitoba and Saskatchewan. He has done extensive mapping of the Gaspe Peninsula and New Brunswick; investigations of the zinc and lead resources of Canada, and the manganese and oil shale deposits of New Brunswick. He has also lectured at Carleton College on geology and on the forest, mineral and water resources of Canada. Since February of this year Dr. Alcock has been acting curator of the Museum. He brings to his new appointment a wide knowledge of Canada and a keen interest in museum work. As the first full-time director which the Museum has had for many years, his experience will add that new measure of energy and direction so necessary to expanding its usefulness in accordance with similar programmes which are being carried out in other countries.

Physical Society: Awards for 1947

The Council of the Physical Society has made the following awards for 1947: Duddell Medal to Dr. R. J. Van de Graaff, of the Massachusetts Institute of Technology, for the invention and development of his high-voltage electrostatic generator; Charles Chree Medal and Prize to Sir Edward Appleton, for his investigations of the ionosphere; Charles Vernon Boys Prize to Dr. C. F. Powell, of the H. H. Wills Physical Laboratory, University of Bristol, for his development of the photographic-plate technique for the investigation of fundamental particles.

New Plastics Laboratories at Birmingham

The Birmingham Central Technical College has given much consideration to the study of plastics technology, and new laboratories in Nelson Street now provide comprehensive courses to meet the requirements of students in the plastics industry.

© 1947 Nature Publishing Group