Hertwig, he decided to devote himself to zoology. After graduating, several university posts were held by him in Munich until 1912, when he was appointed Weissman's successor as professor of zoology at Freiburg. Here he taught for six years, finally moving to Breslau in the autumn of 1918 to become Director of the Zoological Institute in succession to Kükenthal.

A many-sided naturalist, Doflein published work on crabs, ants and Bdellostoma as well as his numerous important papers on the protozoa. The first edition of his text-book appeared in 1901 under the title "Die Protozoen als Parasiten und Krankheitserreger." The second edition five years later was the first to be known as the "Lehrbuch der Protozoenkunde," and it included descriptions of free-living as well as parasitic protozoa. In collaboration with his friend Richard Hesse, Doflein recorded their observations on living animals in a popular book entitled "Tierbau und Tierleben," which appealed to a large circle of readers. In addition to this, he wrote popular books on three scientific expeditions undertaken by him—to the West Indies, Japan, and Macedonia. The last, on his Macedonian travels, published in 1921, is illustrated with his own water-colour sketches.

In the early part of 1923, owing to continued ill-health, Doflein resigned his appointment in Breslau, and he died of pneumonia on August 26, 1924. Thus was tragically cut short a life of great achievement, for not only did he contribute much to biology himself but he also attracted many students to his laboratories, where they were allowed to follow their own lines of research, although always sure of his help in difficulty. His liberality and broad-mindedness were indeed part of that artistic temperament which delighted all with whom he came in contact.

THE *Chemiker Zeitung* of November 4 records the death, on October 25, at the age of seventy-two, of Dr. Carl Huggenberg, one of the pioneers among German public analysts. Huggenberg's name is associated with the well-known Analytical Institute founded by him at Chemnitz, where most of his public work was carried out. Born of Swiss parentage at Winterthur, he studied first at Zurich and later at Würzburg, where he became assistant to J. Wislicenus, and graduated in 1876. During the following three years he held an official appointment as analyst of foodstuffs in the Canton of Zurich. This special branch of applied chemistry was still in its infancy at that time, but in all the German towns, associations were being formed with the object of fighting against the adulteration of food. In 1882, the association which had been founded five years previously at Chemnitz by L. Friedrich, offered Huggenberg the direction of its laboratory. Here he found full scope for the development of his natural powers. His analytical skill, his comprehensive knowledge of chemistry, and his practical insight into the needs of industry and commerce were invaluable assets to him, and his opinion on technical matters was soon widely sought. His interest in technology led him to make numerous valuable investigations in oils, fats, and soaps, and he made numerous contributions to scientific literature on the refractometry of soap-fats, the recovery of waste fat, and on soap analysis. Until 1902 he also held the post of food controller at Chemnitz. In 1910 he retired to Zurich.

Current Topics and Events

THE Fishery Board of Scotland recently issued a notice to fishermen and others directing attention to the protection afforded to the grey seal under the Grey Seals Protection Act of 1914, which lays open to a penalty of 5*l*. any person taking, killing, or wounding grey seals during a close season, October 1-December 15. The publication of the notice has led to correspondence in the Scottish newspapers, the protection of this seal being condemned on the ground that it is increasing in numbers and is responsible for the destruction of some of the Hebridean cod fisheries. The weight of the evidence, however, seems to indicate that the grey seal is very rapidly decreasing in numbers on the west coast, and that the constant slaughter of the young in certain breeding haunts, their pelts being sent in considerable numbers to furriers in Glasgow, threatens the existence of the species in these waters. As regards the destruction of fisheries, the assertion is made that dog-fish and not cod form the diet of the seal, and that the destruction of seals and consequent increase of dog-fishes are responsible for the deficiency of cod. The point is an important one, which is left undecided by the assertions of the correspondents. It might readily be settled by the examination, by an expert in fragmentary fish remains, of a few series of stomach contents taken at appropriate seasons.

THE Field Museum of Natural History, Chicago, has arranged a series of twelve free programmes of moving pictures, with occasional lectures, illustrating natural history subjects, for children on Saturday mornings from October to December. The subjects include "Wild Animals I have known," by Mr. Ernest Thompson Seton, Capt. Kleinschmidt's "Polar Adventure," Theodore Roosevelt's "Visit to a Bird Reservation," and a number of films illustrating particular facts and aspects of zoology, botany, and geology. At each entertainment a little printed "museum story" is given to each child. This story gives, in simple language, some brief facts about the men, animals, and plants seen in the pictures, and directs the child to the case or cases in the Museum in which they are exhibited. By directing attention to the permanent exhibits in this way, opportunity is afforded to the child to crystallise the general impressions and information gathered from the films, and the real educational value of the scheme is thereby enormously enhanced. It surely is more than a series of entertainments, as the programmes are described on the syllabus. The experiment will be watched with great interest not only by those who believe in the vast potentialities of museums in education, but also by those who are convinced of the possibilities of the cinematograph as an aid in the same field.

THE proposal made by James Watt in 1783, that international units of weights and measures should be adopted, was the direct origin of the metric system. The strongest argument in favour of this system, as was pointed out by Sir Richard Gregory in his presidential address to the Decimal Association on November 26, is its international character. Scarcely a year passes without the addition of one or more countries to the list of those which have adopted metric weights and measures as their sole standards, while not a single country has introduced British measures to supersede its own. One of the latest additions to this Metric League of Nations is Japan, where metric weights and measures became official on July 1 of this year. The change was made as the result of the report of a Commission of Inquiry, which gave careful consideration to the advantages, from the points of view of industry and commerce, of the British, metric and other systems. Great Britain and the United States are responsible for so large a proportion of the world's trade that it would seem that this of itself would have led to the adoption of their weights and measures by other countries; yet whenever a country has appointed a Commission to inquire into the desirability of a change of units, it has always reported in favour of the metric system and never of the British. When Germany introduced the metric system, it seemed to be against immediate manufacturing interests on account of the overpowering superiority of British trade at the time. What decided the question then, as it should now in Britain, is that the metric system is an international system. At the annual meeting of the Decimal Association, Mr. A. J. Stubbs was elected vice-chairman of the executive committee, and the following were elected new vice-presidents: Sir Hedley le Bas, Mr. Llewellyn Atkinson, Mr. Harold Cox, and Mr. Gordon Selfridge.

AN interesting and little known chapter was added to the history of mechanical transport by Col. R. E. Crompton in his paper on "The Motor Car: its Birth, its Present, and its Future," read to the Royal Society of Arts on November 12. Col. Crompton's aim was avowedly "to vindicate the memory of that great Scotsman" Robert William Thomson, who was born on June 29, 1822, and died on March 8, 1873. A prolific inventor, Thomson as a young man came in contact with Faraday, Cubitt, and Stephenson, and then in 1844 set up in business for himself. The following year he took out his patent for the pneumatic tyre, an invention made possible by the rubber pioneers Macintosh, Goodyear, and Hancock. Thomson's tyre, however, was used but little, and Dunlop's re-invention of it forty years later was an independent one. By 1862 Thomson had a consulting practice in Edinburgh, and in 1867 he built a three-wheeled steam road locomotive for colliery work in Labuan, the wheels having heavy ring rubber tyres. Col. Crompton, then a young lieutenant in the Rifle Brigade in India, learning of this, got into correspondence with Thomson and was able to persuade the Government authorities to try steam locomotives on the Indian roads. In 1870 Col. Crompton came to England, spent some time at the home of Thomson, who by then was an invalid confined to his sofa, and supervised the building of two road engines, the "Chenab" and "Ravee." With a permit to test the engines on the roads at speeds greater than those allowed by the notorious Red Flag Act, the "Ravee" in September 1871 went from Ipswich to Edinburgh and back, hauling a large omnibus, and near Doncaster attained a speed of 25 miles per hour. In India the engines were in the first place used for Post Office work and then for military transport. It was the experience thus gained which led to Lord Roberts' advocacy of mechanical transport in South Africa in 1900. Thomson's achievements as one of the great pioneers of modern road haulage have often been acknowledged, and two years ago the Royal Automobile Club placed a tablet to his memory on the site of the house in which he was born in Stonehaven, Kincardineshire.

THE Engineering Department of the University of Cambridge has attained a leading and distinguished position among the engineering schools of Great Britain, and the illustrated descriptions of its new laboratories published in the *Engineer* for October 24 are of great interest. There are indications that the number of engineering students at Cambridge will become stabilised at about 500, which is approximately the present figure. The new laboratories stand on the Scroope House site in Trumpington Street, which occupies an area of about 4 acres. The buildings mostly consist of one-storied north-lighted structures of the factory type. The laboratories were completed and equipped in 1922 at an approximate cost of 100,000*l*., but no money was available for the construction of the projected two-storied lecture room block. In consequence, lecture rooms and laboratories are separated by a considerable distance, and the authorities hope that this inconvenience may be remedied soon by some generous benefactor; a further sum of 60,000*l*. is required. Provision is made in the laboratories for experimental work on heat engines, including engines and boilers, materials, structures, hydraulics, electrical engineering, including wireless telegraphy, and metallurgy. The equipment of all these laboratories is on a generous scale, and a large number of the machines has been presented by engineering firms. Whilst the Department also possesses workshops, we note with approval that students are encouraged to spend some of their vacations in real engineering workshops, and are advised, if possible, to serve in an engineering workshop for about six months prior to starting the course at the University.

NOMINATIONS for the award of the Elliot Medal of the National Academy of Sciences, Washington, for the year 1924 should be addressed to the secretary of the Academy. The terms of the award in the Daniel Giraud Elliot deed of gift are as follows: "One such medal and diploma shall be given in each year and they, with any unexpended balance of income for the year, shall be awarded . . . to the author of each paper, essay, or other work upon some

branch of zoology or palæontology published during the year as in the opinion of the . . . judges in that regard shall be the most meritorious and worthy of honor. The medal and diploma and surplus income shall not, however, for more than two years successively, be awarded for treatises upon any one branch of either of the sciences above mentioned. . . . The medal and diploma and surplus income may be conferred upon naturalists of any country and . . . no person acting as judge shall be deemed on that account ineligible to receive this annual gift . . . if, in the opinion of his associates, he shall be entitled to receive them." The treasurer of the Academy reports that the Elliot Fund has increased since the original donation of 8000 dollars. The best idea of the kind of work for which this award was designed may be gathered from a resume of previous awards: 1917, to Frank M. Chapman for his "Distribution of Bird Life in Colombia"; 1918, to William Beebe for his "Monograph of the Pheasants," volume i.; 1919, to Robert Ridgway for his "Birds of North and Middle America," Part VIII.; 1920, to Othenio Abel for his "Methoden der paläobiologischen Forschung"; 1921, to Bashford Dean for his "A Bibliography of Fishes," volume i.; 1922, to William Morton Wheeler for his "Ants of the American Museum Congo Expedition"; 1923, to Ferdinand Canu for his "North American Later Tertiary and Quaternary Bryozoa." Unlike other awards, the Elliot Medal is always for a special piece of research in zoology or palæontology completed and published in the year for which the award is made. The Committee particularly desires that nominations shall be received for foreign as well as for American work during the year 1924. Recommendations should be accompanied by a printed copy of the research submitted for consideration.

HEATHFIELD HALL, Birmingham, where James Watt lived from 1768 up to the time of his death, and where many of his experiments were carried out, having been sold, the former owner, Major Gibson Watt, has presented to the Science Museum, South Kensington, the contents of the attic workshop in which Watt worked. After Watt's death the room remained closed for some forty years, and all the contents still remain practically as he left them. A room, which will reproduce as closely as possible the attic at Heathfield Hall, is about to be constructed in the Science Museum on the ground floor of the new Museum buildings not far from the two Boulton and Watt engines which are preserved there. In this room the furniture, tools, two or three machines which Watt used, as well as many trial pieces, etc., will be placed on view.

ACCORDING to messages which have appeared in the daily papers, photographs were successfully transmitted by radio across the Atlantic in some tests carried out on Sunday, November 30. The transmitting apparatus was installed at Radio House, London, and the radio signals were picked up at Long Island and transmitted to New York by land lines. Brief descriptions of the apparatus have been issued, from which it appears that a photographic film is attached to a rotating glass cylinder and the actual emission of radio signals is regulated by a photo-electric cell under the influence of the light which traverses the photographic film. After each revolution of the drum carrying the film, the latter is automatically moved by a fixed amount; in the recent experiments the shift was $\frac{1}{128}$ in., but it is stated that $\frac{1}{64}$ in. would be sufficient. It takes about twenty minutes to transmit a half-plate film. The invention has been developed by Mr. D. H. Ranger, of the Radio Corporation of America. According to the New York correspondent of the *Times*, the receiving apparatus executes on paper a pen-and-ink reproduction resembling an engraving, and it is stated that the photographs transmitted in the test were easily recognisable. The general principles of the transmission of a film record by means of the action of light on a selenium cell were described by Prof. A. O. Rankine in articles in NATURE of February 5, 1920, p. 604; October 27, 1921, p. 276; and June 2, 1923, p. 744.

PROF. RISLER, working in the Laboratoire Physiologique des Sensations at the Sorbonne, has produced tubes filled with air or other gas at low pressure, excited by high-frequency current, with phosphorescent and fluorescent materials and pigments, either applied to the tubes or incorporated in the glass. The result is an emission of light, with little or no long wave-length red or infra-red radiation and no green, to which the name "cold light" has been applied. It is claimed that a large tube gives 12,000 candle power with an input of 2·5 kilowatts. A special arrangement of the electrodes maintains the pressure automatically at the optimum point, so that some of the tubes have worked for 9000 to 10,000 hours without any noticeable diminution in their illuminating power. A large quantity of ultra-violet radiation is given off, and the tubes have proved valuable for therapeutic purposes. When the current is switched off, the tubes continue to glow with phosphorescent light, the colour of which is different from that emitted previously, and the tubes appear suitable for use in advertising. Particulars of the tubes can be obtained from Mr. D. L. Daponte, 147 Cannon Street, E.C.4.

PROF. A. W. BICKERTON has been elected an honorary member of the New Zealand Astronomical Society in recognition of his work on cosmic evolution.

PROFS. THEODORE LYMAN, of Harvard University, and Gilbert N. Lewis, of the University of California, have been elected honorary members of the Royal Institution, London.

MR. E. LEONARD GILL, assistant in the Natural History Department of the Royal Scottish Museum and formerly Curator of the Hancock Museum, Newcastle-upon-Tyne, has been appointed Director of the South African Museum in succession to the late Dr. Louis Albert Péringuey. The assistantship in the Royal Scottish Museum therefore becomes vacant and applications are invited.

AT the opening of the hundred and fifty-fourth session of the Royal Physical Society of Edinburgh, the following new office-bearers were elected: *President*, Dr. James Ritchie; *Vice-Presidents*, Dr. Marion Newbigin and Prof. J. Arthur Thomson; *Secretary*, Dr. H. M. Vickers; *Assistant Secretary*, Prof. J. Russell Greig; *Librarian*, Mr. J. Kirke Nash; and *Councillors*, Prof. D'Arcy W. Thompson, Principal O. Charnock Bradley, Prof. J. H. Ashworth, Prof. J. Graham Kerr, Dr. J. R. Henderson, and Mr. Hugh Miller.

THE Rivers Memorial Medal of the Royal Anthropological Institute for the year 1924 has been awarded to Dr. A. C. Haddon. This is the first occasion on which the medal has been awarded. In future one or more medals will be given annually in recognition of meritorious anthropological work in the field, in memory of the late Dr. W. H. R. Rivers, who was president of the Royal Anthropological Institute at the time of his death. Apart from Dr. Haddon's unquestioned claims as a field worker in ethnology, it is peculiarly appropriate that he should be the first recipient of this honour in view of the close association of Dr. Rivers with him when the latter first took up his investigations among primitive peoples.

A GROUP of papers on "Base Exchange in Soils" will be presented for discussion at a meeting of the Faraday Society to be held in the rooms of the Chemical Society, Burlington House, London, on Tuesday, December 9, at 4.30-7.30 P.M. The chair will be taken by Sir Daniel Hall, scientific adviser to the Ministry of Agriculture, and an introductory address will be given by Dr. D. J. Hissink, of Groningen. Further particulars may be obtained from the Secretary of the Faraday Society, 90 Great Russell Street, London, W.C.1. Papers will be presented by Prof. N. M. Comber (University of Leeds), Messrs. H. J. Page and W. Williams (Rothamsted Experimental Station), Prof. G. W. Robinson and Mr. Rice Williams (University College, Bangor), Mr. S. J. Saint (University of Leeds), and Mr. E. A. Fisher (Research Association of British Flour-millers).

AN extra meeting of the Institution of Civil Engineers will be held on Thursday, December 11, at 6 P.M., in conjunction with the Institutions of Mechanical Engineers, Electrical Engineers, and Naval Architects, the Institute of Marine Engineers, the North-East Coast Institution of Engineers and Shipbuilders, the Institution of Engineers and Shipbuilders in Scotland, the Institute of Chemistry of Great Britain and Ireland, the Institution of Gas Engineers, the British Electrical and Allied Manufacturers' Association, and the British Engineers' Association. These bodies are co-operating in the work of the special committee on tabulating the results of heat-engine and boiler trials, and the chairman of the committee, Capt. H. Riall Sankey, will submit for discussion: "Standards of Comparison in connection with the Thermal Efficiency of Steam Engines."

THE before-Easter lecture arrangements at the Royal Institution have just been issued. The general courses will begin on Tuesday afternoon, Jan. 13, at 5.15, when Prof. A. Fowler will commence a course of two lectures on the analysis of spectra; on succeeding Tuesdays there will be two lectures by Dr. H. R. Hall on the prehistoric Greek and ancient Egyptian civilisations, four by Prof. Barcroft on the colour of the animal creation, two by Prof. E. N. da C. Andrade on the evolution of the scientific instrument, and two by Prof. A. S. Eddington on the internal constitution of the stars. Thursday afternoons at the same hour beginning on Jan. 15, Mr. J. S. Huxley will give two lectures on the courtship of animals and its biological bearings; Sir William Bragg, four on the properties and structure of quartz; Sir A. Smith Woodward, two on dinosaurs; Dr. Leonard Hill, two on the biological action of light; and Mr. T. Thorne Baker, two on chemical and physical effects of light. The Saturday lectures will include four by Sir Ernest Rutherford on counting atoms, and two by Prof. J. H. Ashworth on a zoological topic. The Friday evening meetings begin on January 16 with a discourse by Sir William Bragg on the investigation of the properties of thin films by means of X-rays. Succeeding discourses will probably be given by Dr. A. W. Crossley, Profs. J. W. Gregory, R. W. Chambers, T. H. Pear, Gilbert Murray and J. W. McBain, Principal Irvine, Mr. W. B. Hardy, Sir Ernest Rutherford, Sir Daniel Hall and other gentlemen.

THE autumn issue of *Bird Notes and News*, the journal of the Royal Society for the Protection of Birds, is a double Dominions number and contains interesting papers written by prominent bird-protectionists relating to the work of bird protection in Australia, New Zealand, Canada, British Columbia, Newfoundland, and South Africa. A comprehensive report on the bird-life of the sanctuaries in the Royal Parks in London, by a member of the sanctuaries committee, forms an enlightening and encouraging leading article; and the effort the Society is making to combat the oil menace to sea-birds is further evidenced.

THE National Research Council of Japan has initiated an active programme of scientific publication, in several series of "Japanese Journals" under the separate headings of chemistry, physics, geology and geography, botany, zoology, medical sciences, engineering, mathematics, and astronomy and geophysics. The first two of these journals each appear in ten numbers annually, the third appears quarterly, while the remainder are occasional publications. The second part of volume ii. of the *Japanese Journal of Astronomy and Geophysics* has just been issued, and contains six memoirs, occupying about sixty octavo pages. The papers cover a wide range of interests—precise levelling, theory of monsoon rainfalls, gravitational fields, thermal expansion of rocks, and tidal undulations — and in some cases originate from

research institutes, independent or connected with universities or colleges. They indicate a highly satisfactory state of activity and interest in geophysical research in Japan. All the papers are in English.

INSTRUCTIONS and information relative to wireless reports of weather on the coast of Brazil have been issued by the Brazilian Meteorological Service. The Director, Señor Sampaio Ferraz, who is responsible for the issue of the information, is thoroughly conversant with the meteorological requirements. With the view of assisting navigation, twelve transmitting stations have been established on the coast and send observations six times a day, every four hours, of the force and direction of wind and the state of weather and sea. In case of storms and dense fogs, these frequent messages should prove useful to approaching vessels. The reports are expressed in Portuguese, but very simply. The messages from the transmitting stations are sent on 600 m. waves spark. Rio's special messages, sent out twice daily, include detailed forecasts for the south coast of the State of Rio de Janeiro and general forecasts for the rest of the southern Brazilian coast and up to Buenos Aires; the first part, organised by the international code, gives barometric pressure, force and direction of wind, state of weather and air temperature. The instructions contain specifications of the international codes, and every facility is afforded for commanders navigating these seas to draw for themselves weather charts which will give them full information of the conditions of the weather over the whole neighbourhood.

THE British Dyestuffs Corporation, Ltd., Manchester, has issued a booklet entitled "Medicinal Products: A booklet issued to the Medical Profession," which gives an account of the various dyestuffs which have found a therapeutic application, and also of some chemicals that are used as reagents in clinical tests. The formula is given in each case, together with a considerable number of references to papers in which the use of the products is described. The main section is devoted to a consideration of the flavine antiseptics, and is followed by one on the di- and tri-phenyl-methane series: namely, auramine, crystal violet and brilliant and malachite green. Among other dyes considered may be mentioned trypan blue, Biebrich scarlet, gentian violet, methylene blue and picric acid with their therapeutic uses, and indigo-carmine which has been used for testing the function of the kidneys. In the last section a brief account is given, amongst other compounds, of benzidine, dimethylp. aminobenzaldehyde and phenylhydrazine hydrochloride and their use in clinical tests. The booklet should be useful to all those who desire information on the constitution and reactions of any substances in the above groups which they may happen to be using.

Our Astronomical Column.

THE GREAT FIREBALL OF NOVEMBER 11.—Mr. W. F. Denning writes that the fireball of November 11, 5 h. 40 m. G.M.T., was observed by a great number of persons in Ireland and extreme north of England. Sixty-nine accounts of it have been received, and though the observers were taken by surprise and most of them inexperienced in recording meteors, their results are in very fair agreement. At most of the stations the moon, which was nearly full, was near the beginning point of the meteor and furnished a useful guide to position.

The fireball had an exceptionally lengthy flight, and a very long duration, the average time being 33 seconds, when proper allowance is made. The whole of the luminous course appears to have extended over 510 miles, and the velocity was 16 miles per second. It passed from over the North Sea, 80 miles east of Hartlepool, across the extreme north of England and south of Scotland and onwards over the Atlantic Ocean, to Long. $11\frac{3}{4}°$ west, Lat. $56\frac{1}{2}°$ north. The average height was about 53 miles. The radiant point was as nearly as possible at $31° - 6°$ near Mira Ceti. As the fireball sailed along in its nearly horizontal course it showed some curious variations of colour; in the head blue and yellow predominated, while flakes of red were distributed along the tail. The effect produced was that of a brilliantly coloured snake-like object wriggling its course through our resisting atmosphere. Some of the observers compared the oval head to the size of a football; others thought it equal to the moon's diameter or to half the latter value. Adopting the smaller estimate, the nucleus would be half a mile in diameter, but this included the outlying flames and luminous off-come resulting from its combustion. The real size of the solid nucleus may not have been more that two or three feet.

OBSERVATIONS OF MARS.—*L'Astronomie* for October contains a number of drawings of the planet, made in September at Juvisy and Meudon. The large dusky areas are represented in much the same manner as by the American draughtsmen, but the canals as a rule are broader and more diffused; some of them appear on almost all the drawings, so that there is practically a consensus as to the existence of the markings, the difference only extending to their exact aspect. Thus, M. Quénisset on September 19 drew the Ganges as a very broad dark streak, fully 300 miles wide, with straight parallel edges.

M. E. M. Antoniadi has again observed the planet with the great Meudon refractor and contributes some very beautiful drawings. As is well known, he rejects the geometrical aspect of the canals and draws them as broad irregular shadings. He reproduces for comparison his drawings of Pandoræ Fretum made in 1909 and 1911, which show a marked change of intensity of this region from one year to another. He lays stress on the planet being a living world, and is inclined to return to the old notion that those dusky areas that do not show a seasonal change of tint are veritable seas.

M. Quénisset also observed Uranus with the Meudon refractor, and distinctly saw two equatorial belts and dusky regions at the poles. The aspect was quite like that of Jupiter except that the belts were nearly vertical.