

be incomplete without allusion to the part played in it by his wife. In 1891 he married Florence Woodrige, the daughter of Sir Edward Sieveking. They were inseparable companions. With unselfish devotion she helped him more than will ever be known. They discussed all his projects together, and for many years she performed for him all the functions of an efficient secretary. Further, in addition to the responsibilities of bringing up their four children, she bore on her shoulders the burden of the humdrum duties of his life, thus releasing the more energy for his work.

Starling was the recipient of many academic honours. Honorary degrees were conferred upon him by the Universities of Dublin, Sheffield, Cambridge, Breslau and Heidelberg. He received the Baly Medal in 1907 and the Royal Medal of the Royal Society in 1913. What place amongst the

great discoverers in medical science should be allotted to Starling must be left to the judgment of posterity, but it will be generally conceded by his contemporaries that he was one of the foremost physiologists of our time, and that no one since Harvey has so greatly advanced our knowledge of the action of the heart.

Although no man gave more devoted service to science, Starling's interests were many-sided. He loved music, he loved beauty, he loved a fight; in fact, he loved life. The great charm of his companionship was, in part, due to his extraordinary mental alertness and boyish enthusiasm; like Peter Pan, he refused to grow old. His death means a sad loss to all of us and will be felt not least by the generations of pupils who have been his companions during his lifelong search for new knowledge by experiment. C. J. MARTIN.

News and Views.

IN a supplement to NATURE for July 3, 1926, Dr. G. E. Hale described his recently completed spectroheliograph—a visual instrument for observing solar phenomena in monochromatic light—and indicated its large scope in exploring the higher parts of the sun's atmosphere. On p. 708 of our issue this week, Dr. Hale gives us some of his results obtained during the last few months from observations of the hydrogen gases involved in the upper part of the vortex of a sunspot and its attendant region of disturbance. The particular problem to which he has applied his instrument is to determine whether the characteristic appearance of whirl-formation of the hydrogen flocculi surrounding sunspots is hydrodynamical or electromagnetic in origin. These hydrogen whirls, depicted on photographs taken in monochromatic light of H α by the spectroheliograph, had previously been closely studied by Dr. Hale, who found the evidence inconclusive for an explanation of their exact nature, for they appeared to be unrelated to what is presumably a periodic reversal every 11½ years of the direction of whirl of a deeper-seated vortex which gives rise to the magnetic field of a sunspot. He is now able to show in the present article that his recent observations afford a more critical test, which proves to be against the electromagnetic explanation. He states, however, that there still exist several difficulties in the way of explaining the structure of the flocculi along purely hydrodynamical lines.

ONE great advantage of the spectroheliograph is that it permits the observer to watch continuously the movements of the solar gases, and by means of a 'line-shifter'—a neatly devised accessory—the radial velocity of separate portions of a flocculus can readily be estimated. Although photographs of hydrogen flocculi strongly suggest movements of inflow or outflow, the reality of such motions has, as a general rule, been difficult to establish even from a long series of daily spectroheliograms or from others taken at shorter intervals. With his spectroheliograph, Dr. Hale has now seen a number of these flocculi being drawn into spots with accelerated velocities, in one

instance increasing from 22 to 50 km./sec. at corresponding distances of 56,000 km. and 20,000 km. from the centre of the spot. These and other observations of moving masses of gas in the near vicinity of spots have an important bearing on the motions of related prominences which have been recorded from time to time. The possibilities of this instrument and the remarkable observations which have already been made with it are of the greatest interest.

THE commemoration of Huxley's birthday by an annual lecture delivered at the College with which most of his teaching life was associated, is a new institution, which the Imperial College of Science owes to its Rector, Sir Thomas Holland, who himself was an old pupil of Huxley's. The first lecture in the series was delivered by Prof. E. B. Poulton in 1925 and was of a charming and intimate biographical character. The second lecture, by Dr. P. Chalmers Mitchell, should have been delivered last year, but had to be postponed owing to the general strike. It was delivered on May 4 of this year. Dr. Mitchell took as his title, "Logic and Law in Biology," and, as was to be expected, he delivered an admirably lucid and incisive address. Dr. Mitchell's thesis was that it is a weakness of the human mind to invent imaginary entities to account for the flux of things, and that of these entities the idea of 'law' is the most universal. He pointed out that Huxley had said that every law is a construct of the human intellect, and no more exists outside us than does colour. Dr. Mitchell then went to scourge the concepts of 'vitalism,' 'orthogenesis,' and 'emergent evolution.' If we get rid of all these conceptions, what remains? According to Dr. Mitchell, an increase of 'plain materialistic explanation.' But many will ask: Is not 'materialistic explanation' itself an imaginary concept? There was, in fact, an aura of nineteenth-century materialism and scarcely veiled 'episcopophagy' about Dr. Mitchell's address which was admirably in keeping with one phase of Huxley's character. But the same Huxley who on one occasion said that it was as absurd to talk of the

'vitalism' of an animal as of the 'horology' of a clock, on another occasion declared that he was not a materialist because he could not conceive of matter apart from mind to picture it in.

DR. CHALMERS MITCHELL referred to biogenesis—the chief stumbling-block in the way of the thorough-going materialist. He pointed out that Huxley fully admitted that all life comes only from pre-existing life, but that he claimed the right to 'imagine' a condition in the past when life had arisen from dead matter. If science is the determination and measurement of the processes going on now and their imaginary prolongation into the past and the future, and if this procedure leads to the inference that a discontinuity occurred, then the scientific attitude is to recognise frankly that this is so. To say that it could not have been so, is to introduce an *a priori* conception such as Dr. Mitchell justly deprecates. Indeed, many biologists will maintain that Lord Kelvin's famous assertion that there are in the history of the universe at least two discontinuities which the theory of development cannot get over, namely, the primary concentration of energy and the beginning of life, remains as justified to-day as when he made it. Dr. Mitchell referred to numerous investigations which he claimed are reducing the gap between the living and the non-living. To the opposite school of thought the trend of the recent investigation is not in this direction. A few years ago it was thought that Amœba could be successfully imitated by a drop of rancid oil, and that all its motions were due to surface tension; now, a recent investigator tells us that if Amœba were the size of a dog, no one would refuse to call its actions intelligent.

BIOLOGISTS will be surprised to learn that Prof. Julian S. Huxley is resigning the chair of zoology in King's College, London, to which he was appointed less than two years ago. We understand that Prof. Huxley will still continue to be attached to King's College in an honorary capacity, but he intends to devote himself entirely to writing and research. Thus a new situation is created with regard to the purveyors of knowledge and their relation to academic institutions, a situation which all who are concerned with the spread of knowledge will do well to examine thoroughly. With the spread of popular education and the use of applied science there has come into existence not only a large body of the general public which desires further knowledge, but also, in the shape of cheap printing, broadcasting, instructional films, and the systematisation of popular lectures, the means for gratifying this desire without recourse to formal lectures at a college or university. The use of broadcasting and the cinematograph is now being officially encouraged for instruction in schools. The successful 'libraries' issued by various publishers, such as the Home University Library, Benn's new Sixpenny Library, and other similar ventures, show what can be done with educational series; works like Wells's "Outline of History," what can be done with the single book; the University Extension Lectures

and the classes arranged by the Workers' Educational Association—which some members of the Royal Commission on Oxford and Cambridge thought the most important innovation in university practice which had ever occurred—the Chautauqua, the organised lecture-tours of the United States, what can be done with lecturing partly or wholly detached from academic institutions.

THESE gateways to knowledge are of great importance to the learner; but their importance to the teacher seem not yet to have been fully realised. They imply that an increasing number of those who are interested in teaching or in the pursuit of knowledge for its own sake will be able to make a livelihood without lecturing to students in a college or university. On the other hand, it will obviously be of advantage to such workers to be connected in some way with academic institutions, with their facilities for research and study and their atmosphere of learning; it will equally be of advantage for the academic institutions to be associated with any new means of spreading knowledge, and with any one, whatever his method of obtaining a livelihood, who desires to devote his energy to pure research. It will be interesting to see how educational organisation will adapt itself to the new situation which is thus arising, and in particular to follow the success of this new and courageous venture of Prof. Huxley.

IN the past twenty-five years, the Appointments Board of the University of Cambridge has effected quietly a noteworthy revolution in the attitude of tutors and undergraduates towards the business world and of the business world towards the universities. Where formerly men looked to an academic life, to the Civil Service, or to one of the professions as a natural sequel to a successful university career, now in growing numbers they are looking to the world outside, and the outside world is more and more seeking for men of proved ability with a university training. The immediate result is at present most apparent in the Far East, where, for example, Sir John Jordan has described the Cambridge graduates as having "changed the face of business in China," and where the great oil groups are relying with confidence to their staffs, mainly university men, to enable them to maintain their lead throughout the world. Firms and industrial organisations in Great Britain are also more and more inclined to turn to the universities for their administrative appointments, and along with this is a growing demand in industry for trained scientific workers for chemical, physical, geological, engineering, forestry, or agricultural work. The Appointments Board at Cambridge has, through its secretary, Mr. H. A. Roberts, gained the confidence of the business world and of Government departments, and serves now as the natural channel for meeting their demands. In meeting these demands satisfactorily it has also stimulated a wider demand. It will be of interest to watch in the coming years the reaction of this larger demand on the conditions of the alternative careers which are losing ground at present in the order of choice of the young graduate.

A PRELIMINARY programme has now been issued of the Leeds meeting of the British Association, to be held on Aug. 31-Sept. 7, under the presidency of Sir Arthur Keith. The president's address will be delivered in the Majestic Cinema, City Square, on Wednesday evening, Aug. 31, on the subject, "Darwin's Theory of Man's Descent as it stands To-day." Evening discourses will be given to members of the Association in the Albert Hall, Leeds, on Sept. 2 by Prof. R. A. Millikan on "Cosmic Rays," and on Sept. 5 by Dr. F. A. E. Crew on "The Germ-plasm and its Architecture." Public lectures are being arranged for Leeds and the neighbouring towns. Several excursions to local places of interest and to works and factories in or near Leeds are being organised, a civic reception will be held in the Art Gallery on Sept. 1, and the University will hold a reception on Sept. 6. The reception room during the meeting will be at the Town Hall; the local honorary secretaries for the meeting are Mr. James Graham and Prof. A. Gilligan, Education Department, Calverley Street, Leeds.

IN the issues of the *Morning Post* for May 4 and succeeding days, Dr. T. W. Gann publishes a further report on his investigations of Maya ruins in Yucatan in the present season. Writing from Belize, he says that his last expedition has proved somewhat eventful, his larger motor boat having been wrecked and the smaller left behind badly damaged, while the greater part of his equipment has been lost. At Ambergris Cay, off the north coast of British Honduras, he found evidence that this island had once been inhabited by a branch of the Maya who had developed along lines of their own. They worshipped a god, a short, round-faced, masked individual like nothing known on the mainland. Dr. Gann's objective was Tuluuum, where he proposed to visit the jealously guarded country of the Santa Cruz Indians, the only pure-blooded descendants of the ancient Maya. Before reaching Tuluuum, however, he landed at a place called Majanal, just south of Espiritu Santo Bay, on a report from his pilot that there were ruins in the neighbourhood. A search revealed a city literally buried in sand, which lay in terraces. On the highest of these, huge square stones were still exposed. The preservative qualities of sand should make this a profitable site for future excavation.

ON reaching Tuluuum he found the ruins cleared of vegetation, and learnt later from the chief of the Santa Cruz Indians, by whom he was most hospitably received, that although they had a chapel in their nearby native *pueblo*, the temple was held in veneration and used by them. Dr. Gann took part in an elaborate religious ceremony in the old Maya temple before a cross draped with a native woman's skirt, and before which *jabin* branches were placed, this being the herb held peculiarly sacred to their gods by the ancient Maya. The celebrant at the service was a woman, the widow of the priest who had recently died leaving a son too young to learn the prayers. She conducted the service in Spanish, although she knew no word of the language, but the responses were given in Maya. The service opened

with a fumigation of every one and the temple with aromatic resins to drive away the devils, and concluded with the drinking of a bowl of a mixture of ground corn and honey. Dr. Gann was able to collect much interesting information about the beliefs and customs of these survivors of the ancient Maya race, and obtained a unique photograph of the idol which they dread as an embodiment of evil.

AN interesting series of copies of frescoes from Theban tombs has been placed on exhibit in the British Museum on permanent loan. They have been executed by Mrs. N. de Garis Davies and belong to Dr. Alan Gardiner, but will ultimately become the property of the Museum. With the exception of copies made for the Metropolitan Museum of New York, this is the only representative collection of reproductions of this class of Egyptian art. The examples which have been chosen for exhibition go back in date to so early as 2150 B.C. They have been selected especially with the view of covering as wide a field as possible in illustration of the social life and history of the early Egyptians. The earliest example shows women baking cakes. A representation of women at a feast of 1420 B.C. is interesting as illustrating the custom of placing solid unguents on the head at a feast, which melted and ran down over the hair, face and even garments. The motives of conventionalised spirals and lotus flowers used as the decoration of the ceilings of tombs are illustrated in frescoes of about 1300 B.C. A cat seated beneath the chair of its mistress and another eating fish, from the tombs of the astronomer Nakht and the Harbour Master are successful examples of Egyptian realism, more happy, indeed, than the leashed hound from the tomb of Rekhmire. Paintings showing relations with Crete are well represented. A drawing from the tomb of Tut-ankh-amen's governor of Syria will no doubt prove attractive on the ground of its associations. Among other features represented are negroes carrying tribute, and Ethiopians with cattle having fetishes on their horns, golden rings and a giraffe. There are also shown cattle, mourning women in a boat, and Kenre and his wife Mutemnia drinking from a pool in the fields of the dead. As an exhibit the collection is one of the most attractive and, possibly, instructive now in the gallery.

IT is announced that a decision taken at the concluding meeting of the International Congress of Orientalists at Athens in 1912 that the next meeting of the Congress should be held at Oxford is to be given effect. With the consent of the Vice-Chancellor of the University, the seventeenth International Congress will be held there during the week beginning Aug. 27, 1928. The approval of the Royal Asiatic Society has been obtained, and the leading oriental societies of France, Italy, Germany, Holland, and America have signified their intention to take part. The arrangements for the meeting are in the hands of the members of the Oriental Faculty of the University. It is to be hoped that the Congress will be strongly supported, for circumstances combine to give it a special importance. During the interval which has

elapsed since the last meeting the international bonds of common study have been strained and broken, while for Great Britain as an Empire with vital interests in the Middle and Farther East, the course of events since the War has given a peculiar significance to the subject-matter with which the Congress deals as one, and not the least important of the avenues by which we may arrive at an understanding of the mind of the various Eastern races. In the circumstances, no more appropriate meeting-place for the Congress than Oxford could be found. We trust, therefore, that the Oriental Faculty of the University may receive wide public support.

THE new laboratories of the Metropolitan Asylums Board at the Park Hospital, Hither Green, London, S.E., were opened on May 9 by Mr. Neville Chamberlain, Minister of Health. The buildings, which have cost about £13,500, have been equipped for research on the primary causation of infectious diseases and particularly acute fevers. Mr. Chamberlain, in his address, said that about 5 per cent. of the children born in London die from infectious disease before reaching twenty years of age. Apart from the suffering, this constitutes a great waste of human material, and Mr. Chamberlain expressed surprise that local authorities throughout Great Britain, which have to meet expenditure for isolation hospitals and treatment of infectious disease, have not done more in the past to discover the causes and means of prevention of such diseases. The results already achieved by the investigation of scarlet fever and diphtheria have been most encouraging and have shown that money spent on research in this field is a good investment.

ON Tuesday, April 26, a numerous party of members of the Illuminating Engineering Society and friends paid a visit to the National Physical Laboratory, Teddington, and were afforded an opportunity of inspecting the Photometric Section under the supervision of Mr. J. W. T. Walsh. Some of the most interesting features of the work were summarised by Mr. H. Buckley, who pointed out how it has become interlinked with that of other bodies, such as the Illuminating Engineering Society, and directed attention to the variety of researches being conducted for Government departments. In addition to the important work dealing with the unit of light, such problems as the design of picture galleries, the requirements for ships' navigating lights, the effects of glare, the relation between illumination and the carrying out of fine work, and reflection of artificial light from road surfaces have been studied. The visitors were afforded an opportunity of seeing the apparatus for such tests in operation, and much interest was taken in the equipment, notably the new 10-ft. diameter integrating sphere now installed. It was recalled in the discussion that the problem of devising a primary standard of light was raised in a comprehensive paper on photometry read by Prof. J. A. Fleming nearly twenty-five years ago. Research on this difficult problem is still proceeding at the National Physical Laboratory and elsewhere.

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THE annual cider-tasting day took place at the University of Bristol Research Station, Long Ashton, on Thursday, May 5. The gathering was a record one, about 1000 visitors—mainly fruit growers, cider makers, and agriculturists—being present on the occasion. In addition to the usual display of single variety ciders made during the past season from the 1926 crop, there were exhibited ciders made from apples submitted by farmers of the surrounding counties in connexion with the Institute's scheme of cider-apple competitions. These competitions are designed to demonstrate to farmers the cider-making values of the various varieties grown in the different localities and to stimulate interest in the growing of high-grade cider fruit to meet the greatly increased requirements of the cider industry. The competitions are extremely popular with the farmer, and have proved of definite value to the Station for research purposes. During the day, parties of visitors were conducted around the laboratories and field plots by members of the Station staff, who demonstrated the practical results of the Institute's research work on problems of fruit culture. Special parties of fruit growers were organised for demonstrations of the results of research work on strawberries and for practical demonstrations in the making of spray fluids. Demonstrations of the use of various new models of motor-driven cultivators suitable for use in fruit plantations and of the latest types of spraying machines for applying spray fluids and 'dusts' were given by commercial firms throughout the day.

DR. L. PRANDTL, professor of applied mechanics in the University of Göttingen, has been awarded the Gold Medal of the Royal Aeronautical Society, in recognition of his work on aerodynamics. The medal will be presented on May 16, when Dr. Prandtl will deliver the fifteenth Wilbur Wright memorial lecture.

It will be remembered that a fund was subscribed by friends and old students of Dr. J. A. Fleming for a portrait to be presented to University College, London, in commemoration of his forty-two years' tenure of the chair of electrical engineering in the College. The portrait, which was painted by Sir William Orpen, is considered to be an excellent likeness, and is being exhibited in Room XI. at the Royal Academy.

MR. T. H. SAVORY, Biological Laboratory, Malvern College, Wores., informs us that he is at present engaged in the compilation, for the Welsh National Museum, of a list of the spiders of Wales, to accompany a type collection which has recently been presented to the Museum. Records are not numerous, and it is desirable to be complete, if possible. Mr. Savory would therefore be glad to know of any work on Welsh spiders which has not been published or is not generally accessible.

INFORMATION has been received of further discoveries bearing upon the early peoples of East Africa by Mr. L. S. Leakey of the East Africa Stone Age Expedition. Portions of thirty-six skeletons have now been unearthed, of which twenty-six were found

in the Elmenteita district. According to a dispatch in the *Times* of May 4, Mr. Leakey considers the Elmenteita type to be even more primitive than that discovered at Nakuru in December last. In particular the nose is narrower, some individuals having a nasal index of 44. As a race they were tall, and differ markedly from the existing peoples of Kenya.

THE council of the Institution of Civil Engineers has made the following awards in respect of papers read and discussed at the ordinary meetings during the session 1926-27: Telford Gold Medals to Mr. I. J. Jones (London) and Mr. T. B. Hunter (London); a Watt Gold Medal to Mr. Gerald Curry (London); and a George Stephenson Gold Medal to Mr. A. L. Bell (Malta); Telford Premiums to Mr. A. W. Stonebridge (Bombay), Mr. P. R. Roberts (Barrow-in-Furness), Mr. A. C. Anderson (London), and Mr. George Ellson (London); a Manby Premium to Prof. Douglas Hay (Sheffield); and a Trevithick Premium to Mr. Powys Davies (India).

THE Paris correspondent of the *Times* announces that Baron Edmond de Rothschild, who has already done great service to scientific research in France by creating the Rothschild Foundation, has made another gift of 30,000,000 francs to the foundation for the purpose of endowing an institute for physical and chemical research as applied to biology. The work of the institute is to be conducted by a committee consisting of Profs. Jean Perrin, Job, and André of Paris, and M. Pierre Girard.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A junior assistant hydrographic surveyor under the Port of London Authority—The Staff Manager, Port of London Authority, Trinity Square, E.C.3 (May 18). A lecturer in pharmacology and therapeutics at St.

Bartholomew's Medical College—The Dean of the College, St. Bartholomew's Hospital, E.C.1 (May 20). A junior scientific assistant for Admiralty Research—The Secretary of the Admiralty (C.E. Branch), Whitehall, S.W.1 (May 21). A full-time lecturer in chemistry at the Polytechnic, Regent Street—The Director of Education, The Polytechnic, 309 Regent Street, W.1 (May 23). A full-time teacher of geography at the City of London College—The Secretary, City of London College, White Street, E.C.2 (May 27). An assistant lecturer in physiology in the University of Birmingham—The Secretary of the University (June 1). A professor of zoology at King's College, London—The Academic Registrar, University of London, South Kensington, S.W.7 (June 2). A part-time research organiser under the Research Fund Committee of the Institute of Brewing—The Secretary, The Institute of Brewing, Brewers' Hall, Addle Street, E.C.2 (June 3). A full-time lecturer in electrical engineering at the Borough Polytechnic Institute—The Principal, Borough Polytechnic Institute, Borough Road, S.E.1. An assistant master for electrical engineering at the Rugby Technical School—P. I. Kitchen, 61 Clifton Road, Rugby. A graduate to teach botany at the Erith Technical College—The Principal, Technical College, Erith Road, Belvedere. A full-time mistress for mathematics and science at the Girls' Trade School of the Borough Polytechnic Institute—The Principal, Borough Polytechnic Institute, Borough Road, S.E.1. A part-time mistress for hygiene, physiology, health, and science subjects at the Borough Polytechnic Institute—The Principal, Borough Polytechnic Institute, Borough Road, S.E.1.

ERRATA.—In NATURE of April 30, p. 629, col. 1, line 29, for "Haustein" read "Hanstein," and line 47, for "Sonèges" read "Souèges."

Our Astronomical Column.

GLOBULAR CLUSTERS AND SPIRAL NEBULÆ.—An article by Mr. A. R. Hinks in the *Nineteenth Century* for May gives a vivid account of the great enlargement of our conception of the size of the visible cosmos that has resulted from the work of Hale, Shapley, and Hubble at the great American observatories. The various stages in the deduction of the absolute magnitudes of the Cepheids are lucidly described; but one point in the proof, the practically perfect transparency of the celestial spaces, seems to need fuller treatment than is given in the article. The shortest proof appears to be the simultaneity of phase in light of different colours, whereas their speeds would be different in an absorbing medium.

Mr. Hinks was the first to detect the asymmetrical arrangement of the globular clusters: they lie in one hemisphere of the sky, with its pole in the galaxy. Further, their number is limited to about ninety, and no increase in optical power seems to add to it, so that they belong to a rather special class of objects, the curious grouping of which is still unexplained and merits further study.

Brief allusion is made in the article to Prof. Hubble's recent paper in the *Astrophysical Journal*, in which he assigns a distance of 140,000,000 light years to the smallest visible spiral nebulae. Representing the distance of α Centauri as one inch, these objects would be 550 miles away. Some verses by G. M. Minchin appeared in NATURE, April 14, 1898, p. 564. One verse ran:

"For, the rays that reach me here
May have left your photosphere
Ere the fight of Waterloo—
Ere the pterodactyl flew!"

The last line was probably intended as a bold exaggeration, but Hubble's result would make it literally true.

ASTROPHYSICS IN RUSSIA.—The State Astrophysical Institute of Russia is publishing *Trudy* (Memoirs), the first volume of which appeared in 1922, the second in 1923, and two parts of the current third volume in 1925 and 1926, respectively. The contents of the published volumes are very varied, both theoretical papers and those elucidating various practical points of astrophysics being well represented. To the former category belong papers by V. A. Kostizyn on masses of stars and on equilibrium of radiation in stars; those by V. G. Fesenkov on the evolution of the solar system, on cosmic refraction, on the structure of the atmosphere from photometric observations, and others. Some of the practical papers deal with the technique of stellar photography in particular cases; B. V. Numerov describes a new method of determination of orbits and of calculation of ephemerids; E. K. Epik writes on photometric properties of air and of clouds (with an explanation of variations in the brightness of Venus). The latest volume contains a catalogue of equatorial components of velocities of 1470 stars.