magnetic effect of the spin of the electron, is necessary to give a quantitative theory adequate for low-temperature research. Future developments, in the way of even lower temperatures, involve an even greater reliance on quantum mechanics as a guide to the interaction between the magnetism of nuclei and the thermal motion of the lattice, through which the attainment of these very low temperatures is to be effected.

It will be seen from this very brief survey that modern low-temperature research derives its chief interest from the impetus of the quantum theory. It is difficult to separate the old and the new quantum theory in this development. The old theory was adequate for the theory of the specific heats of solids, and up to a point for the understanding of gas degeneracy and magnetism; the new theory is required for a quantitative explanation. Ortho- and para-hydrogen, on the other hand, could scarcely have been intelligible in terms of the old theory. In the theory of metals, the specific heat could have been understood on the old theory, supplemented by Pauli's principle (actually contemporaneous with the birth of the new quantum mechanics, but independent of it); but conductivity can only be fully understood in terms of the new. Quantum mechanics, in its modern form, is certainly necessary for the understanding of those phenomena connected with extreme degeneracy, in which macroscopic systems exhibit quantal features usually only found in the atomic domain, such as superconductivity and helium II. Much has been learnt in twenty-five years; but the subject is not closed, and there are still many promising lines of research to follow, though it would perhaps be too optimistic to hope that any revolutionary development of physical theory will come from low-temperature research.

OBITUARY

Sir Sidney Harmer, K.B.E., F.R.S.

THE death of Sir Sidney Frederick Harmer on October 22 after long years of disability removed the last survivor of a remarkable group of naturalists on the staff of the University of Cambridge in the closing decades of the past century: Alfred Newton, Adam Sedgwick, Bateson, Gadow, Harmer, Hickson, Sharp —all of them fellows of the Royal Society—each one of them, by original research, teaching and personal influence, playing an important part in the advancement of zoological science.

Born in Norwich in 1862 with a heritage of ability which had found expression in his father's rise to high position in business and in public affairs, Harmer had the further advantage of a childhood spent in an atmosphere of interest in science, his father being an enthusiastic student of the palæontology of East Anglia. His formal training in zoology was initiated at University College, London, and carried forward at Cambridge, where in due course he obtained first-class honours in the Natural Sciences Tripos, Parts 1 and 2, a University lectureship in zoology, and a fellowship of his College (King's). In 1891 he succeeded J. W. Clark as superintendent of the University Museum of Zoology.

As a University teacher, Harmer's duties were concerned with the advanced training of students who had already obtained honours in Part 1 of the Tripos. His teaching was admirably designed to give a balanced and judicial summary of existing knowledge of the particular section of the animal kingdom with which he was dealing, while at the same time inculcating these ideals to be aimed at in all scientific work—industry, patience and accuracy in observation, clarity and precision in record, and abhorrence of hurried clutching at results. Harmer's capacity as a teacher is well brought out by his section, "Polyzoa", in the "Cambridge Natural History", of which great work he acted as joint editor with Shipley. His admirable articles in the "Encyclopædia Britannica" —more especially those on Polyzoa and Cetacea— provide further testimony to this capacity.

In the field of original research, Harmer's Cambridge activities were specially concentrated upon the Polyzoa; he adhered loyally to J. V. Thompson's name for the group in spite of the more general use of Ehrenberg's "Bryozoa". His long series of memoirs on the classification, morphology, physiology and distribution of the Polyzoa brought him world-wide recognition as perhaps the leading authority on the group. Almost at the beginning of the series is his remarkable work on *Pedicellina*, while its culmination is found in his report upon the Polyzoa of the *Siboga* Expedition, which he regarded as the most important of all his works.

An important side-issue of Harmer's work on the Polyzoa was his investigation of a remarkable little animal, *Cephalodiscus*, first obtained by the *Challenger* Expedition. At first regarded as a compound Ascidian, it was later thought to be a polyzoon, and as such came under the notice of Harmer, who as a result of detailed investigation demonstrated the surprising fact that *Cephalodiscus* was no polyzoon but rather an ally of *Balanoglossus*, and therefore of the Chordata.

During Harmer's later years in Cambridge, his teaching and research activities were encroached upon by the administrative work falling to the superintendent of the Museum of Zoology. In this post he was a great success, combining the acquisitive instincts proper to the museum curator with the greatest care in classifying and cataloguing, and the scrupulous conscience which regarded gifts to the Museum as sacred even when they no longer roused particular topical interest.

Harmer's reputation as superintendent of the University Museum of Zoology led to his appointment in 1907 as keeper of zoology in the British Museum (Natural History), this in turn leading up to his appointment in 1919 as director of the Natural History Museum. His appointment followed the publication in *The Times* of March 1 of that year of a letter signed by twenty-two leading men of science, with a relevant leading article, inspired by leakage of a recommendation by the general body of British Museum trustees to the three principal trustees (the electoral body) that they should appoint as director a layman, the very efficient assistant secretary.

The directorship of the Natural History Museum, involving the official leadership of British naturalists, meant inevitably the broadening out of Harmer's activities over an area which cannot be adequately covered in the space here available. Outstanding among them must be mentioned his vice-chairmanship of the "Discovery" Committee, one result of which was to revive and intensify his old interest in the Cetacea. An important outcome of this was his organizing machinery for reporting, through the

coastguards and receivers of wrecks, all strandings of whales noted around the coasts of Britain. This led to a great increase in the amount of material available for study by specialists on the Cetacea, and as a result to important advances in knowledge. Mention must also be made of Harmer's long and active interest in the Marine Biological Association and the work of the Plymouth laboratory.

On retiring from the directorship of the Museum in 1927, Harmer was able to concentrate upon his *Siboga* Report, of which Parts 1 and 2 had appeared in 1915 and 1926. Parts 3 and 4 were duly completed, but the text and illustrations of Part 4 unfortunately reached Holland just before the German occupation of that country, and their supposed loss was a blow from which Harmer never really recovered. When eventually news came of their safety, it was too late to bring relief. Happily they are now in the capable hands of Dr. Anna Hastings, and the publication of this concluding part of Harmer's great work should not be long delayed.

Harmer's last years were spent at Melbourn and then at Cambridge, where he died. He is survived by his wife, Laura, daughter of A. P. Howell, and by their son and daughter.

His scientific work received wide recognition. He was knighted in 1920. Elected a fellow of the Royal Society in 1898, he served on the Council and was vice-president during 1922–24. Fellow of University College, London; honorary fellow of King's College, Cambridge; president of the Linnean Society of London; foreign member of the Norwegian and Swedish Academies; honorary member of the Boston Society of Natural History and the Société Zoologique de France; gold medal of the Linnean Society of London; these were among his long list of distinctions. JOHN GRAHAM KERR

NEWS and VIEWS

Nobel Prize for Chemistry for 1950: Prof. O. Diels and Prof. K. Alder

THE Nobel Prize for Chemistry for 1950 has been awarded jointly to Prof. Otto Diels and his former pupil, Prof. Kurt Alder, for their work on the diene synthesis. This award will be acclaimed by organic chemists generally as a fitting acknowledgment of one of the outstanding achievements of organic chemistry. The names of Diels and Alder will be inseparably linked in the annals of chemistry, and their combined names with the diene synthesis which they developed. Prof. Diels, who will shortly celebrate his seventy-fifth birthday, has been professor of chemistry at the University of Kiel since 1916. Prof. Alder now occupies the chair of chemistry and chemical technology in the University of Cologne. Their first paper on the reaction of dienes with quinones was published in 1928. Similar additions had already been recorded by other workers, and in particular by von Euler and Josephson, who in 1920 described the reaction of isoprene with benzoquinone and correctly formulated the product. It was Diels and Alder, however, who provided the first experimental proof of the nature of the reaction and who appreciated and demonstrated its wide application to the synthesis of ring compounds of many types. The ease with which the diene synthesis occurs, without the need for powerful chemical reagents, is one of its most remarkable features, and study of the reaction has also contributed greatly to knowledge of polymerization processes by which plastic materials of great practical value have been obtained. It is probable that many plant products are formed in Nature by diene additions. Prof. Alder, who is still actively working on the diene synthesis, has made important contributions to the stereochemistry and the energetics of the process. Prof. Diels is also noted for his work on other aspects of organic chemistry, and in particular for his studies on cholesterol, which culminated in his discovery of the method of dehydrogenation with selenium.

Royal Society: Medal Awards for 1950

H.M. THE KING has been graciously pleased to approve recommendations made by the Council of the Royal Society for the award of the two Royal Medals for 1950 as follows: Sir Edward Appleton, for his work on the transmission of electromagnetic waves round the earth and for his investigations of the ionic state of the upper atmosphere; Dr. C. F. A. Pantin, for his contributions to the comparative physiology of the Invertebrata, particularly his work on nerve conduction in Crustacea and Actinozoa.

The following awards of Medals have been made by the President and the Council of the Royal Society: Copley Medal to Sir James Chadwick, for his outstanding work in nuclear physics and in the development of atomic energy, especially for his discovery of the neutron; Rumford Medal to Air Commodore Sir Frank Whittle, for his pioneering contributions to the jet propulsion of aircraft; Davy Medal to Sir John Simonsen, for his distinguished researches on the constitution of natural products, especially the plant hydrocarbons and their derivatives; Darwin Medal to Prof. F. E. Fritsch, for his distinguished contributions to the study of algology; Hughes Medal to Prof. M. Born, for his contributions to theoretical physics in general and to the development of quantum mechanics in particular.

Royal Observatory, Cape of Good Hope: Dr. J. Jackson, F.R.S.

DR. JOHN JACKSON has recently retired from the post of H.M. Astronomer and Director of the Royal Observatory, Cape of Good Hope. Dr. Jackson was appointed chief assistant at the Royal Observatory, Greenwich, in 1914. He edited the double-star observations made at Greenwich, which he used together with observations elsewhere for the investigation of the orbits of many binaries and for the determination of dynamical parallaxes. In conjunction with Mr. Bowyer he made a study of the performance of the Shortt free-pendulum clocks; the effect of the short-period nutation terms was shown, and it became necessary to introduce the conception of mean or uniform sidereal time. The reduction, jointly with Dr. H. Knox-Shaw, of the observations made by Hornsby at the Radcliffe Observatory, Oxford, in the years 1774–98 was an important contribution to fundamental astronomy. In 1933 Dr. Jackson was appointed H.M. Astronomer at the Cape, and has fully maintained the high traditions of that important southern Observatory. The stellar parallax programme and the photographic determinations of star places were vigorously continued.