

News and Views.

How experimental research carried out on dogs has benefited both that animal and man is described in the Memorandum of the Medical Research Council on the Dogs Protection Bill now before Parliament. Recent advances in knowledge have been made by this means in the study of rickets, disorders of the teeth, diseases of the heart and circulation, and in diabetes, as well as in distemper and various types of jaundice prevalent among dogs. The proof that rickets is a dietary disease and can be cured by changing the diet, so as to supply an adequate amount of the anti-rachitic vitamin, was first obtained by feeding experiments carried out on puppies. An unexpected outcome of these experiments was the discovery that absence or deficiency of this vitamin in the diet prevents the proper development of the hard enamel of the teeth: this work is still in progress, and may lead to the prevention of dental decay in human beings. The control of diabetes by the use of insulin, which has been such a boon to sufferers from this disease, was made possible by experiments on dogs: in fact the whole of our knowledge of this disease from the time of the discovery of the relation of the pancreas to diabetes to the discovery of insulin has been gained by experiments on this animal. Nor must the benefits to the dog itself from experimental research be forgotten: protection against distemper is already becoming practicable, as also against the spirochaetal jaundice which is not uncommon in Great Britain and often fatal, whilst a cure has been found for the malignant jaundice or piroplasmiasis of dogs in the injection of the dye trypan blue.

It is the considered and unanimous judgment of the Medical Research Council that the proposals of the Dogs Protection Bill would place an insuperable and permanent barrier across some of the chief paths of progress in medical research. The memorandum describes the reasons which make the use of dogs for experimental purposes necessary, and gives in some detail results which have been, or are being, obtained from such experiments. Considerations of size are frequently important: practicable alternatives to the dog are the sheep, pig, goat, or ape, but none can be kept completely healthy and comfortable in the laboratory except the dog. Moreover, its long domestication has assimilated its natural diet to that of man, and many of its bodily structures provide the nearest approximation among animals to those of man, so that results of experiments, both dietary and pharmacological, can often be applied directly to the case of human beings. The special habituation of the dog to man's presence is also in favour of its use, since it is less terrified by the near approach of human beings than other less domesticated animals. On the other hand, the memorandum points out that the dog is only used when no other smaller animal is available, and only a very small minority of experiments are performed with it. The knowledge which has been gained from such experiments forms part of the everyday armamentarium of the physician or surgeon, and

includes the foundations of the physiology of the digestive and circulatory systems. To avoid the danger of the use of stolen dogs for purposes of experiment, the Council recommends that the Dogs Act, 1906, be amended to allow of the use of some of the 50,000 animals annually destroyed in London alone. These dogs are those which either have no owner or whose owners do not care enough about them to make inquiries when they are lost. It would allow part at least of the now useless annual massacre of dogs to be turned to the permanent advantage of mankind and of other animals.

THE forthcoming total eclipse of the sun affords radio amateurs an excellent opportunity of experimenting on the effects produced by the eclipse in preventing the sun's rays passing through part of the conducting layer in the upper atmosphere. The shadow cast by the moon will pass through the reflecting surface of this layer at approximately 100 miles south-east of the path of the visible eclipse. During the eclipse, the layers over a broad band of the country between Cardiff and Grimsby will be a band of totality for radio observations. In the *Wireless World* for June 8, Prof. E. V. Appleton gives a popular description of the phenomena that are likely to happen, and offers useful advice to all who desire to attempt to record them. Observations, he says, ought to be confined to the broadcasting range or even to waves of shorter wave-length. These will probably give indications of the phenomena associated with sunrise and sunset after the normal sunrise has taken place. The observations made on the day of the eclipse will, however, be of little value unless they can be compared with the results normally obtained. Hence observations of a similar character should be made at least on the morning before, and on the morning after the day on which the eclipse occurs. Observers should choose a station the signals from which they can receive with great ease, and make a special study of the sunrise and sunset characteristics of these signals. They will, therefore, only have to note if any extra phenomena are observed on the morning of the eclipse. It is important to time each observation correctly with a watch or clock checked before and after the series of observations by means of time signals. It should also be recorded whether the times given are in British summer time or Greenwich mean time.

THE Halley Lecture on "Modern Eclipse Problems," delivered by Mr. F. J. M. Stratton on May 20 and just published by the Clarendon Press, Oxford, at 2s. 6d. net, provides a comprehensive and clear account of investigations, carried out and contemplated, into the nature of coronal light and related matters. Chief attention is rightly devoted to these subjects, because it is only during the brief period of a total eclipse that the corona can be studied spectroscopically or its form be portrayed. As Mr. Stratton remarks, "The question of the source of the coronal light, particularly in the lower levels, remains a very open one, and

further detailed work must be done, combining spectroscopic, photometric, and polariscopic methods, before a final answer can be obtained." The characteristic bright-line spectrum of the corona has not yet been reproduced in the laboratory, so that although a fair amount is known as to coronal lines and their relation to the chromosphere, some very fundamental questions still remain unanswered, and while it is only possible to study them for less than two minutes a year on an average, they are likely to remain so. All students of physical science will find Mr. Stratton's lecture full of interest, and his notes on the forthcoming eclipse on June 29 afford much valuable guidance to lay readers as well. We are glad that the lecture is available in time to be mentioned in this week's issue of NATURE and are sure that it will find many appreciative readers.

THE announcement that Sir Daniel Hall has ceased to hold the post of Director of the Intelligence Division of the Ministry of Agriculture will cause general regret on the part of agriculturists and many others. It is true that he retains the post of Scientific Adviser to the Ministry, and that, consequently, no immediate change in policy affecting agricultural research need be feared, but the need of scientific direction in the lower walk of education will always remain, and it is not clear how far the spirit of science will be permitted to inform the future administration of the Department. But Sir Daniel Hall's influence in the past has extended far beyond strictly scientific issues. It is no exaggeration to say that he has displayed a remarkable capacity for handling the difficult border-land problems that lie between technical husbandry and public policy. With no intention of commending the arts of the demagogue, we must admit that, in these days, the influence of the finished public speaker is very great, and that influence Sir Daniel Hall has exercised in a very marked degree. In a narrower field also, that of the committee of experts, this spiritual gift—if we may be permitted the epithet—has been equally marked, as many a doughty opponent, to his chagrin, has experienced. But we particularly cherish the recollection of an address delivered to a body of American students some years ago, which well illustrates Sir Daniel's many-sided gifts. His address—with delightful irony if we note the environment—deprecated the relentless pursuit of efficiency, and recalled with regret the conversion of a certain meadow "starred with Grass of Parnassus ('where, too, the sedgewarbler swung her nest') into a pond for the growth of food—to wit, watercress to grace the Cockney's tea-table."

WE are glad that the B.B.C. has decided to adopt the principle of stating the kilocycle figures instead of the wave-length figures in connexion with all its stations. The reason that has frequently been urged against giving the frequency instead of the wave-length is that the large figures involved might easily lead to mistakes. For broadcasting, however, this would not apply. The wave-length of the waves broadcast from Aberdeen, for example, is 500 metres

and the number of kilocycles per second is 600. The Union Internationale de Radiophonie, Geneva, has based its system of measurement on kilocycles (1000 cycles) and not on wave-lengths. The minimum spacing between a wave exclusive to a single station and a common wave used by several stations has been fixed at 10 kilocycles. When this is done the heterodyne note has a frequency of 10,000 vibrations per second, and so, even to one whose hearing is acute, it is barely audible. With the new arrangement all the kilocycle measurements are in round numbers. It is easier to remember that Daventry is 187 kilocycles per second than that it has a wave-length of 1604.3 metres. The London station has a frequency of 830 kilocycles and a wave-length of 361.4 m. In the future it will be designated by the former number.

AMONG the six ingenious inventors, Kay, Paul, Hargreaves, Arkwright, Crompton, and Cartwright, whose work laid the foundation of the great textile industry of Lancashire and ushered in the Industrial Revolution, Crompton is famous for his invention of the spinning-mule, a machine embodying some of the principles of the drawing rollers of Paul and Arkwright with the stretching contrivance of Hargreaves' jenny, which solved the problem of spinning fine yarns. Crompton was born on Dec. 3, 1753, and died at 15 King Street, Bolton, on June 26, 1827, and Bolton during Whitsun week has just been worthily commemorating the centenary of his death. The celebrations included an official visit of the Mayor and Corporation to the Swedenborgian Church of which Crompton was long organist and choirmaster, an exhibition at the Chadwick Museum, a pageant, a civic procession to Crompton's tomb and monument, and meetings of the Textile Institute at which papers were read referring to Crompton's work. Among these was a historical review by Mr. H. W. Dickinson, who represented the Newcomen Society; an account of the state of the cotton trade during its early development, by Mr. Frank Nasmith; and a paper by Mr. W. Scott Taggart dealing with the significance of Crompton's invention and subsequent developments. Like many of his fellows, Crompton, partly due to his shy and reserved character, failed to reap the full benefit of his invention. He was, it is true, given a Parliamentary grant of £5000, but he died in comparative poverty and obscurity, leaving furniture which was valued at £17.

DURING this summer the new diocese of Derby will be inaugurated, and All Saints' Church, Derby, will become the Cathedral Church. It is in the Cavendish vault in this church that Henry Cavendish is buried, and as there is no memorial to him it has been proposed that steps should now be taken to erect one. Cavendish was born in 1731 and died in 1810, and practically all his life was devoted to experimental science. His investigation of the properties of hydrogen and discovery of the composition of water, his famous experiment on the mean density of the earth, and his electrical investigations, have rendered his name immortal.

For nearly fifty years he was a fellow of the Royal Society. Some of his experiments were probably made in his father's stables in Great Marlborough Street, but the greater part of his life was passed in his bachelor home which faced Clapham Common. Though gifted with great acuteness of mind and sound judgment, and with a passion for accuracy equal to that of an Airy or a Rayleigh, he was morbidly shy and reserved and his life was almost that of a recluse. So shy was he, that no portrait of him was ever taken, and the only sketch we have was made surreptitiously. Brougham declared that Cavendish probably uttered fewer words than any one, outside a Trappist monastery, who lived to nearly four-score years. A contemporary of Watt, Black, and Priestley, Cavendish was the most distinguished natural philosopher Great Britain could claim, and he was recognised as such by other nations. Biot wrote of him as "le plus riche de tous les savants, et probablement aussi le plus savant de tous les riches." There are reasons for believing that a memorial tablet to Cavendish once existed in the church in which he lies, and it may have been removed when the church was restored about fifty years ago. In any event, the proposal now put forward is one which should meet with the support of all the various scientific societies whose work is included in the great domain of physical science and its application.

THE History of Science Society, which has its headquarters in the United States but is well known in Great Britain through its journal *Isis*, is following up the Newton celebration of last March at Grantham by a similar gathering at the Columbia University in New York on Nov. 25 and 26. The programme is full and varied. Mathematical, astronomical, and physical papers are to be followed by others which deal with matters only alluded to incidentally, if at all, at the English meetings. Thus there will be a full account of Newton's "Theological Thoughts" and his "Mint Problems," and an equally long paper on Newton's "First Disciple in America." We shall look forward with interest to this, for his name is not familiar to the ordinary Newtonian in England. There is also to be an exhibition of Newtonia, including the first edition of the "Principia," with portraits, medals, and autograph letters, of which very likely the United States may possess a larger store than we have in England. Any one who has such material and would be willing to lend it, should communicate with the secretary of the History of Science Society, Frederick E. Brasch, at the Library of Congress, Washington, D.C. The Programme Committee includes some of the best-known names in American mathematics, astronomy, and physics, and we wish the celebration every success.

DR. JOSEPH S. AMES, of Baltimore, has been elected chairman of the U.S. National Advisory Committee for Aeronautics in succession to the late Dr. Charles D. Walcott, who died on Feb. 9 last. Dr. Ames is one of the original twelve members of the Committee appointed in 1915. He was born in Manchester,

Vermont, in 1864, and worked at the Johns Hopkins University, from which he received his doctorate in 1890. After studying abroad, he went as assistant professor of physics to Johns Hopkins University and has been professor of physics there since 1890. In 1909 he was elected a member of the National Academy of Sciences for "outstanding work in physics," and was one of the first members of the National Research Council organised by the Academy in 1917. He is the author of many articles and books on physics, electricity, and mathematics. For the past eight years, Dr. Ames has been chairman of the Committee on Aerodynamics of the U.S. National Advisory Committee for Aeronautics, and as such has directed the preparation of research programmes for the air services of the U.S. Army and Navy, the Langley Memorial Aeronautical Laboratory, and the Bureau of Standards, and has effected a practical co-ordination of effort among the government and private agencies concerned with the scientific study of various aspects of the fundamental problems of flight.

THE report of the chairman of the National Illumination Committee for the year 1926 mentions that the proposed plenary session of the International Illumination Commission in New York has been provisionally postponed to 1928. In the meantime, meetings of the executive and technical committees are to take place in Rome in September this year. It is also stated that Belgium, Germany, and Japan have been added to the list of countries represented on the International Illumination Commission. In a supplementary report an account is given of the work of the committees operating under the British Engineering Standards Association. Five British standard specifications have been issued, or are on the point of completion, namely, those dealing with portable photometers, the British standard glossary of terms used in illumination and photometry, industrial reflectors for direct general lighting, illuminating fittings of translucent glassware for interior lighting, and street lighting. The question of neck dimensions of illumination glassware is now being considered, and the work on industrial reflectors is based mainly on the specification of a suitable 'cut-off angle' so as to diminish glare. The work of both these committees has been rendered difficult by the wide tolerances allowed on the light-centre-length of electric lamps, and it is hoped to set up standards for all types of lamps, or at least for pear-shaped and spherical lamps. Reference is also made to a method of defining glare which has been embodied in the specification on street lighting.

THE publications of the Science Museum, South Kensington, are most useful to inventors and to students of the development of various branches of manufacturing industry. We can commend the catalogue of the electrical engineering section recently published (London: H.M. Stationery Office, 1927. 1s. 6d. net). The descriptive and historical notes are well done, and the numerous illustrations almost dispense with the necessity of making a visit to the

museum. It proves the leading part taken by the pioneers of Great Britain in the development of the industry. In many cases the apparatus appears crude, but it generally shows the principle which the inventor more or less successfully endeavoured to apply in practice. From this point of view we think that replicas of the original apparatus, when the latter is not available, are most useful, and we think that the number of them might advantageously be increased. Faraday was the first and the greatest of the pioneers, but he was closely followed by Kelvin, Parsons, and Ferranti. Many of the exhibits have figured in famous law cases. Some of the apparatus was invented for special purposes and is no longer required. Some of the machines are still being manufactured with practically no change in their appearance or design, but others have been developed almost beyond recognition. We doubt whether high-tension direct current will ever develop in England. The transverter has still to prove its usefulness. The 230 kilovolt lines in California, mentioned by the writer of the 'notes,' will be eclipsed by the 380 kilovolt line being constructed in Germany. 'Copper-clad steel' for transmission lines is not now so popular as aluminium wires with a steel core. With this conductor spans of so much as 1000 feet are used in South Wales.

THE National Broadcasting Company of America has made good progress since it started six months ago. Its objects are to provide a high-class programme which will be within easy reach of every inhabitant of the United States. Its position to other broadcasting companies is analogous to that of the Associated Press to the local newspapers in Great Britain. It is noteworthy that it is paid for by indirect advertising. The American advertiser broadcasts what is called a 'sponsored' programme. His name is only heard in an unobtrusive way in connexion with the announcement of an item of the programme. An interesting account of the company's activities by A. Dinsdale appears in the *Wireless World* for May 11. More than a hundred broadcasting stations have applied for the N.B.C. service. Their lines radiate from New York to the Canadian border, to the Pacific coast, and to Florida and Texas. Special telephone circuits with special valve repeaters are used to carry the programmes to the various stations. On Feb. 22, 42 stations broadcast President Coolidge's address. It is estimated that 25 million people heard him. It was also transmitted by a beam wave and broadcast by the B.B.C. in England. In broadcasting *Faust* from the Chicago Civic Opera House, no less than 15 microphones in parallel were used. Two microphones were hung up high over the audience so as to produce an 'echo' effect, the sounds reaching them a fraction of a second later than they did the seven footlights microphones. The N.B.C. is not seeking a monopoly of broadcasting, and welcomes new local broadcasting stations. It is also hoped that considerable use will be made of its facilities, for educational purposes. A 'university in the air' well endowed by philanthropists is one of its ideals.

THE divergent views held by the Cambridge and Vienna schools on the question of disintegration of atomic nuclei by α -particles have again been brought into prominence with the publication by the latter of a group of papers in the *Zeitschrift für Physik* of May 5. It is still maintained that the conditions employed in the Cavendish Laboratory are such that a large number of scintillations due to H-particles of short range are missed, and, in particular, that with the special Hilger microscope used by Dr. Chadwick, the intensity of the flashes is limited because the pencil that emerges from the eye-piece more than fills the pupil of the observer. The validity of the Geiger test for efficiency of observation is also disputed, on the ground that when two persons count a group of particles of variable speed simultaneously, both will tend to miss the weaker scintillations. If the conclusions of Dr. Pettersson and his collaborators are to be accepted, the nuclei of almost all elements so far examined can be broken up, and the disruption can be accomplished by α -particles of small speed, with the production of protons the velocity of which has no marked lower limit. All of these results are in sharp disagreement with the experiments of Sir E. Rutherford and Dr. Chadwick. Carbon, for which the latter workers found no evidence of disintegration, and aluminium have been carefully re-examined, and the earlier Austrian results have apparently been confirmed by use of a photographic method, and with the Wilson expansion apparatus. Dr. Stetter has also succeeded in applying a modified form of the Aston mass-spectrograph to the problem, and has shown that protons are present in about the numbers found in the scintillation experiments, and with about the same velocities. The opinion of the Austrian workers is that whilst counting of scintillations does not always lead to accurate quantitative determinations, they can nevertheless usually distinguish between the flashes produced by α -particles and by H-particles, and that the results which they have obtained in this way are adequately confirmed by other methods.

REGIONALISM in some form or other has made rapid strides during recent years. Towns and districts with a local consciousness are taking stock of themselves in an endeavour to see what manner of region they are at present and what they will or may become. The latest aspirant to self-examination is south-west England. Its sponsor is the University College of South-West England, situate at Exeter. This region, it is claimed, is "a distinct natural unit with a long tradition of human settlement rooted in native soil and with a continuous cultural history little disturbed by the violent innovation of industrial activity." The survey aims at a detailed investigation of social life "viewed as the interaction of Place, People, and Work or Function." Under this comprehensive scheme everything within south-west England from boglands to betting, and from social stratification to the stratification of the rocks, comes under review. Now the collection of exact data, whether geological, anthropological, or social, for any locality is eminently desirable. Too often the recording of the present has

been forgotten in the admiration of the past or the aspiration for the future. It is desirable, also, that regional data shall be housed in some recognised centre for reference and possible collation for various purposes. To this extent the new survey is to be commended for the work it is about to undertake. The accumulated data will furnish raw material for innumerable workers and will provide a datum line to which subsequent investigations may be referred. There is a danger, however, that the survey may go beyond the scientific collection of data to a pseudo-scientific philosophy. To state that "racial or temperamental traits may be the result of climatic conditions and may in turn have some part in determining the religious outlook" is doubtful wisdom. The survey may well rest content if it can adequately observe and record all the data enumerated in its programme without speculating on doubtful relationships among various groups of data.

PENDING the publication of the report of the Board of Education's Committee on the public library service in Great Britain, which is expected shortly, the Carnegie United Kingdom Trust, according to the annual report for 1926, has for the most part been content to develop upon traditional lines. The most notable new departure is the policy of offering assistance in book purchase to the smaller-sized libraries on condition of their imposing a higher library rate. This, no doubt, is a step in the right direction in the case of growing towns, in which expenditure on book purchase is often pitifully low. We think, however, that the Trust should have differentiated between towns with stationary and growing populations. Town Councils are proverbially short-sighted in their willingness to accept cash gifts without adequate consideration of the liabilities attached thereto. When the period over which the Trust's gifts carry has passed away, the town may find itself saddled with higher official salaries, a larger stock of books to maintain, and little surplus income to meet the increased liabilities. We think also that the Trust would have been well advised if in making these grants it had stressed the importance of building up strong reference libraries. The tendency of the town's library is always in the direction of increasing its fiction department. Satisfactory progress is recorded in respect of the growth of the Central Library for Students and the 'outlier' library policy of the Trust, and we note with pleasure the rapid development of the work of the National Institute of Industrial Psychology. The fees received by the Institute increased from £6700 in 1925 to £8600 in 1926. The value of its system of vocational tests is now beginning to be recognised both in Great Britain and in the United States.

THE Malthusian League will celebrate its fiftieth anniversary by a dinner, on July 26, at the Holborn Restaurant, London. Among the speakers will be Mr. J. M. Keynes, Mr. H. G. Wells, and Mrs. Annie Besant, who was the first secretary of the League.

PROF. F. G. DONNAN, professor of general chemistry in the University of London, has been elected a

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member of the Royal Academy of Sciences of Amsterdam, thus filling the vacancy caused by the death of Prof. C. Golgi, of Pavia.

THE Makdougall-Brisbane Prize for the period 1924-1926 has been awarded by the council of the Royal Society of Edinburgh to Dr. C. M. Wenyon, for his distinguished work in protozoology. He will deliver an address to the Society at the annual statutory meeting to be held on Oct. 24, when the prize will be presented. The James Scott Prize for the period 1922-1926 "for a lecture or essay on the fundamental concepts of Natural Philosophy," has been awarded by the council to Sir Joseph Larmor, who will deliver a lecture to the Society on July 4. The prize will be presented on that date.

IN an address delivered at a meeting of the Psychological Society at Oxford, Sir Oliver Lodge stated that he considered it as not improbable that the synthesis of organic substances may eventually reach a point at which the production of protoplasm will become possible. The exhibition of vitality may follow. It is certain, he said, that living organisms appeared at some period on the earth, which was once a mass of molten material or even of incandescent gas; and what has happened before may happen again. The production and control of living substance may possibly come within the power of human agency.

"HEALTH WEEK" will be celebrated in Great Britain this year on Oct. 2-8. The object of Health Week is to focus public attention for one week in the year on matters of health, and to arouse that personal responsibility for health without which all public work, whether by the Government or local authorities, must fall far short of its aims. It is suggested that the dominant idea should be "Self help in Health." The movement known as Health Week was instituted in 1912, their Majesties the King and Queen are patrons, and the Royal Sanitary Institute undertakes the central organisation, but local celebrations in each centre are organised and controlled by local committees. A circular may be obtained from the Secretary, Mr. E. White Wallis, 90 Buckingham Palace Road, London, S.W., giving information of the aims and procedure and formation of local committees, with suggestions regarding items for the programme and subjects for lectures.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A full-time lecturer in electrical engineering in the Newport, Mon., Technical College and Institute—The Secretary and Executive Officer, Education Offices, Charles Street, Newport, Mon. (June 24). A metallurgical assistant, Grade II., in the Ordnance Factories—The Chief Superintendent of Ordnance Factories, Royal Arsenal, Woolwich, S.E.18 (June 24). An assistant lecturer in pharmaceutical chemistry at the Cardiff Technical College—The Principal, Technical College, Cardiff (June 25). An assistant for cancer research in the Bland-Sutton Institute of Pathology of the Middlesex Hospital Medical School—The Secretary, Cancer and General Research Committee, Middlesex

Hospital, W.1 (June 30). An assistant librarian (male) for the University of Aberdeen—The Secretary, The University, Aberdeen (June 30). An assistant lecturer in philosophy in the University of Birmingham—The Secretary, The University, Birmingham (July 1). A laboratory steward and lecture assistant in, respectively, physics and chemistry in the Durham Division of the University of Durham—The Head of the Department of Science, University of Durham, South Road, Durham (July 2). A medically qualified demonstrator in the physiology department of the Middlesex Hospital Medical School—The School Secretary, Middlesex Hospital Medical School, W.1 (July 7). A teacher of

engineering subjects at the Gloucester Technical College—The Principal, Technical College, Gloucester. An assistant bacteriologist at the Wellcome Tropical Research Laboratories, Khartoum—The Controller, Sudan Government, London Office, Wellington House, Buckingham Gate, S.W.1. A laboratory assistant under the Sudan Government—The Controller, Sudan Government, London Office, Wellington House, Buckingham Gate, S.W.1. A temporary junior assistant under the directorate of Metallurgical Research of the Research Department, Woolwich—The Chief Superintendent, Research Department, Woolwich, S.E.18.

Our Astronomical Column.

TIME SIGNALS FOR THE ECLIPSE.—Very ample arrangements have been made by the Astronomer Royal, in conjunction with Mr. Hope Jones and Mr. P. H. Hepburn, and with the kind co-operation of the B.B.C., for transmitting time signals on the morning of the eclipse. The 6-dot signals will be sent at 5^h 0^m, 5^h 15^m, 5^h 20^m, and 5^h 30^m U.T. The sixth is the exact minute. Also every second, except 29^s and 59^s of each minute, from 5^h 22^m to 5^h 26^m U.T., which covers the whole period of totality in Great Britain (Summer Time 1 hour greater than above). The minutes and every fifth second will be named verbally. The signals will be transmitted from Daventry (wave-length, 1600 metres), and we understand from London also. A full rehearsal of the programme was given on Saturday, June 11. Probably no previous eclipse has had such facilities for accurate time determination.

NEW COMET.—The sixth cometary discovery of the year has been made by Mr. Gale at Sydney. There are two previous comets in the catalogue, 1894 II. and 1912 II., discovered by Mr. W. F. Gale. As no initials are given in the present case, there is a doubt whether this discovery is due to him or to his son, Mr. A. W. W. Gale. The following two positions have come to hand.

	U.T.	R.A.	S. Decl.	Mag.	Observer.
June	7-604	21 ^h 38 ^m 0 ^s	31° 38'	8.0	Gale, Sydney.
	10-137	21 53 4	31 38	10.0	Gonnessiat, Algiers.

The deduced daily motion is +5^m 57^s, 0'. Not much stress can be laid on the decline in magnitude, as there is considerable personality in estimating this for comets. The comet is on the meridian at 3^h 30^m U.T., but is too far south for convenient observation in England. Its designation is 1927f. Of the six discoveries this year, four are new comets and two are the returns of periodic ones.

A LARGE SUNSPOT.—The large group of sunspots described in NATURE for May 21, p. 759, has made its appearance for the second time, being seen in transit across the sun's disc on June 1-15. When near the sun's east limb, there was a large spot followed closely by a smaller composite one. The latter spot was the nucleus of a growing train, which together with the original leader spot finally stretched across 10° of solar longitude, or about 70,000 miles, and had a total area of nearly 2000 millions of square miles. Latterly the group was decreasing perceptibly. It may be remarked that no magnetic disturbance was registered by the magnetographs about the time of the central meridian passage of the group on June 8. It is also of interest that at the time of the forthcoming total solar eclipse on

June 29, the tail-end of this group of spots, if still existent, will be at the sun's east limb at position angle 70°, measured from the north point of the disc. A solar prominence or any peculiarity in the sun's corona should be looked for in this region. Other details of this naked-eye spot—the largest seen as yet this year—are as follows:

No.	Date on Disc.	Central Meridian Passage.	Latitude.	Maximum Area.
5	June 1-15	June 8-0	16° N.	1/650 of hemisphere

THE NUMBER OF THE STARS.—The Scientific News Service of the Smithsonian Institution, Washington, for May 22, contains an interesting article by Dr. C. G. Abbot on the total number of stars in our system, which he takes as thirty thousand millions, or, as he calls it, 'thirty billions.' (This diversity of use between England and America as to the meaning of 'billion,' 'trillion,' etc., is a perpetual source of confusion, and a decision on the subject by the International Astronomical Union is much to be desired.)

The estimate is derived from star counts down to different limiting magnitudes on photographs of the Kapteyn selected areas. The ratio of increase in numbers for an increase of a unit in the limiting magnitude is found to tend to zero as the stars grow fainter. Assuming that the law continues for still fainter stars, the total number of stars can be arrived at, and is found to be 30,000,000,000.

Earlier investigations of the same kind were made by Chapman and Melotte from the Franklin Adams plates, and by P. J. van Rhijn. The former found the number of stars down to mag. 16.0 to be 33 millions, and by extrapolation similar to that of Dr. Abbot, found the total number in our system to be 3 or 4 thousand millions, which is only $\frac{1}{7}$ or $\frac{1}{8}$ of Dr. Abbot's result. But his is based on photographs showing much fainter stars than the other, so is more trustworthy.

Incidentally, Dr. Abbot gives a fallacious proof that the total number of stars is not infinite; for he says the whole heavens would then blaze like the sun. This is correct only for uniform distribution of stars throughout all space. There is an infinite number of ways in which we could arrange an infinite number of stars, without making the heavens more luminous than they are at present, even granting the perfect transparency of space. We would not contend that the number of stars is infinite, but it is desirable to avoid misleading statements in these articles. Dr. Abbot's estimate of the size of our stellar system is 100,000 light years in its maximum diameter, and 20,000 light years in its minimum one. The article goes on to give some details of stellar physics, including Eddington's recent researches.