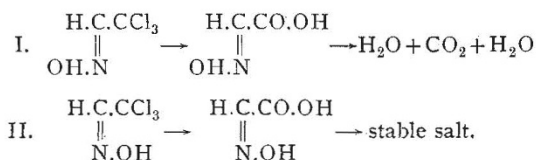


fields selected for description. Most of the advances which receive notice have been mentioned in these notes, but there are two which have not, and which deserve attention. Messrs. Reboul and De Bollement have found that copper and silver at 500° C. eject particles in a vacuum in oxygen, air, and carbonic acid, which form deposits on the walls of the containing vessel. In hydrogen no deposit occurs. Prof. Wiener has directed attention to the possibility of protecting balloons from lightning by replacing the cord netting now in use by netting containing wire, so that the balloon is virtually in a wire Faraday cage. He has also suggested the insertion in the gas valves of the Davy lamp arrangement of fine copper wire netting so as to protect the gas inside the balloon from the effects of electric sparks outside.

An interesting contribution to the study of the stereoisomerism of the oximes is contained in a paper by Mr. F. Carlo Palazzo on trichloroacetaldoxime (*Atti R. Accad. Lincei*, vol. xxi., ii., 530). Hitherto only one oxime, melting at 39-40°, has been obtainable from chloral, but it is now shown that this substance probably consists of a mixture of two stereoisomerides, as with water it gives what is apparently a mixture of the corresponding stereoisomeric oximino-acetic acids, one of which is readily decomposed further by alkalis, giving hydrogen cyanide, whilst the other forms a stable alkali salt. These changes are easily interpreted by writing them as follows:—



The view that the trichloroaldoxime, melting at 39°, is really a mixture is confirmed by the fact that it can be obtained with a considerably higher melting point, viz. 56°, when carefully freed from its syrupy congener, although it is still doubtful whether this material represents a definite individual.

The Engineer for January 3 says that there is no hesitation and temporising about the report which Sir Francis Fox has presented to the Dean and Chapter of St. Paul's Cathedral. Sir Francis states that the cathedral is overloaded, and is actually moving and cracking; the eight great piers supporting the dome have moved, and have sunk from 4 to 6 in. It is to be hoped that this report will settle once and for all questions affecting the injury that is to be anticipated from subterranean work in the neighbourhood of the cathedral. *The Builder* of the same date, commenting on this subject, says that, in view of the report, the abandonment of the London County Council proposal to construct a tram subway in the immediate vicinity of the fabric is practically assured; in face of such a report it would be folly to proceed.

An interesting article in *Engineering* for January 3 on the Daimler motor-omnibus gives some account of

the process of elimination whereby the present highly efficient motor-omnibus has been produced. In this process of natural selection, the police authorities gave very great assistance by avoiding the institution of any initial standard of perfection, and gradually increasing their requirements as experience was gained. The forward drives on the present omnibus are either direct or through chains, spur-gearing being used solely for the reverse. This plan is in consequence of the pressure of the London police authorities, who insisted that the omnibus should run as silently on low gear as on high. Helical wheels were tried, but failed to satisfy the demands of the authorities. In desperation almost, chain drives were installed, though the makers of the chains declared that they did not think that they would last a week, since not only was the pressure transmitted high, but the chain speed exceeded 2000 ft. per minute. As the event has proved, however, these prognostications were falsified, the chains giving a very satisfactory service. The chain pinions are of high-carbon steel, unhardened; the spur-gears used for the reverse are of nickel-chrome steel, case-hardened.

OUR ASTRONOMICAL COLUMN.

THE ATTRACTION OF SUN-SPOTS FOR PROMINENCES.—In an illustrated article appearing in No. 4, vol. xxxvi., of *The Astrophysical Journal*, Dr. Slocum shows that in some cases sun-spots apparently have a very strong attraction for prominences. He deals especially with a large group of spots which first crossed the solar disc between August 2 and 15, 1910, and received the Greenwich number 6874; at the next apparition it was numbered 6880, and, reappearing on September 27, as an extended group, its parts were numbered 6894 and 6893.

At each apparition active prominences and large flocculic areas were observed in the immediate neighbourhood of the spot, the best prominence displays occurring at the west limb on October 8, and at the east limb on October 22. Photographs, in calcium light, taken on the former date, show that the prominences were pouring down from both sides right into the large spot. So many jets are visible that there can apparently be no doubt as to their common direction; moreover, the measures of successive photographs indicate accelerated velocities for the matter forming these jets. Three bright knots, shown on photographs taken at 4h. 26.6m. and 4h. 34.9m., respectively, show velocities along the apparent trajectories of 16, 20, and 60 km. per second at distances of 170,000, 130,000, and 75,000 km. from the centre of attraction; other points recognised on two photographs give velocities ranging from 15 to 90 km. per second. In addition to the general feature of attraction there is also evidence of repulsion, but the jets showing this are very short-lived.

The distances over which the attractive force of the spot appeared to exert its influence are remarkable. The prominences covered 45° of the solar limb, and prominences 260,000 km. (162,500 miles) from the spot were evidently drawn towards it.

Both Hale and Evershed have previously found evidence for this spot attraction, but Dr. Slocum's observation differs from theirs inasmuch as he finds accelerated velocities for the prominence matter, whereas their observations indicated diminishing velocities.

THE NEXT RETURN OF ENCKE'S COMET.—In a communication to M. Flammarion, Mr. F. E. Seagrave gives the results of his calculations concerning the return of Encke's comet in 1914. From the elements, corrected for the Jovian perturbations, it is seen that perihelion passage should take place on December 5.89, 1914, while the ephemeris shows that the comet should be circumpolar and near to the earth about October 27, 1914; on this date its distance from us will be about 42 million kilometres (26.2 million miles), and the comet should be of about the fourth magnitude. The period found by Mr. Seagrave is 1204.8001 days. (*L'Astronomie*, December.)

THE MAGNITUDE AND COLOUR OF BROOKS'S COMET, 1911C.—In a note appearing in No. 4619 of the *Astronomische Nachrichten*, Herr Max Valier gives the magnitudes, diameters, and colours of Brooks's comet (1911C), as observed by him during the period September 7 to November 4, 1911. Both magnitudes and colours were regularly progressive until October 21, the former going from 5.0 to 1.8, the latter from bluish, through blue, greenish, greenish-yellow, yellowish-red, to white; the order was then reversed in both cases.

JOHN GOODRICKE.—A portrait of John Goodricke, the astronomer who discovered the periodicity of Algol in 1783, and suggested the accepted explanation of the star's variability, has recently been presented to the Royal Astronomical Society by Mr. C. A. Goodricke, of Hampstead. It is not generally known that John Goodricke was deaf and dumb from birth, yet, although he died in 1786, at the early age of twenty-two, his scientific attainments had earned for him the fellowship of the Royal Society and the award of the Copley medal; his astronomical work was done at York. An interesting letter, giving the chief facts concerning Goodricke's life, appears in No. 1, vol. lxxiii., of *The Monthly Notices*.

"THE COMPANION TO THE OBSERVATORY."—This useful annual, for 1913, contains practically the same matter as last year, with the various tables revised. Messrs. Denning and Lewis have revised the "Meteor Showers" and "Double Stars" sections respectively, and a welcome addition is a list of the principal star clusters and nebulae. It is interesting to note, from the page dealing with the universal time system, that every State of any importance, except Russia, now uses a standard time directly depending upon the Greenwich meridian; Russian time depends upon the Pulkowa meridian, and is 2h. 1m. fast on Greenwich. We remark that the editorship of *The Observatory* has changed hands, the new editors being Mr. F. J. M. Stratton, of Cambridge, and Mr. A. S. Eddington and Dr. S. Chapman, of Greenwich, in place of Messrs. T. Lewis and H. P. Hollis. The "Companion" is published by Taylor and Francis at 1s. 6d., and should be in the hands of every astronomical observer.

DEVELOPMENTS OF NATIONAL EDUCATION.

THE papers read at the North of England Education Conference, at Nottingham, on January 2, 3, and 4, give evidence of a growing realisation of the principal weaknesses of English public education. One of the most remarkable and significant developments in national education, and one to which considerable prominence was given in papers read by the Rev. W. Temple, headmaster of Repton School, and Mr. P. E. Matheson, New College, Oxford, respectively, is the valuable work of university level being done by the Workers' Educational Association. Mr. Temple stated that there are now more than 100 university tutorial classes in different parts of the country, with nearly 3000 students, which have been

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organised and provided by this association. These classes are limited to thirty students, who undertake to attend throughout a three-years' course. The class meets once a week for twenty-four weeks during the winter session. Each student writes an essay once a fortnight. The essays are pronounced by distinguished scholars to be equal in value to the work done in Oxford by men who take a first class in the honours history school. Mr. Temple concludes from the experience of the association, that "not only is a vast amount of intellectual capacity going to waste in England at this moment for lack of opportunity," but "that men who have only had an elementary education and no secondary can none the less do work of a university type at the proper age. Of course, they have not the *knowledge* . . . but apparently their intellectual capacity has gone on growing."

The advantages of practical and manual work of various types in elementary schools were frequently insisted upon. Mr. Bird, superintendent of handicraft, Leicester Education Committee, criticised effectively the defects of the present methods of manual training in schools, in which so much stress is laid upon mere copying of models, and so little attention given to developing the ingenuity and originality of the boys. A suggestive criticism was made by Mrs. Ogilvie Gordon in a paper on "trade schools" upon the much-quoted Continuation Trade Schools of Munich. She stated that "a weak point in the Munich system, and in most of the Continental systems, is that there is no easy bridge by which the public elementary and trade continuation class scholar can pass into the higher ranks of his vocation and complete his studies in the polytechnic or university. The avenue to these higher courses is solely through the gymnasial high schools."

Sir William Mather, in a weighty and important paper on the cooperation of employers and education authorities, complained "of the want of aptitude and intelligence, application and interest, displayed by a considerable majority of the boys and girls coming to work direct from the elementary schools." From his experience as an employer who had for some years made attendance at evening continuation schools compulsory upon his junior employees, he strongly urged a similar course of action upon all employers of labour. In a paper upon the educational responsibilities of the employer, Councillor George Cadbury, jun., described the remarkably complete scheme of continued education (mental and physical) in operation at the Bournville Works for the junior employees. The main features of the scheme are (1) compulsory attendance at evening continuation school, with remission of fees, and the award of prizes; (2) physical exercises and swimming during the firm's time; (3) special technical and commercial classes within the works during working hours. J. WILSON.

THE INHERITANCE OF FECUNDITY IN FOWLS.¹

THE application of Mendelian principles to the inheritance of an economically productive character of an animal has a twofold importance, viz. first, because it may be questioned whether or not it is possible to apply a Mendelian interpretation to the facts, and, secondly, the data and conclusions arrived at make it possible for others to outline a practical scheme of breeding with the view of an increased egg-production.

In the study before us, Mr. Raymond Pearl, an investigator well known by his work on the fecundity and breeding of fowls, sets forth in great detail the

¹ "The Mode of Inheritance of Fecundity in the Domestic Fowl." By Raymond Pearl, *Journ. Exp. Zool.*, 1912, pp. 153-268.