News and Views.

THE new Sir William Dunn School of Pathology was formally opened at Oxford on the afternoon of Friday, Mar. 11. Unfortunately the Chancellor of the University, Viscount Cave, who was to have performed the opening ceremony, was prevented by illness from being present. The circumstances which led the Sir William Dunn trustees to make this magnificent presentation to Oxford were detailed by Mr. C. D. Seligman, the senior trustee present, and the building was gratefully received and declared open by the Vice-Chancellor, the Warden of All Souls, on behalf of the University. The objects of this munificent offer made to the University in Nov. 1922, subject to confirmation by an Order in the Court of Chancery of Feb. 1924, have thus been carried out. Of the total gift of £100,000, £80,000 has been devoted to the building and to its equipment, and £20,000 has been invested as a fund for maintenance and for the encouragement of the study of pathology. On the other hand, the University has provided a site of $2\frac{3}{4}$ acres near the south-east corner of the University Parks, and covenants to make permanent provision for the upkeep of a chair of pathology and for a full teaching staff. £3000 has, moreover, been allocated for the refitting of Prof. Dreyer's old Department of Pathology as a school of pharmacology -a subject which hitherto was poorly housed in attics under the roof of the old Radcliffe Library in the Museum.

THE building which students of pathology in Oxford have now for their use is of red brick with stone coins, and is in three storeys in a simple and pleasing style of architecture, well lit by large windows. The main entrance leads up to the first floor, where are the lecture-room, museum, library, chemical laboratories and culture rooms. The large students' laboratory, and numerous research rooms are on the upper floor, while the service rooms, the refrigerating plant and cold chamber, centrifuge room, low-pressure apparatus room, engineering work-shop, store rooms, etc., are in the basement, whence a covered way leads to the animal house, an important two-storey building where there is accommodation for the live-stock and a caretaker. The requirements of any modern building for biological research are now of so varied a character that a gift for planning of a high order is needed to provide all needful accessories in suitable juxtaposition, and Prof. Georges Dreyer is much to be congratulated upon his great and obvious success in this matter. He now controls the finest scientific building in Oxford. The following inscription is placed on the main staircase:

Hoc aedificium A.S. MCMXXVI completum suppeditavit Gulielmi Dunn Baronetti munificentia pecuniis ingentibus ad levandos humani corporis dolores testamento devotis.

IN a paper read to the Institution of Electrical Engineers on Mar. 3, Commander H. T. Harrison discussed the problem of public lighting by electricity. He pointed out that, since the War, practically no

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advance in public lighting has been made in Great Britain. In America, on the other hand, good progress is being made in this direction. The town of Indianapolis, for example, installed a system of public lighting ten years ago. It has now completely scrapped the system, with the result that the illumination has been doubled with very little increase in the annual cost. The reason given for the change was that the great increase in automobile traffic made it necessary. Commander Harrison, who is responsible for many public lighting schemes, favours centrally suspended light sources for most business thoroughfares. In streets with buildings on either side, the span wires can be fixed to the buildings; in other cases they can be attached to steel columns set well back from the road so as not to offer obstruction to the traffic. He said that in shopping districts, where improved lighting benefits trade, it is easy to get permission to fix the span wires to privately owned buildings. If high-powered gas-filled lamps were used they would only want renewing about three times a year. Access to the lamps could be obtained by electrically propelled and operated tower wagons. Heavy batteries at the base would provide the necessary power and ensure stability.

WHILST we admit, with Commander Harrison, that economies could be effected in this way with improved lighting, we think that many will be opposed to span wires. It is true that the main streets of the city of London are lit in this way, but we think that the unnecessary multiplication of overhead wires is to be deprecated. In a gale of wind it is noticeable that the movements of the shadows produced by the vibrations of the lamps are objectionable. For lighting high roads and arterial roads passing through populated districts and used by motor traffic, Commander Harrison proposes that concentrated light sources at a considerable height above the ground should be used. In our opinion, such a solution would make special additional lighting arrangements necessary in foggy weather. Some of the lighting problems discussed, for example the relative advantages of having lights in the centre of the road or at the side where the reflecting power of buildings must be taken into account, will be of value in the theory of photometry.

SIR FLINDERS PETRIE'S preliminary report on the work of the School of Archæology in Egypt, which, owing to the conditions imposed on archæologists in Egypt, is now engaged in investigating the Egyptian remains on the Palestinean side of the frontier, describes the infertile conditions which have prevailed on the frontier during the current winter. These, however, have provided a more plentiful supply of labour than is normal, and have in this way been propitious for the initial year of the School's work in the area. The fortifications of Gaza have been examined, and a fourteenth-century B.C. wall revealed, of which the lower construction may be of Canaanitish age. The present state of desolation of much

of the built-over area seems to offer a favourable opportunity for excavation, but much Roman material would have to be moved. In Sir Flinders Petrie's opinion, the site most likely to be profitable in historical results is that of Tell-Jemmeh, a mound about nine miles south of Gaza. The city was important in Hyksos times and flourished until about 1000 B.C., accumulating about 50 ft. depth of buildings. It was afterwards burnt and refortified, but its life ended about 500 B.C. A ruin in the neighbourhood named Umm Jerrar was supposed to be the Gerar of Abraham and Isaac, but this name probably belongs to the Tell. Gerar was of importance under the Philistine king Abimelech, but only appears once later under Asa in 940 B.C. During this season it is proposed to search thoroughly a fort with the surrounding buildings on the more prominent end of the Tell.

PROF. A. S. EDDINGTON, in his ninth Gifford Lecture in the University of Edinburgh on Friday, Mar. 11, reminded his audience that the typical laws of physics are not controlling laws; they are identities implied in the structure of the cycles of entities to which The controlling laws (if any) in the they refer. basal material are of a type which has not yet come within our knowledge. The physical universe cannot be completely subject to deterministic law unless mental states are also subject; it was for that reason that Prof. Eddington emphasised in an earlier lecture that through the new quantum theory physics is no longer pledged to a deterministic system-so that the nature of the governing laws of the mental substratum may be left open. After all, we have intimate acquaintance with a part of this substratum in our own minds. Prof. Eddington thinks that the hypothesis that this procedure is expressible by mathematical equations is scarcely plausible. We are disinclined to make this philosophical outlook too definite because we do not yet know how to place the physical laws of atomicity and quanta. The quantum theory is developing along rational lines, and this seems to suggest that the laws of atomicity will ultimately be assimiliated with the field laws by some profound extension of the idea of physical cycles. But the opposite view that whereas all other physical properties are due to our mental selection in worldbuilding, the integral character of atoms and quanta is inherent in the basal world-stuff, is attractive. It reminds one of Kronecker's famous saying in pure mathematics-"God made the integers; all else is the work of man."

THE Friday evening discourse at the Royal Institution on Mar. 11 was delivered by Sir George Macdonald on "The Wall of Hadrian." Hadrian's Wall consists of the stone wall itself, the ditch in front, the series of forts, mile-castles and turrets which housed its defenders, and the earth-work in its rear known as the Vallum. Excavation has shown that the earthwork is certainly not older, and probably rather later, than the forts, and was not a military work but a civil or legal boundary. The forts, again, or at least some of them, have been definitely proved to

be earlier than the stone wall. Thus we seem to get the chronological sequence-isolated forts, Vallum, stone wall. The evidence of pottery and coins suggests unmistakably that there was extensive destruction and restoration about A.D. 180, events that are certainly to be associated with the great rising in which southern Scotland was lost. The barrier was again swept about A.D. 270, and yet once more about A.D. 330. The final abandonment came about half a century later. In 1895, Prof. Haverfield and his colleagues of the Cumberland Excavation Committee discovered at Appletree a long stretch of wall built of turf, abutting at either end on the Wall proper, with which it did not seem otherwise to be organically connected. At first it looked as if the turf wall were going to provide a new and unexpected way of reconciling the rival claims of Hadrian and Severus, but in 1925 it (or another turf wall) was found six or seven miles farther east at Aesica, this time on the north of the stone wall and ultimately beneath it. Until further digging has taken place, it is unwise to theorise further. The key will probably be found at Birdoswald.

A PAPER read by Mr. H. N. Green at a recent meeting of the Illuminating Engineering Society dealt with a subject of great scientific interest, on which little is generally known-the use of artificial light in connexion with aerial navigation. Much care is now expended on the marking out of air-ways by beacons and the illumination of aerodromes to facilitate safe landing by night. The summit of a hill is not always the best site for a beacon. Hills are apt to be capped with clouds. It appears better to select a site slightly above the level of surrounding country and mount the beacon on a tower high enough to clear ground mists. Distinctiveness is usually given to beacons by flashing, the optical system rotating as a whole. But recently neon gas beacons, on account of the unmistakable colour of the light (red-orange) and the rapidity with which such lights can be flashed, have come into favour. It is even stated that the neon beacon at Crovdon aerodrome can be seen in clear weather by pilots leaving the French coast. Effective methods of 'floodlighting' landing areas have now been introduced, and by means of lights sunk in the ground, pilots can be informed of the intensity and direction of the wind. The greatest difficulty is fog. Regular flying is not yet attempted at times when the visibility is very low. But pilots are liable to be caught in a mist, and in such circumstances can receive effective aid by means of directional radio, and the 'leader cable,' which carries a low frequency alternating current, and traces the correct route into the aerodrome. Once this cable has been picked up by the instruments on the aeroplane, the pilot can steer his way to the landing ground, where special lights assist his descent.

PART 12 of Volume 3 of the *Rendiconti della Reale* Accademia Nazionale dei Lincei, which has recently been issued, contains an account of the meeting of the Academy held on June 5, 1926, in the presence of the King and Queen of Italy. In his opening speech the president, Prof. Scialoja, referred briefly to the activities

of the previous session. The library has been extended by the addition of premises adjacent to the Palazzo Corsini and should now meet the needs of the Academy for many years to come. The Copernican Museum, which was presented to Italy some years ago by the Pole, Wolinsky, and includes valuable records of the distinguished astronomer, together with old astronomical instruments and terrestrial and celestial globes, has been transferred from the Collegio Romano to a more fitting setting in the premises of the Academy. Among the donations announced were: the sum of 100,000 lire, given by the Bank of Italy, the Bank of Naples, and the Bank of Sicily, to celebrate the completion of the twenty-fifth year of the King's reign, to be awarded as a single prize for a thesis on the economic, financial, and social consequences of the European War; an equal amount, given by the Italian Banking Association, to provide a biennial prize; a similar sum, presented by the Assurance Company of Milan, on the occasion of its centenary, for the purpose of making a biennial award for scientific work bearing on insurance; 35,000 lire from the Italian Institute of Social Hygiene, to create two awards for investigations on the pathology of cancer and for work on social hygiene, and to furnish two gold medals to be given for work on social hygiene and industrial hygiene respectively; the sum of 125,000 lire, collected by public subscription in honour of Battista Grassi and presented by him to the Academy, to found an annual award for investigations on parasitology.

In the succeeding discourse, dealing with the conceptions of the atom and molecule due to Avogadro and Cannizzaro, Prof. Nasini protested against the opinion that, in the light of recent developments, the old fractional atomic weights correspond with mixtures similar to that present in sea-water and must be regarded as deposed. Prof. Nasini discussed the so-called 'Avogadro number' and is unwilling to consent to this magnitude being known as the 'Loschmidt number.' This name may justly be given to the number of molecules in unit volume of a gas for which Loschmidt was the first to determine an approximate value; the name 'Avogadro number' should, however, be retained for the number of molecules in the gram-molecular weight of any substance, this being a universal constant derived directly from Avogadro's law. Furthermore, although the ultimate particles of matter are now known to be the electrons and protons, and not the atoms, Cannizzaro made the definite statement that extension of the means of analysis available in his day might lead to further division of the atom of hydrogen, and later (1874) asserted that the atom contains parts capable of relative motion. The bearings on this question of the transformations of radioactive elements, of isotopes, and of the periodic law were also discussed.

THE March issue of the Nineteenth Century contains an interesting article by Mr. Edwin Edser entitled "Science and Wonderland." Mr. Edser's thesis is that physical science has left the broad highway of

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logic and consistency and strayed into meadows where all is new, surprising, and paradoxical-the wonderland to which his title refers. While practically all men of science must agree that the present position, with its coexistence of wave theory and quantum theory, and the difficult physical implications of the generalised theory of relativity, is full of paradoxes and trouble, it is open to question whether Mr. Edser's presentation preserves due proportion. and whether his particular criticisms are really cogent. He urges that an ether must exist by means of such arguments as, "If light is propagated through space in the form of waves, the space must be occupied by a medium which can propagate the waves. To speak of the propagation of waves in an empty space is as meaningless as to discuss the propagation of the human race in an uninhabited country."

THE real question, however, is not whether we use the term 'ether' or not, which is a question of words, but what meaning and properties we are to attribute to the ether. Einstein himself is quite ready to call empty space in which gravitational and electromagnetic fields prevail the 'ether,' but the properties of this ether are not the traditional mechanical properties which it was formerly sought to attribute to it. Mr. Edser's discussion of the theory of relativity, to which much of the article is devoted, gives a comparatively long account of the Michelson-Morley experiment. No distinction, however, is made between the special and the generalised theory, which are not even mentioned separately by name, while it is definitely suggested that the influence of gravitation on light was predicted by Einstein on the basis of a corpuscular theory. Again, the discussion of the quantum theory of spectra is not very satisfactory, for the statement that in the atom "only those orbits are possible in which the kinetic energy is equal to an integral number of quanta,' scarcely represents the essence of Bohr's theory, as usually understood. There is no reference to the new quantum mechanics of Heisenberg and his followers. the general trend of which can be put quite simply.

THE inclusion of Boyle's experimental notes on the mechanical origin of electricity and the mechanical production of magnetism in the "Old Ashmolean Reprints" being issued by Dr. R. T. Gunther (Magdalen College, Oxford. 3s.) was a happy thought. The notes give a clear account of the experimental knowledge and the orthodox theories of the subject current in 1675. We read how, when amber is rubbed or heated, it emits rays or "files of unctuous steams," which, when they become a little cooled by the external air, shrink back to the amber and carry with them any light bodies in the neighbourhood. Boyle points out how odoriferous gums and perfumes send forth fragrant steams when heated. Apparently navigators and others of that period were willing to pay the owner of a good lodestone to have their needles, swords, knives, etc., magnetised. It is also interesting to read how a bar of steel placed vertically acquires a temporary 'verticity' (polarity), and how when its direction is reversed the polarity is often reversed also. This was one of the experiments

Lord Kelvin used to show in his lectures on magnetism to students. He demonstrated also, like Boyle, how unstable was the induced magnetism.

DR. GEORGES SCHREIBER in an article in The World's Health for February discusses the important question, "Should a medical examination before marriage be obligatory ?" In a few of the United States a pre-nuptial certificate is necessary as regards the absence of venereal diseases, and in some States, in addition, absence of tuberculosis, epilepsy, and alcoholism. While generally restricted to the male, in two States the woman must also present a certificate. In other States a declaration on oath without medical examination is required. In the Netherlands, France, Germany, and Austria, pre-nuptial medical examinations are advocated by the health authorities, but there is no compulsion. In Scandinavia the registration by a doctor of a declaration on oath by the contracting parties as to their state of health is required. Dr. Schreiber considers that there are many objections to a compulsory pre-nuptial medical examination, and that the Scandinavian system seems to provide the most equitable, the most efficacious, and simplest safeguard.

AT a recent meeting of the Zoological Society of London, Lord Rothschild exhibited a mounted specimen of Varanus komodensis, the 'Dragon' of Komodo Island, Dutch East Indies. Specimens of other species were also shown for comparison. Much has been written lately about this, the largest of the lizards, but most of the statements are much exaggerated. The type-specimen is 12 feet 4 inches in length. None now alive on the island exceeds 10 feet in length, but their bulk is very considerable. The interesting feature of the Komodo monitor, apart from its bulk, lies in its relationship. The twenty-two other Indo-Australian species all have smooth scales, with one exception, tails much longer than the body, and narrow heads : V. komodensis, on the other hand, has the scales much raised with a central keel, a comparatively short tail, and a broad blunt head ; in these respects it resembles the much smaller West African lace-lizard V. albigu-The only Indo-Australian Varanus showing laris. raised scales, and these on the hind neck only, is V. rugicollis of Borneo, but this is a small slender species. V. salvator of western Malayasia and V. giganteus of New Guinea come near to V. komodensis in length, examples nearly reaching 8 feet being on record; but neither ever approaches this species in bulk, a 10-foot specimen of which weighed 3 cwt. alive.

THE Ural region has a special interest for archeologists, lying as it does on the route of migrations of prehistoric races between European Russia and Siberia. During the bronze age the region was one of the main centres of mining industry, as is evidenced by numerous remains of primitive mines. A still earlier period left its traces in various sites of palæolithic culture. But most interesting of all are numerous finds of wooden objects like boats, figures of gods, etc., which occur in the pith-deposits near the main ridge of the Ural mountains; these remains are

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similar to those found on the sites of ancient lake settlements on piles in Switzerland. No systematic investigations have been so far undertaken in the Ural region, but the Russian Academy of Sciences is organising a special expedition there in 1927.

THE Council of the British Association has nominated Sir William Bragg as president of the Association for the meeting in Glasgow in 1928. Rapid progress is being made with the arrangements for the forthcoming meeting in Leeds this summer, under the presidency of Sir Arthur Keith, and it is expected that a preliminary programme will be issued in April.

DR. HAROLD JEFFREYS has been awarded the Adams Prize for the period 1925-26 for an essay on "The Constitution of the Interior of the Earth, and the Propagation of Waves through the Interior and over the Surface of the Earth." The prize is awarded by the University of Cambridge every two years for an essay on some branch of pure mathematics, astronomy, or other branch of natural philosophy, and is of the value of about £250.

THE executive committee appointed to make arrangements for an International Botanical Congress in England in 1930 has decided that the Congress shall be held in Cambridge, commencing about the middle of August. The following officers have been appointed: *Chairman of the Executive Committee*: Prof. A. C. Seward; *Treasurer*: Dr. A. B. Rendle; *Secretaries*: Mr. F. T. Brooks and Dr. T. F. Chipp.

IN a letter to the editor, Mr. A. G. Tarrant refers to the sympathetic attitude displayed in the leading article in NATURE of Mar. 5 towards the appeal which is being circulated by the National Union of Scientific Workers. He raises the problem of the unqualified practitioner in science, and states that unless a definite assurance is given by the executive of the Union that it does not include any such workers in its membership, it will meet with opposition from members of such bodies as the Institute of Chemistry and the Institute of Physics. We have communicated with the general secretary of the Union, who informs us that it is definitely stated in the rules that one of the objects is "to insist on a legally recognised qualification for all scientists engaged in the practice of science for remuneration," and that "only those who possess a recognised degree in science, mathematics, or technology, or other qualification recognised as equivalent thereto," are entitled to the privileges of membership.

AT the annual general meeting of the Society of Public Analysts, held on Mar. 2, the following officers were elected: *President*: Mr. E. Richards Bolton; *Vice-Presidents*: Mr. R. L. Collett, Mr. C. H. Cribb, Mr. John White; *Hon. Treasurer*: Mr. Edward Hinks; *Hon. Secretary*: Mr. F. W. F. Arnaud.

MR. A. E. MOURANT, Department of Geology, University Museum, Oxford, writes asking for reports of the earthquake which affected lands bordering the English Channel shortly before 11.30 P.M. on Feb. 17. Further information regarding the shock of July 30 last would also be welcome (see NATURE, Aug. 7, 1926, p. 204).

APPLICATIONS are invited for the following appointments, on or before the dates mentioned :--- A patho-logist at the Charing Cross Hospital Institute of Pathology-The Secretary, Charing Cross Hospital Institute of Pathology, 62 Chandos Street, W.C.2 (Mar. 23). A junior scientific assistant for Admiralty research—The Secretary of the Admiralty (C.E. Branch), Admiralty, Whitehall, S.W.1 (Mar. 26). Two junior technical officers in an Admiralty Experimental Establishment—The Secretary of the Admiralty (C.E. Branch), Admiralty, Whitehall, S.W.1 (Mar. 26). An assistant in the Liverpool Observatory, Bidston-The Mersey Docks and Harbour Board, Liverpool (Mar. 31). Six forest officers for service under the Government of Burma-The Secretary to the High Commissioner for India, 42 Grosvenor Gardens, S.W.1 (April 1). A scientific officer under the directorate of scientific research, Air Ministry, primarily for research in con-

nexion with electrical ignition appliances-The Chief Superintendent, Royal Aircraft Establishment, South Farnborough, Hants (April 6, quoting A. 81). An adviser in agricultural entomology in the University of Manchester-The Registrar, University, Manchester (April 19). A professor of anatomy in King's College, London-The Academic Registrar, University of London, South Kensington, S.W.7 (April 21). An instrument maker for experimental work in the Experimental Department of the Fine Cotton Spinners' and Doublers' Association, Ltd., Rock Bank, Bollington, Macclesfield-The Secretary. A demonstrator in the mechanical engineering branch of the Artillery College, Woolwich - The Assistant Commandant, Artillery College, Red Barracks, Woolwich, S.E.18. An agricultural entomologist at the Kirton Agricultural Institute-The Principal, Kirton Agricultural Institute, nr. Boston, Lincs. A junior chemist, and a senior laboratory assistant, under the Lancashire and Cheshire Coal Research Association---The Director of Research, Lancashire and Cheshire Coal Research Association, College of Technology, Manchester.

Our Astronomical Column.

DISCOVERY OF A NEW COMET, 1927 d.—A telegram from Prof. Shapley, circulated by the I.A.U. Bureau at Copenhagen, announces the detection of the fourth comet of 1927. The discovery was made by Dr. C. L. Stearns, at the Van Vleck Observatory, Wesleyan University, Middletown, Connecticut, on Mar. 10 at 10^h 4·8^m U.T. in R.A. 15^h 16^m 6·0^s, south declination, 7° 21′ 43″. The comet was of the tenth magnitude, and its daily motion was -16^s , North 19′. On Mar. 19 it will be in R.A. 15^h 13^m 42^s, south decl. 4° 53′, assuming uniform motion. This is some 5° north of β -Libræ. Meridian passage will be about 3^h 30^m A.M.

RADIO RECEPTION AND SOLAR ACTIVITY.—A paper entitled "The Correlation of Radio Reception with Solar Activity and Terrestrial Magnetism" is con-tributed by G. W. Pickard in the Proceedings of the Institute of Radio Engineers, Feb. 1927. The purposes of the paper are to emphasise the need for prolonged systematic observations of radio reception and to give preliminary results which have been obtained from data extending over nine months. At the outset it appears that poor broadcast reception coincided with practically every magnetic disturb-ance of note between 1922 and 1926 as registered at Cheltenham, U.S.A., but in order to establish a more definite correlation, a series of nightly measurements of the radio reception at Boston of WBBM at Chicago (operating at 1330 kilocycles) was commenced early in 1926. Over this relatively short interval the author obtains a correlation factor of -0.89 ± 0.06 between radio reception and magnetic character on a monthly average basis. The graph for monthly averages show little correlation with sunspots, but on using moving weekly averages it appears that an increase of solar activity is paralleled by an increase in magnetic disturbance and a decrease in reception. Another graph, giving weekly departures from monthly means of sunspots, magnetic character of days, and radio reception, shows a succession of peaks suggestive of the well-known 27-day interval relation between solar disturbances and magnetic storms. Other points of interest are, first, that the low frequency end of the radio spectrum is not very sensitive to solar disturbances, the most sensitive portion being apparently between 1000 and 1500 kilocycles; secondly, that although the magnetic storm and reception depression begin together, the storm reaches its maximum before reception is at a minimum and magnetic quiescence returns two or three days before reception is normal. It is greatly to be hoped that the observations will be continued to substantiate thoroughly these interesting preliminary results.

SOLAR ECLIPSE OF JUNE 29.—The Ordnance Survey has published a very useful map of the circumstances of the total solar eclipse across England and Wales on June 29 (Southampton : Ordnance Survey, The scale is ten miles to the inch. 1927. 3s.). The central line, north and south limits of totality, the lines where the magnitudes are 0.99, 0.98, 0.97, 0.96, the lines where the sun's altitudes are 10°, 11°, 12°, 13°, and those where central eclipse occurs at U. T. $5^{h} 20^{m}$, $5^{h} 21^{m}$, etc., to $5^{h} 28^{m}$, are all laid down from computations made at the Nautical Almanac Office. As estimated corrections have been applied to the moon's positions calculated from Brown's Tables, the various curves should be accurate within a mile. The map shows contour lines for every 400 feet of altitude, the spaces between them being printed in different colours; this information is of use in selecting stations, as the sun is so low in Wales that it is important to ascertain whether high ground will interfere with the view.

The width of the track of totality is 28 miles on the west coast and 31 miles on the east coast; the speed of the shadow is about 100 miles per minute.

It may be mentioned that two excursions to the eclipse from London are announced; one by Messrs. Cook to Southport, the other by the L.N.E.R. to some point in Yorkshire near the central line. The departure from London is on the afternoon or evening of June 28, returning on the following afternoon. These should be very useful to observers pressed for time.

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