

described, among other things, the way in which it is now possible, in certain instances, to determine the positions of hydrogen atoms. She then traced the way in which our knowledge of stereochemistry has been increased by our ability to study the effects of such factors as the repulsive forces between non-bonded atoms in addition to those of the classically directed valencies. Finally, she referred to the analysis of such complex compounds as vitamin B<sub>12</sub> and the problems set for the theoretical chemist by the molecular configurations recently found in substances such as the boron hydrides.

Prof. Raynor, after surveying the part played by the electron theory of metals in the development of our ideas of the metallic state, discussed Pauling's suggested valencies and described how, by making absolute measurements of X-ray scattering power, a check might be obtained on these. He added that such an attempt, recently made in Chicago, favoured, if anything, the conventional valencies. Other points dealt with by Prof. Raynor concerned the examination of the diffuse X-ray background, on one hand to determine the local distortions around dissolved atoms in alloys and, on the other, to measure the elastic constants of metals.

In the final talk of the conference, Sir Lawrence Bragg dealt with his recent work at Cambridge on hæmoglobins, carried out in collaboration with Dr. M. F. Perutz. He said that a systematic attempt is being made, based on an extensive series of intensity measurements of the diffraction by a hæmoglobin crystal at various stages of shrinkage, to see just how much could be discovered without making any structural assumptions; and he described a series of ingenious steps by which not only the size and shape of the protein molecule has been established, but from which also the distribution of scattering matter within the molecule is beginning to be understood. When it is realized that the volume of the molecule is 83,000 Å.<sup>3</sup> dry and 116,000 Å.<sup>3</sup> hydrated, the magnitude of this task will be appreciated; but Sir Lawrence gave every hope that, as he put it, we are now in sight of the promised land.

Space does not permit a detailed discussion of these or the previous papers, but a fuller report of the conference will appear in the *British Journal of Applied Physics*.

An account of the conference would be incomplete without a further reference to the dinner held on the evening of October 24, at which Prof. von Laue, replying to the toast of "X-ray Diffraction and the International Union of Crystallography", proposed by Sir Charles Darwin, made what is believed to be his first public speech in English. He began by referring to his early days in Strassburg and ended by hoping, as Röntgen had done before him, that, even if those younger workers present were not as lucky as he had been, they would derive as much enjoyment from their work as he had done from his. In a final gesture, he drank their health in a personal toast which was all the more appreciated for being so entirely and so obviously spontaneous.

In conclusion, a few words must be said about the historical exhibits at the Royal Institution which were shown during both days of the conference. Among other things on view were the original Bragg spectrometer, reproductions of Laue's original photographs, correspondence and note-books of the two Braggs, letters written by Barlow, Moseley and others, and even a (correct) model of rock salt constructed from balls of wool and knitting needles by

Prof. Crum-Brown in Edinburgh in 1883. No one who attended the conference could fail to be impressed by the tremendous vitality of X-ray crystallography as well as by its versatility and power in application. He would indeed be a bold man who would guarantee what the next forty years of X-ray diffraction will bring forth.

J. THEWLIS

## OBITUARIES

### Dr. C. H. Kellaway, F.R.S.

CHARLES HALLILEY KELLAWAY, director-in-chief of the Wellcome Research Institution, London, died on December 13 at the age of sixty-three. He was born in Victoria, and was educated at Melbourne Church of England Grammar School. A brilliant student, always the head of his year, he graduated at Melbourne in 1911, and after holding house appointments at Melbourne Hospital, became resident medical tutor at Trinity College, Melbourne, and then acting professor of anatomy at the University of Adelaide. During the First World War he served as a regimental medical officer with the 13th Australian Infantry Battalion in the Middle East and won the M.C. At the end of the War he worked at the Lister Institute in London under Dr. H. H. (now Sir Henry) Dale for a short period, and then became acting professor of physiology at Adelaide for a short time. In 1920 he was in England again as a Foulerton Scholar of the Royal Society. He worked at the National Institute for Medical Research and at University College Hospital, London. He returned to Australia as director of the Walter and Eliza Hall Institute, Melbourne, in 1923. During the Second World War he was director of pathology for the Australian Medical Services and later scientific liaison officer with D.G.A.M.S. In 1944 he retired with the rank of brigadier and became director-in-chief of research to the Wellcome Foundation, Ltd.

Kellaway's main interest in scientific work was initiated by his collaboration with Dale on the mechanism of anaphylaxis, and through most of his work he returned to the problem of cell damage and the associated release of histamine and similar substances. He was a pharmacologist working in the field of experimental pathology. The Hall Institute was closely connected with the Melbourne Hospital, to which Kellaway was appointed specialist physician, and consequently most of his research there was related with practical medicine. He worked on hydatid antigens and intradermal tests in the diagnosis of hydatid disease, on renal infection and hypertrophy. He studied intensively the pharmacology of the venom of the numerous Australian colubrid snakes, including many not previously studied, and extended his researches to the venom of spiders, the bee and the duck-billed platypus. He produced antivenoms in horses to several of the larger Australian snakes and collected venom from the snakes himself. In the course of this work he was once bitten by a tiger snake. His life was probably saved by the injection of antivenom; but he nearly died from serum reaction. He was one of the world's leading authorities on snake venoms. He continued his work on anaphylaxis and the histamine problem; one of his last personal investigations was conducted with collaborators on the pharmacological action of the toxins of the *Clostridium welchii* group,

particularly in reference to the action on the pulmonary circulation. This was a good example of the application of physiological methods to experimental pathology; evidence was obtained that histamine, or a substance pharmacologically similar, was a link in the chain of action of the toxin.

Concurrently with all his personal research, Kellaway steadily developed the work of the staff of the Hall Institute. He had a gift for choosing able workers, and for fostering them. In the 'thirties, virus work was started under the present director, Sir Macfarlane Burnet; research on the Q fever virus is one of the outstanding examples of the growing importance of the Hall Institute. All the time Kellaway had considerable anxiety for the Institute on the financial side, for its original endowment was not large by modern standards; but by unceasing efforts he persuaded the Government, the Rockefeller Institute and other semi-official bodies and various private donors to increase the resources at his disposal, and before he left he had succeeded in getting erected for the Institute a beautiful modern building in close proximity to Melbourne Hospital. In addition to all this, with the growth of his personal reputation, his wise counsel was increasingly sought on pathological matters for the Government. He was, for example, appointed chairman of the commission which investigated the death of some children at Bundaberg from poisoning with the until then unknown staphylococcal toxin, which had developed in an accidentally contaminated injection of prophylactic.

Kellaway was elected a Fellow of the Royal College of Physicians in 1928, Foundation Fellow of the Royal Australasian College of Physicians in 1938 and Fellow of the Royal Society of London in 1940. He received the Walter Parfitt Prize of the Royal Society of New South Wales in 1932.

During the Second World War, the Hall Institute diverted its work into researches on influenza, scrub typhus, Asiatic schistosomiasis, blood typing and transfusion, drying of serum and other problems of direct importance in war; and in spite of his official duties with the Army, Kellaway continued to control its activities. When he accepted the post of director-in-chief of research to the Wellcome Foundation, Ltd., in 1944, he had the satisfaction of having brought the Hall Institute into the front rank of the world's medical institutes, and he had complete

confidence that he was leaving the Institute to the care of an outstanding successor—one of his own men.

In the Wellcome Foundation, Kellaway was responsible for the research policy of the organization in Great Britain, and acted in an advisory capacity for the research activities of the American subsidiary company in Tuckahoe, U.S.A. He had under him the directors of the Wellcome Laboratories for Tropical Medicine, of the Research Laboratories at Beckenham and of the Museum of Medical Science and of the Museum and Library for the History of Medicine. While delegating much to his colleagues, as was inevitable, he kept very close interest in all their activities. He found time to serve on outside scientific committees, where he was often in demand because of his own reputation. His particular interest in the Foundation was the development of chemotherapeutic research; an intensive drive for the discovery of new compounds of therapeutic importance was started. What is perhaps the most important result so far is the drug sold as 'Daraprim', which seems likely to be of considerable importance as a suppressive drug for malaria. This came as a result of collaboration between the Foundation laboratories in Tuckahoe and London. It was Kellaway who first brought these laboratories to close collaboration.

The field in which he now worked was very different from that in which he had worked. But the way in which he adapted himself to his new responsibilities was a tribute to his wide knowledge and versatility, and he carried the organization successfully through some very trying times.

Kellaway was an attractive character. His boyish enthusiasm, his kindness to his colleagues and his discerning courtesy to his lowliest subordinate, combined with his resoluteness and reliability and his power to see another point of view, stirred affection and respect in all who worked with him. His courage in his last illness will be an abiding memory for those who witnessed it. Our sympathy goes out to his wife and three sons.

J. W. TREVAN

WE regret to announce the following deaths:

Prof. W. H. Hobbs, emeritus professor of geology in the University of Michigan, aged eighty-eight.

Prof. F. E. Weiss, F.R.S., emeritus professor of botany in the University of Manchester, on January 7, aged eighty-seven.

## NEWS and VIEWS

### Royal Astronomical Society: Awards

THE following awards of medals have been made by the president and Council of the Royal Astronomical Society: *Gold Medal of the Society*: Prof. S. Chandrasekhar, for his contributions to mathematical astrophysics; *Eddington Medal*: Canon G. Lemaître, for his work on the expansion of the universe; *Jackson-Gwilt Medal and Gift*: Mr. J. P. M. Prentice, for his contributions to the study of meteors.

### Royal Photographic Society: Centenary Celebrations

ON January 20 the Royal Photographic Society will celebrate the hundredth anniversary of its formation, and to mark the day there will be a special ceremony at 11 a.m. in the Society's house at 16 Princes Gate, London, S.W.7, when the president

of the Society will receive the representatives of a large number of other societies and kindred organizations. At 3.30 p.m. in the house of the Royal Society of Arts in John Adam Street, London, W.C.2, exactly a hundred years later to the very hour and in the same place where the inaugural meeting of the Royal Photographic Society was held, Mr. Bertram Sinkinson, vice-president, will give a lecture entitled "The Centenary of the Royal Photographic Society", in which he will reconstruct the atmosphere surrounding the Society's inception and give historical details of the incidents which led to these events. Mention will be made of the great part played by the first officers of the Society, namely, Sir Charles Eastlake, president, and Roger Fenton, honorary secretary, and the support given to them by the many ardent pioneers of photography at that time, including