IN the *Atti dei Lincei*, vol. xxiv., No. 2, Prof. P. Pizzotti studies the relative central orbit of a pair of bodies attracting, according to the Newtonian law, but of variable mass. The investigation appears to be based on the assumption that the impressed force is equal to the product of the mass and acceleration, and not to the rate of change of momentum, the effect of variable mass thus being equivalent to a variation in the gravitational constant. The method would thus appear to be strictly applicable to the motion of two electrified bodies with variable charges, or attracting bodies parting with their substance by evaporation, but not to cases of bodies accumulating matter from without.

A RECENT number of *Scientia* contains an interesting article by Signor Aldo Mieli on Greek science and the characteristics of its development. He directs attention to the fact that while mathematicians hold in high esteem the achievements of Euclid and the investigations of Archimedes, and while the physician finds much to admire in the works attributed to Hippocrates, the chemist and the biologist are disposed to regard Greek speculation on their respective subjects as fruitless. These diverse judgments are due, he thinks, not to any different attitude of the Greek intellect towards one subject as compared with another, but rather to the special characters of the subjects themselves. The aim of Greek thought was the unification of disconnected knowledge. This laid the foundation of true science, but carried with it the tendency to reduce natural phenomena to a rigid geometrical or logical system. The culmination of Greek science was reached by Hippocrates, Aristotle, and Euclid. Hippocrates brought his generalisations to the test of observation; Aristotle in great measure did the same, the value of his results depending largely on the opportunities he possessed for checking them by observation and experiment. Euclid laid a solid foundation in the region of pure mathematics. The successors of the two former long delayed the progress of knowledge by an undue reliance on the dicta of their masters, but the "granitic" fabric of Euclid made possible the work of Apollonius on conic sections, and even the conception of the infinitesimal calculus reached by Archimedes.

MR. J. H. GARDNER, writing with reference to the note in NATURE of December 9 (p. 407) relating to the *Archives of Radiology and Electro-therapy*, in which the statement was made that "it is the only English periodical dealing with the subject of X-rays in all its bearings," reminds us that the Journal of the Röntgen Society, of which he is the editor, has for a much longer period dealt fully with this subject. The latter important and excellent journal, to which reference has frequently been made in NATURE, is, however, almost exclusively devoted to printing the Proceedings of the Röntgen Society, and therefore does not come within the same category as one dependent for its existence upon the conditions that apply to any other public periodical. For the same reason, we should not confuse the *Electrician*, or a new periodical on electrical engineering, with the Journal of the Institution of Electrical Engineers. This was the distinction we had in mind when referring to the new publication on radiology in all its branches.

UNDER the title *Archives Russes d'Anatomie, d'Histologie et d'Embryologie*, Prof. A. Dogiel, professor of anatomy and physiology in the University of Petrograd, has commenced the issue of a new periodical intended to make Russian workers in the three branches of biology embraced by it independent of German mediums of publication. All articles will be published in the Russian language, but they will be accompanied by translations into French or English, or summaries, which in no case will be less than three parts the length of the original paper. Three fascicules are to form a volume of about forty-five sheets of Russian text, illustrated by plates produced by the best engravers in Petrograd. The annual subscription will vary according to the number and nature of the plates, but will not exceed 12 roubles (25*s*.) for each fascicule. Subscriptions should be addressed to Prof. A. Dogiel, Pétrograde, Vasili Ostrov, 3e Ligne, Maison 4, logement 16, or to the publisher, K. Ricker, Pétrograde, Rue Morskaïa, 17.

OUR ASTRONOMICAL COLUMN.

COMET 1915*e* (TAYLOR).—This comet has been observed at the Naval Observatory, Washington, by Mr. H. E. Burton. On December 6, 11h. 33·5m., its position was R.A. 5h. 22m. 42·9s., declination 0° 1′ 36″, quite close to δ Orionis. Its magnitude is not stated.

SPECTROSCOPIC ORBIT OF 12 LACERTÆ.—Orbital elements have been obtained for this binary system by Mr. R. K. Young from a series of spectrograms secured at Ottawa. It presents technical difficulties owing to its extremely short period and faint magnitude. Its period remained in doubt until quite recently, and proved to be only 4h. 38m. 3s. The range of velocity is 35 km., the velocity of the system −14·23 km., the projected semi-major axis has the very small value =46600 km., and the mass function=0·0001. The spectrum is of type B2 (Crucian level). The system bears close resemblance to that of β Cephei.

THE USE OF THE BLINK-MICROSCOPE.—Further series of stellar proper motions found and measured by means of the blink-microscope are given in Circular No. 28 of the Union Observatory, South Africa. On twelve pairs of catalogue plates thirty-five stars with annual proper motions exceeding 0·1″ have been found. Of these seventeen were brighter than the 10th magnitude. Mr. Innes points out that observations of wide double stars justify the assumption that the vast majority of the stars on the plates is relatively "fixed" (*i.e.* moving as a group). Thus after picking out the proper-motion stars it would suffice for astrographic chart purposes to measure a mere dozen or so stars per plate, a proceeding which would cut down the vast programme of the Carte du Ciel Comité to 100,000 stars.

THE STRUCTURE OF THE SPECTRUM OF THE SOLAR CORONA.—The recent brilliant application of Planck's quantum theory to the explanation of some celestial spectra by Prof. J. W. Nicholson demonstrated that vibrations of a hypothetical dynamical system—the so-called protofluorine atom—should be capable of giving rise to the majority, but not all, of the then known lines in the spectrum of the solar corona. Among those not so picked up were three prominent lines, one of these being the well-known λ 5303, the others having wave-lengths 4359 and 3534 Å. Prof. Nicholson stated that the cube-roots of the wave-lengths of these lines differed by a constant quantity,

a community of origin being thereby probably indicated. M. P. Carrasco now points out (*Comptes rendus*, vol. clxi., p. 631) that there is an additional member of this series, the next earlier term being the red line at λ 6374·2. This line, unknown when Prof. Nicholson was pursuing his investigations, was the most important feature of the coronal spectrum as photographed at the late eclipse (August 21, 1914), and M. Carrasco was one of the fortunate observers who obtained a record of the line.

AREAS OF ABSORPTION MARKINGS ON SECTROHELIOGRAMS.—The results of the limb prominence observations made at Kodaikanal Observatory during the first half of the current year are given in Bulletin No. 47. The mean daily area is the largest since 1908, and shows an increase of 59 per cent. over that for the preceding six months. Prominences seen projected on the disc as absorption markings on spectroheliograms taken in the light of the Hα reversal are being specially recorded with the grating spectroheliograph for measurement. Mean daily areas in millionths of the sun's visible hemisphere and mean daily numbers for the five half-years 1912–13, and January–June, 1915, are published in the above bulletin. For the second half of 1913 the areas were sixty, whilst for the first half of the present year they were 1375·6. The distribution in latitude of these markings shows the prominence maximum between 50° and 60°, together with a pronounced maximum about 30°, due to prominence in spot latitudes, the equator being avoided, as in the case of sun-spots.

THE CORROSION OF METALS.

ON December 8, under the presidency of Sir Robert Hadfield, the Faraday Society held a discussion on the corrosion of metals. Of the seven papers contributed, only two dealt with the more general aspects of this very important question. Three were concerned with the corrosion of iron, and some of the numerous steels which find application in modern industrial life; the remaining two had reference principally to marine condenser tube alloy, 70 : 30 brass. As it turned out, there was almost no discussion on the fundamental characteristics of corrosion phenomena. During the first hour instances of corrosion among iron alloys came under review, the remainder of the evening being devoted to a consideration of the corrosion of copper-zinc alloys.

As Dr. Rideal pointed out in his printed contribution to the more fundamental aspects of the question, "the phenomena observed in the corrosion of metals are to be found scattered among the earliest records of mankind, and in consequence of the universality of the subject we have received a heritage consisting of a jumble of facts and theories." The first report by Dr. Bengough to the Corrosion Committee of the Institute of Metals consists mainly of a critical examination of the views held with regard to the cause, or causes, of the corrosion of marine condenser tube alloy, the general conclusion being that the evidence is so conflicting that no particular view can be regarded as at all firmly established. The committee, therefore, in planning the experimental investigation decided that there was nothing for it but to begin at the very beginning and take nothing for granted.

Dr. Rideal's definition of corrosion is as follows:—"Corrosion may be said to result from an irreversible chemical change proceeding with a small velocity and taking place on the common surfaces between two or more phases, the products of which change are continually removed from the sphere of action." Moreover, it takes place generally on the surfaces of phases which are electrically conducting, a fact which lies at the base of the now generally accepted electrolytic theory of corrosion. This theory requires the presence of minute cells operating on the surface of the corroded metal or alloy. As yet, however, there is no information as to the number of such cells or the rate at which they work.

Dr. Desch's contribution dealt with the influence of physical and mechanical factors in corrosion, an aspect of the subject the importance of which is by no means always adequately realised. Although the process of corrosion is probably in all cases initially one of chemical solution, the physical heterogeneity of the metal or alloy has a considerable influence on its nature and velocity. More especially has this to be considered when it is remembered that many of the commonly used industrial alloys are in a "strained" condition, and contain, as Dr. Beilby has shown, films of amorphous material on the surfaces of slip of the crystals. Such films have been demonstrated to be more electropositive than the crystalline material, a fact which determines the course of corrosion of cold-worked metals in particular. The increased corrodibility of such alloys is no doubt also partly to be ascribed to the energy produced by work being stored up in these films.

The Cumberland process for preventing the corrosion of metals immersed in liquids, of which a demonstration was given at the close of the discussion, is based upon a recognition of the galvanic nature of this phenomenon. It consists in introducing a higher counter-electromotive force to that causing the corrosive action. A continuous current working at 10 volts is supplied to the anode, consisting of pieces of iron suspended in the liquid and insulated from the vessel being protected. It is claimed that this system has been in use in all types of steamships and in many large power plants, and that it is applicable to any metal in contact with water or any other corrosive liquid.

H. C. H. CARPENTER.

VISCOSITY OF OILS.

THE Institution of Petroleum Technologists is one of the most recent of our technological associations. Founded in 1913, to advance the study of mineral oils from the various points of view of the chemist, the geologist, the engineer, the prospector, and the financier, it has shown from the first a healthy vitality and the promise of a vigorous future. At a general meeting held on November 16, at the Royal Society of Arts, the institution had the pleasure of listening to an illuminating address by Dr. Glazebrook on the viscosity of oils in relation to the rate of flow through pipes. The tests described had been undertaken at the request of the Admiralty, and permission had been given for their publication. The results of the investigation showed that the ordinary law of viscous flow, $P/V=2\eta/9gd^2$, holds good in the particular case postulated so long as the critical velocity which is given in the expression $\rho Vd/\eta=2500$ is not exceeded.

Many experimental difficulties were met with in the actual measurements, which were carried out in the engineering department of the National Physical Laboratory by Mr. Pannell. The small variations in pressure were measured by means of a sensitive mercury tilting gauge, and the quantity of oil passed per minute through the pipes was measured on an Avery weighing machine. Thermal changes were eliminated by jacketing and careful electrical heating.

In general excellent agreement was found between the calculated and observed values of P/V through a wide temperature range.

Part ii. of the research was occupied with the determination of the physical contents of the various oils which were used. The densities call for little com-