

At the end of the War, Harrison returned to Sydney to the post of lecturer in zoology, and on the death of Prof. S. J. Johnston in 1920, became acting professor, and two years later succeeded to the Challis chair, so long occupied by his distinguished teacher, the late Prof. W. A. Haswell. At the time of his death he was president of the Linnean Society of New South Wales and a member of the Board of Trustees of the Australian Museum, in the affairs of both of which he took a very active interest.

Harrison's scientific work covers a wide field and is of great general interest. As an undergraduate he had already in 1911 read a paper before the Science Society on "The Taxonomic Value of Certain Parasites," in which he discussed the possible value of the parasites in question (the biting lice or Mallophaga which occur on birds and mammals) in the determination of the phylogenetic relationships of their hosts. This same thesis had been put forward by Kellogg in 1896, also in the case of the Mallophaga of birds, and by Zschokke when dealing with the cestodes of South American and Australian marsupials. It formed the main-spring of Harrison's best work, and he selected it under the title of "Host and Parasite" as the subject of his presidential address to the Linnean Society of New South Wales. This address, which he was destined not to deliver, is a most interesting and masterly survey of the whole field of host-parasite relations, in which his own observations (embodied in a series of scattered papers), as well as those of others, are summarised and discussed. His general conclusion is that parasites may quite justifiably be used to aid in the solution of phylogenetic and other problems affecting their hosts. The address (*Proc. Linn. Soc. N.S.W.*, vol. 53, part I.) is worthy the attention of all zoologists.

As the direct outcome of his work in this field, Harrison became keenly interested in the problems of geographical distribution, and in a series of papers dealing with the migration route of the Australian marsupials and the composition and origins of the Australian fauna, he supported the Antarctic radiation theory and contended that Wegener's hypothesis of the origin of continents is the only one which provides a satisfactory explanation of the facts of distribution (Pres. Address, Sect. D, A.A.A.Sci., Perth, 1926). In 1925, with Miss Claire Weekes, he gave an interesting account of the placentation of the lizard, *Lygosoma entrecasteauxi*, a field of investigation which is being worked by Miss Weekes with conspicuous success.

At the time of his death, Harrison had much unpublished work on hand, notably a taxonomic study of the Ischnoceran Mallophaga and a revision of the Australian frogs, and he had begun the study of a rich collection of developmental material of *Ornithorhynchus*, procured for the Department of Zoology at Sydney by Mr. Harry Burrell. We venture to express the hope that steps will be taken to ensure that his observations on this priceless material are completed for publication, with adequate illustrations.

Harrison was a man of distinctive and vigorous personality, wide in his outlook and interests. He had the capacity of inspiring his students with the research spirit, and not the least of his services to Australian zoology was his establishment of a vigorous research school in Sydney. Though often incapacitated by attacks of acute arthritis, he carried on his work with cheerful fortitude to the end, which came quite suddenly as the result of cerebral hæmorrhage. We tender our sympathy to his widow (Amy E. Mack), who shared so largely in his interests and in his life's work. J. P. H.

News and Views.

THE past week has witnessed the three-hundredth anniversary of the birth, on July 12, 1628, of Henry Howard, who, in 1677, became sixth Duke of Norfolk, on the death of his brother Thomas. The Royal Society recalls him as the donor of a great library of rare books and manuscripts; the University of Oxford for the bestowal of the Arundel marbles. Originally the library was at Arundel House, in the Strand; afterwards at Gresham College. Howard was elected a fellow of the Royal Society on Nov. 28, 1666, through his acquaintance with John Evelyn. Many important influences were in fact established by means of the friendship. Evelyn himself tells us that it was at his instigation that Mr. Howard granted the Society use of rooms in Arundel House, whilst Pepys writes, under date Jan. 9, 1667, "To Arundel House, when first the Royal Society meet by the favour of Mr. Henry Howard, who was there. And here was a great meeting of worthy noble persons; but my Lord Brouncker, who pretended to make a congratulatory speech upon their coming hither, and great thanks to Mr. Howard, did do it in the worst manner in the world."

HOWARD had travelled much before the Restoration, and in the year 1645 had met Evelyn at Venice. Finally, in 1655, he settled at Albury, Surrey, a home at which the diarist was a frequent visitor. In 1662—the year of incorporation of the Royal Society—Howard's first wife died, and for long he was subject to melancholia, and given to dissipation. The strictures of Evelyn as to Howard's neglect of notable and choice inherited possessions were doubtless well deserved, but in kindly extenuation we suggest that this indifference was the reflex of his unhappy moods and habits. In 1664, Howard left London for Constantinople. An entertaining account of his doings was published by one, John Burbury, in 1671, entitled "A Relation of a Journey of Lord Henry Howard (afterwards Duke of Norfolk) from London to Vienna, and thence to Constantinople," 12mo. In 1669, Howard went as ambassador-extraordinary to Morocco. In 1677, the year previous to a second marriage, he succeeded his brother Thomas as the sixth Duke of Norfolk. He died on Jan. 11, 1684, and was buried at Arundel. There is a portrait of Henry Howard, by Sir Peter Lely, in the National

Portrait Gallery, and an engraving from this portrait is also in existence.

DURING the past thirty years the centre of interest in zoology has moved from classical morphology to those studies concerned with function which are carried out on living animals. Experimental morphology, genetics and the cytological studies which are linked up with it, animal behaviour and the very varied investigations which may be called comparative physiology, now form the great bulk of the zoological work of the world. These investigations have to be carried out under controlled conditions, maintained by methods which have to a considerable extent been discovered by physiologists. The interpretation of their results demands a wide knowledge of other sciences; both physics and bio-chemistry are constantly involved, physiological conceptions form the foundation of many lines of research, and psychology and neurology have the most intimate association with the study of animal behaviour. Thus a modern zoological institute must make provision for keeping animals alive, in good health and under controlled conditions. Its staff must include men who have very varied interests and a familiarity with the methods and ideas of many other sciences. Its work will be made much easier if it be housed in the closest association with active schools of chemistry, physiology, anatomy, and psychology, so that first-hand information about these sciences is always available.

THE conditional gift of £120,000 to University College, London, which has recently been announced, is intended to enable that institution to carry out a scheme for the establishment and endowment of a modern department of zoology, comparable in size with the existing departments of physiology and anatomy. It is intended to erect a suitable new building directly continuing that in which anatomy is housed and to provide the necessary equipment. The staff of the department of zoology will be enlarged by the addition of professors of genetics and comparative physiology, and readers in cytology and animal behaviour, and full provision will be made for the necessary technicians and for the heavy expenses of modern zoological work.

THE attempts to rescue the Italian airmen stranded by the wreck of the *Italia* off North-East Land, Spitsbergen, continue, and search is also being made for the lost French aeroplane with Captain Amundsen on board. General Nobile, who was rescued by aeroplane from the pack-ice, has made a statement, published in the *Times*, about the probable cause of the disaster. Although he had a suspicion that one of the valves in the stern of the airship was leaking, he thinks that the wreck was due to a tear in the envelope. After the *Italia* struck the ice and several of the crew and a considerable weight of material were thrown out, it rose rapidly and disappeared among the clouds to the south-east. General Nobile does not think that the *Italia* could have remained in the air more than an hour longer or travelled more than twelve to eighteen miles. This indicates

the area that should be searched for the missing men. Twenty minutes after the accident a column of dense black smoke was seen by several of the crew on the horizon to the east. If this was the burning airship, there is no hope for the men on board. It may, however, have been caused by burning oil and petrol if the tanks had been thrown overboard in order to act as a brake on the fall of the ship. General Nobile inclines to this view, and hopes that the wreck of the vessel may still be found with the men alive; but the hope is faint.

A BRIEF account is given in the *Times* of July 2 of the *Palio* festival held at Siena on the preceding day. This year the procession was particularly splendid. New 'properties' had been provided. Representatives of the seventeen streets marched in procession, on this occasion for the first time with representatives of the old military companies which existed before the fall of the old Republic. A new ox-drawn cart took the place of the old *carroccio*. It was decorated with allegorical banners, and bore the old standard of the commune and four *biccharina*, the magistrates who once presided over all festivals. Horses representing ten out of the seventeen streets competed for the silken banner and silver plate. The Sienese *Palio* is one of the best known of the summer processions of the Italian towns. The *Palio* from which it takes its name is a canopy which used to be presented by one of the lords of the town as the civil contribution, just as the *Ceri*, huge poles of wood, wax, or other material, to which a phallic origin has been attributed, were the contribution of the ecclesiastical authority. The *Palio* is thought to be the cloth with which the image of the god was covered when it was carried in procession around the commune in the pagan ceremony from which these processions are descended. The *Carroccio*, which is always the principal feature, was in early times the holy war chariot of the community, which, after being blessed by the Church, always headed the warlike expeditions of the State. It is usually regarded as a survival of the cart in which the Aryan-speaking peoples, we are told, carried their gods. It is not without significance that dolls were sometimes attached to the cardboard *Ceri* of Florence.

THE annual special issue of *The Chemist and Druggist*, published on June 30, contains, in addition to its usual items, a number of interesting articles relating to the history of medicine and pharmacology. Dr. Charles Singer contributes a paper on Celtic and Anglo-Saxon medicine and pharmaceutical practice from the ninth to the thirteenth centuries, in which he gives an account of the ancient leech books, sympathetic magic, and Anglo-Saxon medicine, including plant lore. Among the numerous excellent illustrations accompanying the article, special attention may be directed to two beautiful coloured plates, one showing the debt of Anglo-Saxon medicine to the classics and portraying Cheiron the Centaur receiving the Book of Wisdom for Plato in Saxon costume, and the other representing pharmaceutical processes in a MS. of the early thirteenth century. A short paper

by Mr. Howard Bayles on an Elizabethan chemist is illustrated by a transcript of the earliest known reference to a chemist in business contained in a letter dated 1596, by John Delabere, an Oxford physician. Mention may also be made of anonymous papers on Raleigh's chemical and galenical experiments with facsimiles of the recipes prepared by him during his imprisonment in the Tower of London, a sketch of the history and development of the drug trade in London from the time of the Roman Empire until the present day, accompanied by numerous contemporary prints, and notes on the history of Cheltenham, which is to be the seat of the British Pharmaceutical Conference on July 23.

THE Mexican earthquake of June 16, which all reports describe as very severe (NATURE, June 23, p. 994), originated, according to the U.S. Coast and Geodetic Survey, in a centre in 14° N. lat., 95° 5' W. long. (*Daily Science News Bulletin*, No. 378 A, Science Service, Washington, D.C.). This point lies in the Pacific Ocean, about 125 miles south of the coast of the State of Oaxaca, not far from the isthmus of Tehuantepec, in which great damage is said to have occurred, and 460 miles from the city of Mexico, where some poorly built houses were injured. The Survey also reports a severe earthquake on Mar. 22 in a centre not far from the above, and two other shocks in the same region on April 13 and 17. One of the latter broke open a tomb in the city of Monte Alban, near Oaxaca, revealing valuable jewels, which it is believed will throw light on the prehistoric races of the country.

THE Nederlandsche Chemische Vereeniging is celebrating the twenty-fifth anniversary of its foundation on July 15-17, and we offer the Society our hearty congratulations and good wishes for a successful meeting. The festivities will take place at The Hague immediately before the meeting of the International Union of Pure and Applied Chemistry. The president of the Nederlandsche Chemische Vereeniging is Prof. S. C. J. Olivier (Wageningen), and the honorary secretary is Dr. A. D. Donk (Haarlem). Honorary membership is to be conferred at the anniversary meeting on several foreign chemists, including Prof. F. G. Donnan, professor of general chemistry in the University of London. It will be remembered that the activities of this important association include the publication of two valuable chemical journals, the *Chemisch Weekblad* and the *Recueil des Travaux chimiques des Pays-Bas*.

AN expedition to the Labrador coast and Davis Strait in connexion with the Ice Patrol of the U.S. Coast Guard is announced in a recent *Daily News Bulletin*, issued by Science Service of Washington, D.C. The steamer *Marion*, under Lieut.-Com. E. H. Smith, U.S.N., will carry this oceanographical expedition, which will be principally concerned with studying currents, in the hope of throwing more light on the drift of icebergs. It is also announced that the Danish Government steamer *Godthaab*, in command of Com. Riis-Cartensen, will be conducting oceanographical work this summer in West Greenland waters.

A MELANCHOLY interest attaches to the paper "On Some Biological Principles" (*Kgl. Danske Vidensk. Selskab.*, Biol. Meddel., 7, 2; Copenhagen, 1928) by Dr. C. G. Joh. Petersen; it was his last work, and marks the end of a long and distinguished career. Since retiring a year or two ago from the directorship of the Danish Biological Station and from active participation in the fishery researches in which he was an acknowledged pioneer and master, Dr. Petersen paid close attention to the philosophical side of biology, and worked out for his own satisfaction a viewpoint which for the time being he felt to be adequate. This point of view is stated in his paper with that simplicity, clarity, and directness which was so characteristic of the man. Dr. Petersen was greatly impressed by the philosophy of Huxley: he held that the mechanistic method should be pushed as far as it would go, and that as a method, it was more strictly 'scientific' than any other. He recognised, however, that it had severe limitations, and he urged that it must be supplemented by the 'principle of the whole,' which he understood much in the sense established by Kant. This principle could not, he considered, be used for explanation, but only for description and orientation. He held, nevertheless, that it was of great importance and wide application in descriptive biology. He admitted also a third point of view—the psychological—but considered this applicable only to the study of the behaviour of the higher animals, and even there to be used with caution. His paper is one which should be read by all who are interested in the question of biological method. It is the adventure in philosophy of a biologist of long experience and great breadth of view.

AN international illustrated fertiliser review, under the title *Superphosphate*, is being issued by the Superphosphate Manufacturers' Association as a monthly journal. Hitherto the Association's publications have not been available to the general public, its object having been to convey information to its members only. The present aim, however, is to provide a journal by means of which all agricultural scientific workers and practitioners may become acquainted with the work carried out at the Hamburg-Horn Experimental Station, and further to quote the more important information with regard to the utilisation of superphosphate and compound fertilisers from the official reports of the various chemical agricultural research stations of the world. In the first number, a detailed account is given of the comparative pot experiments carried out at Hamburg-Horn with superphosphate and various compound phosphatic fertilisers, barley and oats being the crops grown. The development of the plants is traced from germination to harvest, the superiority of those dressed with superphosphate being made clear throughout. A continuation of this report is to be given in the next number, where it is to be hoped that some form of tabulated summary will be appended, as the reader will find some difficulty in making a general review of the work as it is in diary form. Two lectures on the phosphoric acid question, delivered

at the 1928 meeting of the German Agricultural Society at Berlin, are reported, and notes of interest from other sources quoted. The journal is calculated to reach a cosmopolitan circle of readers, since it is published in columns of English, French, and German.

THE issue for June of *Antiquity* fully maintains the high standard in editing and in the interest and quality of its contributions, which so soon have gained for this periodical a place unique among magazines dealing with scientific subjects. It appeals to laymen without special knowledge, as well as to the scientific worker who wishes to keep abreast of recent developments outside his own special branch. In this issue Dr. D. Randall-MacIver continues his study of the early civilisations of Italy, a paper to which fuller reference is made elsewhere in this issue (p. 72), and Admiral Somerville describes two dolmens in the neighbourhood of Tours. Mr. Eric Thompson discusses the 'diffusionist' theory in relation to Central America, concluding that if extravagances are ignored, there is a case to be met, and that there are elements in late old empire times which have an Asiatic air when stripped of their purely Maya features. Mr. O. G. S. Crawford writes on 'Our Debt to Rome?' tracing the history of Cranborne Chase and Grovely Forest from early to Elizabethan times, in relation to the question of continuity through the hiatus between A.D. 400 and A.D. 600. Excavations at Cyprus are described by Dr. Einar Gjerstad, and at Beisan by Dr. Alan Rowe. Mr. George H. Bushnell contributes an article on the Alexandrian Library. Some excellent notes on current and recent events in the archaeological world, and a number of reviews, complete a highly interesting number.

THE annual conference of the German Bunsen-Gesellschaft für angewandte physikalische Chemie was held in May at Munich under the presidency of Dr. A. Mittasch of Ludwigshafen. The retiring president, Prof. K. Fajans, opened the proceedings on May 17, and during the next two days more than forty papers were read on subjects which covered a very wide range. Useful abstracts of many of these communications will be found in the *Chemiker-Zeitung* for May 26 and June 2. Prof. Sommerfeld lectured upon the use of atomic models, whilst many of the papers dealt with the various types of chemical combination, viewed under widely different aspects. Thus Dr. N. V. Sidgwick lectured on co-ordination and the electronic theory of valency, whilst Dr. F. Hund discussed combination from the point of view of the quantum theory. Prof. Debye dealt with electric moments of molecules and intermolecular forces, and also with the conductivity of strong electrolytes. Prof. Scheibe examined the evidence obtained from light absorption, whilst X-ray spectra were dealt with by Dr. O. Stelling, electrical conductivity by Prof. v. Hevesy, and the deformation of ions and molecules as deduced from refractometric measurements by Prof. Fajans. Amongst the many other topics were papers by Prof. Hönigschmidt on the atomic weight of silver, by Dr. Noddack on the chemistry of rhenium, and by Prof. Paneth on the age of meteorites

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calculated from their content of helium. Prof. Bodenstein of Berlin was elected to preside at next year's annual conference to be held in Berlin.

It was in September 1852 that Foucault first showed the Paris Academy of Sciences how the rotation of the earth affected a gyroscope, and for half a century afterwards the gyroscope remained nothing but a piece of scientific apparatus. Its practical development has taken place in the last twenty-five years, and it is to-day used for navigation, for gunnery, for torpedoes, and for stabilisers. Ships are nowadays actually maintained on their course by the gyro compass itself, and in a recent issue of the *Sperry-scope* it is stated that the s.s. *Pulpit Point* was kept on her course, S. 38° W., from San Francisco to Auckland during a voyage of 21 days entirely by the gyro compass. In the same issue is a note on the world's largest motor yacht, *Savarona*, 294 feet long, 2200 tons displacement, which during its maiden trip from the Delaware River encountered a severe gale, during which the rolling of the vessel was reduced from 26° to about 6° by means of the gyro stabiliser. In this vessel a gyro compass is used for navigating, the gyro stabiliser reduces the rolling, a small gyroscope controls the stabiliser, and on the trial a gyro-roll recorder, designed about fifteen years ago, recorded the rolling.

IN 1875, Prof. W. C. McIntosh published a volume entitled "The Marine Invertebrates and Fishes of St. Andrews," which has been of much use to successive generations of Scottish marine zoologists. Now, after the lapse of more than half a century, the veteran author, with help from some of his pupils and other friends, has compiled a volume of "Additions to the Marine Fauna of St. Andrews since 1874" (London, 1927). Like its predecessor, this volume is largely reprinted from papers that have appeared in the *Annals and Magazine of Natural History*. The three coloured plates illustrate some of the more striking forms that have occurred in the plankton. Naturally, some groups have received more attention than others. Prof. McIntosh's notes on the annelids are, of course, especially valuable, Mr. E. T. Browne has assisted in compiling the list of Coelentera, and Dr. W. Nicoll contributes an important list of parasitic worms, with the names of their hosts.

IN commemoration of the gift of £200,000 by the late Mr. H. H. Wills for the erection of the new Physical Laboratory in the University of Bristol, the Council has decided to found a Henry Herbert Wills Memorial Lecture in Physics to be delivered annually in the University. Sir J. H. Jeans has consented to give the first lecture, for which the date, Oct. 30, has been provisionally fixed.

REFERRING to a remark in the review of Forel's "The Social World of the Ants compared with that of Man," published in *NATURE* of May 26, Mr. J. B. S. Haldane points out that the observation that the size of insects is limited by their respiratory system, which works by diffusion, which was attributed to him by Prof. J. S. Huxley, was due to Prof. August Krogh.

THE Hector Medal and Prize of the New Zealand Institute for 1928 has been awarded to Prof. D. M. Y. Sommerville, of Victoria University College, Wellington, for his general mathematical work and for his investigations in non-Euclidian geometry. The medal is given yearly for distinction in different branches of science in rotation, in memory of the late Sir James Hector. This year the subjects of award were astronomy, mathematics, and physics.

THE Council of the Institute of Metals has accepted an invitation from the Verein Deutschen Ingenieure and the Deutsche Gesellschaft für Metallkunde to hold next year's autumn meeting of the Institute at Düsseldorf, in Germany. Düsseldorf is so readily accessible, and so full of interest for metallurgists, that the meeting, the first to be held in Germany by the Institute of Metals, is certain to be well attended and successful, supported as it will be by powerful German technical societies and by a large and enthusiastic German membership.

At a meeting held on July 3, the council of the Institution of Professional Civil Servants unanimously adopted the following resolution: "The Council of the Institution of Professional Civil Servants, realising that the construction and maintenance of the architectural and engineering works controlled by Government Departments calls for the employment of highly qualified and experienced quantity surveyors, is of opinion that the attempt of the Air Ministry to recruit Assistant Surveyors from candidates who are below the age of 25 and are not required to have obtained, by examination the appropriate professional diploma in quantity surveying, is calculated to lower the status of the surveying profession in the Civil Service and is contrary to the public interest."

THE thirteenth International Physiological Congress will meet at the Medical School of Harvard University, Boston, Massachusetts, on Aug. 19-23, 1929. The Federation of American Societies for Experimental Biology, which comprises the American Physiological Society, the American Society of Biological Chemists, the American Society for Experimental Pathology, and the American Society for Pharmacology and Experimental Therapeutics, will be hosts to the Congress, and Prof. William H. Howell, of Johns Hopkins University, will be the president. The arrangements for the Congress are in the hands of Prof. Walter B. Cannon, of the Harvard Medical School, who is chairman of the Congress Bureau, and Prof. Edwin J. Cohn and Alfred C. Redfield, who are the secretaries.

THE second International Congress of Radiology is to be held during this present month at Stockholm. There is little doubt that this will prove to be a very important gathering of X-ray workers from all parts of the world. In conjunction with the Congress an exhibition of apparatus is to be held in the Parliament House at Stockholm, and an important feature will be an exhibit of British-made X-ray apparatus, which is being contributed by the leading firms in this industry. Considerable importance is attached to this

exhibit, for it is the first occasion on which it has been possible for British manufacturers to show their products on a large scale at such a congress outside Great Britain. The X-ray apparatus industry was, up to 1914, mainly in the hands of other countries. Since that time it has become established in England, and the present occasion gives indication of its steady growth and of the hope that at no distant future, Great Britain and the British Empire will be self-supporting in this important branch of scientific investigation. Particulars of the Congress can be obtained from the British Institute of Radiology, 32 Welbeck Street, London, W.1.

A USEFUL survey and index of statistics appearing in official publications issued in 1927 is provided by volume 6 of the annual *Guide to Current Official Statistics* issued by H.M. Stationery Office. Statisticians, economists, social workers, and other investigators will find that the *Guide* saves much labour in hunting up statistical references in government publications.

MR. W. H. ROBINSON, 4 Nelson Street, Newcastle-on-Tyne, has sent us a copy of his catalogue (No. 21) of "Old and Modern Books," comprising more than 1000 volumes dealing with bibliography, English and foreign literature, voyages, and travels. Copies can be had upon application to the bookseller.

THE second annual report for 1927 of the Ross Institute and Hospital for Tropical Diseases, Putney Heath, London, S.W.15, gives an account of some of the activities of the Institute. These include propaganda work on malaria control, and researches in the laboratories by Dr. Menon on the effects of Paris green on the aquatic stage of mosquitoes, on fungi and fungal diseases by Sir Aldo Castellani, and on the changes in the blood and tissues in cancer with reference to diagnosis and treatment by Dr. Shaw-Mackenzie. During the year, 73 in-patients were treated in the hospital, and an extension of accommodation is much needed. The balance sheet shows that the annual subscriptions have increased by only £200, and additional subscriptions and donations are necessary to develop the work of the Institute.

MESSRS. Ogilvy and Co., 20 Mortimer Street, London, W.1, have for disposal at reduced prices a number of second-hand and shop-soiled microscopes and microscopical accessories, microtomes, hæmacytometers, cameras, and other instruments and apparatus by Messrs. Leitz and other well-known makers. Catalogues may be obtained on application to Messrs. Ogilvy and Co.

A FURTHER catalogue (No. 196) just received from the enterprising firm of Max Weg, of Leipzig, contains details of a very large stock of literature and maps relating to the geology of Germany. Its 10,058 items, which fill 296 pages, are classified geographically in 22 sections, and range from short 'separates' to long runs of periodicals. The prices appear very reasonable, and both this and the several other catalogues recently issued by the same firm should prove very

helpful to the student endeavouring to get together the literature of some particular branch of geology.

MESSRS. Bernard Quaritch, Ltd., 11 Grafton Street, W.1, have just circulated an important catalogue (No. 417) of upwards of 1800 second-hand works on zoology and geology, classified as follows: general works, zoology (anatomy, anthropology, arachnida, conchology and mollusca, crustacea, entomology, ichthyology, mammalia, ornithology, reptilia, echinodermata, infusoria, polyzoa, zoophytes, microscopy, etc.), geology, palæontology, etc. The list includes the entomological library of G. T. Bethune-Baker and a selection from the library of W. de Selys Longchamps.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—An honorary lecturer on tropical diseases at Westminster Hospital Medical School, S.W.1—The Dean, Westminster Hospital School of Medicine, 12 Caxton Street, S.W.1 (July 16). A research studentship at St. Mary's Hospital, Institute of Pathology and Research—The Secretary, Institute of Pathology and Research, St. Mary's Hospital, Paddington, W.2 (July 17). A teacher of engineering and allied subjects at the Barnstaple and Bideford Technical Schools—The Secretary, County Education Office, Exeter (July 19). A head of the

mechanical and civil engineering department, and a lecturer in the same department of the Sunderland Technical College—The Chief Education Officer, Education Offices, 15 John Street, Sunderland (July 20). An assistant lecturer and demonstrator in organic chemistry at East London College—The Registrar, East London College, Mile End Road, E.1 (July 31). A lecturer in economics in the United College of St. Salvator and St. Leonard, St. Andrews University—The Secretary and Registrar, The University, St. Andrews (Aug. 31). An assistant lecturer in geography in the University of Bristol—The Secretary, The University, Bristol (Sept. 10). An inspector under the Fertilisers and Feeding Stuffs Act, 1926, and assistant agricultural analyst, under the Devon County Council—The Clerk to the Devon County Council, The Castle, Exeter. A graduate in engineering subjects for the Dursley Secondary School and Evening Institute—The Headmaster, Secondary School and Evening Institute, Dursley, Gloucestershire. Part-time teachers in gas fitting (calculations and drawing), building construction, and science for builders at the Erith Technical College—The Principal, Erith Technical College, Belvedere, Kent. A full-time assistant master to teach engineering and workshop practice at the Kingston-upon-Thames Technical College—The Principal, Technical College, Kingston-upon-Thames.

Our Astronomical Column.

MIRA VARIABLES AND THE MILLIKAN RAYS.—Mr. Axel Corlin, of the Lund Observatory, suggested some time ago that the variation in intensity in the Millikan rays according to the R.A. of the meridian might be due to the rays coming, either wholly or partly, from Mira variables when near maximum. He found a theoretical curve from the maxima of known stars of this type, the date chosen being Sept. 12, 1926. This curve fell below the observed intensity of the rays in the region R.A. 16^h to 23^h . In reply to some objections raised, he returns to the subject in *Astr. Nach.*, No. 5566, using a larger list of Mira variables and including all that were within a quarter period of light maximum on the chosen day. He has thus secured a closer agreement with observation. He considers that the observed variation of intensity with sidereal time shows that the rays come from definite centres in the heavens; these centres may be either Mira stars or unknown cosmical clouds.

FAMILIES OF ASTEROIDS.—Prof. K. Hirayama announced in 1922 his detection of five families among the asteroids, the members of each family having such closely related orbits that it was conjectured that each family might have arisen from the separation of a single body. He contributes another article on the subject to the *Japanese Journal of Astronomy and Geophysics*, vol. 5, No. 3. He uses later determinations of elements, and corrects his former values to a small extent, but the conclusions as regards the five families remain unchanged. He now adds five new families, of which one, named after Phocæa, has eleven members, but the others are very small. The Desiderata family has five, the Pallas family three, while the remaining families have two each. These last have small perihelion distances, and approach the earth fairly closely. Æthra and Ganymed are linked together, also Albert and Alinda; the resemblance between the orbits of the last two

had been noted by others. Incidentally, a principle of asteroid nomenclature was violated here. It was agreed that asteroids with exceptional orbits should have masculine names. This principle was carried out in Albert's case but not in that of Alinda.

SOLAR HYDROGEN FILAMENTS.—The dark filaments of the sun's upper atmosphere are now regularly observed at several solar observatories by means of spectroheliographs working at a limited portion of the middle of the spectrum lines of calcium, *H* or *K*, or of the hydrogen line, *H α* . In a recent publication, *Annales de l'Observatoire de Paris, Section de Meudon*, Tome 6, detailed charts of dark filaments, together with tables, are given for the period March 1919–January 1920. Each chart, which embodies the observations extending over one rotation of the sun, shows sunspots, calcium flocculi, and dark filaments, thus affording an instructive comparison between these different phenomena. The solar latitude and longitude of these objects, which are traced in outline, can be easily read off from the charts. By a suitable notation other details of the filaments are given concerning their growth, duration, and movement.

A glance through the charts shows very clearly the chief characteristics of the dark filaments: namely, (1) their much longer life as compared with sunspots; (2) their distribution in solar latitude, both within the spot zones (where, however, they frequently appear apart from the spots) and also in high latitudes; (3) their great extent in longitude; (4) their marked inclination to the sun's equator. It is generally accepted that prominences and filaments are one and the same thing, the former being seen in silhouette at the sun's limbs, the latter as dark markings projected, whilst in transit, against the more brilliant background of the disc. An extended series of these charts would be of great use to those who study the relationship between various solar phenomena and also to those interested in solar-terrestrial relationships.