OUR ASTRONOMICAL COLUMN.

VARIABILITY OF EROS.—In the *Astronomische Nachrichten* (Bd. 154, No. 3688), Dr. E. von Oppolzer describes his observation of the planet Eros, which led to his announcement of its variations in brightness. The measures were made with the Zöllner photometer on a Grubb refractor of 8¼ inches aperture at Potsdam.

In the same journal there are further confirmatory reports from the observatories of Königsberg and Heidelberg.

NEW TYPE OF SHORTENED TELESCOPE.—In the *Astronomische Nachrichten* (Bd. 154, No. 3691), M. E. Schaer describes some experiments he has made at the observatory of Geneva with the object of facilitating the use of long focus objectives. The light from the object glass is reflected backward and forward from two silvered plane mirrors, so that the distance between eyepiece and objective is only about one-third the focal length. Good photographs of the sun's surface were obtained by using unsilvered glass mirrors and giving an exposure of about one-fiftieth of a second.

CATALOGUE OF NEW VARIABLE STARS.—Harvard College Observatory Circular, No. 54, contains a catalogue of sixty-four new variable stars discovered by the observers at that institution. The majority of these have been detected on examination of the Draper Memorial spectra, by reason of the presence of bright lines of hydrogen in the peculiar cases. For the purposes of this catalogue the variables have been divided into two main classes (1) those having a large range of variation, (2) those in which the extent of variability is small—from half a magnitude to a magnitude. The variables examined are then classified under these headings, 39 of long, and 25 of short period.

NEW COMPONENT OF THE POLAR MOTION.—In the *Astronomical Journal* (vol. xxi. No. 490), Prof. S. C. Chandler makes a preliminary announcement of the detection of a new component relating to the motion of the terrestrial pole. In addition to the already known 428-day and annual terms, he now finds a variation having a period of 436 days and a radius of 0″·09—considerably smaller, therefore, than the others. In the absence of more minute data, the orbit is assumed circular, and the author proceeds to investigate the nature of the variation produced as the resultant of the old 428-day and the new 436-day motions.

The combined motion is found to be subject to a period varying from 431·4 and 415·0 days, the mean length being 428·5 days. The fluctuations are embraced in a cycle of about 57 periods, or 67 years. With respect to the whole cycle, however, the changes of period are of a remarkable character. During five-sixths of the cycle the period remains between its mean value and the upper limit, *i.e.* between 428·5 days and 431·4 days; then it suddenly shortens to minimum, 415 days, and immediately rapidly lengthens again. In addition to this the variations of the radius of motion are also singularly asymmetrical. It is at present about 0″·07 and approaching its minimum value of 0″·05; there was a decrease from 0″·17 to 0″·11 between 1890 and 1897. It will be interesting to note whether the predicted variation of the period actually takes place. Between 1850 and 1890 it persisted at the value 430 days, is now about 428 days, and should continue to shorten to the minimum value of 415 days within the next few years; but of course no sharply-defined numerical limit can be stated on account of the fact that the length of the harmonic cycle, which depends on the difference of the two component periods, is imperfectly determined by existing observations.

INAUGURATION OF A BIRMINGHAM SECTION OF THE INSTITUTION OF ELECTRICAL ENGINEERS.

DURING the last few years, the Institution of Electrical Engineers has actively encouraged the formation of local sections, each having headquarters in some industrial centre.

These local sections are free to manage their own affairs, but the parent Institution arranges that important papers read at any of the local centres are incorporated in their journal, as also are local contributions to the discussion of papers read originally in London. Of the five branches now existing, the most recently formed is that in Birmingham.

The Birmingham local section of the Institution of Electrical Engineers has been fortunate in its first chairman, Dr. Oliver Lodge, principal of the new University, who delivered an address from the chair on Wednesday evening, February 27, at the Inaugural Meeting of the section, before a large gathering of engineers. The president of the Institution, Prof. John Perry, was present to support the local movement.

In the course of some opening remarks, Dr. Lodge congratulated the parent Institution on its wisdom and enterprise in forming local branches. Multiplicity of publishing centres was bad for science; but the lack of stimulus to local exertion was bad too. By the present action of the Institution both evils were avoided.

The original Society of Telegraph Engineers dealt chiefly with cable enterprise. Then it took over successively the telephone, electric lighting, transmission of power, and tramcars; and now it seemed about to take over underground traffic, and, in some countries, the railways themselves. Again, a warship was full of electrical contrivances, and the Institution sent a corps of experts to add to the land forces in South Africa.'

With regard to the engineer's education, the chairman pointed out that it must be truly scientific. Some said that a general education and mathematics were unpractical and useless encumbrances. What they really meant was that if a youth had these and nothing else he was useless, and that he would be more useful if he failed to possess these, but did possess many other powers and aptitudes. This was true; but the two were not mutually incompatible.

Mathematics, for example, was often so taught that by the time a man had acquired a great deal of it he was somewhat unfitted for anything else. A common-sense mathematical training was an essential for an engineer or for a physicist. Euclid himself was splendid. So was his book for its day and generation, and its purpose as a system of geometrical philosophy admirable; but it had had its day, and for elementary and popular purposes should now cease to be. We were too busy; there was too much to learn nowadays to have time to cross every river by ascending to its source and walking down the other side. Professional guides along the old river path still attempted to hide the bridges, because if they were too easily seen their occupation would be gone; but the bridges were there, and sooner or later even schoolboys would be permitted to make use of them and enjoy the country on the other side, without spending all their days in a toilsome and deterrent mode of getting there over a route approved by the ancients.

The pursuit of pure science for its own sake was a good and wholesome formula up to a certain point, because the tendency of unregenerate man had always been opposed to it. The usefulness of scientific application needed no preaching, but, strangely enough, there was a great tendency to forget or ignore the scientific foundation on which they rested. And the human mind was so constituted that, as a rule, the necessary powers and aptitudes for the two things did not go together. The man who could pursue pure science did so best, as a rule, when he was not distracted by considerations of utility; the applier of science, on the other hand, soon got so immersed in practical details and pecuniary considerations which were clearly vital that he had neither leisure nor inclination, nor always the right kind of ability, for advancing the pure science itself.

Pure science must always advance into territory which appeared for the moment rather useless and barren and aloof from humanity; it must be so, since it was new ground never open to humanity before. Consequently there was a weird unearthliness about it which to people engaged in the turmoil of business might be cold and repellent, if ever they allowed themselves to be assisted to breathe its atmosphere for a moment. The strange, new, unknown, bracing air had a fierce fascination of its own, akin to that of the lone ice-packs of the Arctic seas to the healthy and intrepid explorer, or as the mountain tops were to the members of the Alpine Club. So enticing did the atmosphere of pure science become to those who frequently breathed it that to them sometimes it seemed the only air worth breathing, and the everyday atmosphere of humanity was close and stifling in comparison. Let such men of genius alone; encourage them in their quest; they were not too numerous, and whither they showed the way others hereafter would follow. Moreover, the region which they entered was no limited Arctic circle in reality; it was, as it were, the Arctic entrance to another world, whence, if they penetrated further in pursuit of the pioneers, they would ultimately reach the temperate zones of work and livelihood and applied science; nor need they doubt but that at some far distant date the human race might at length make its way on through those regions too, and attain, even by that apparently arid path, the rich tropical belt of luxurious verdure and bright sunshine where conflict ceased and art and enjoyment and emotion and religion began. Facts known to few with effort were science, but those same facts when known to all without effort were æsthetic; they could then be appreciated in a fuller and higher way, could be seen in an altogether new light, so that they became fit subjects for poetry, for music, and for art.

Meanwhile, the justification of all pure, dry science lay essentially in its ultimately human bearings. If a subject could be proved to be never capable of any human influence or any relation to humanity, however developed it might become, then its pursuit would be rightly condemned. But such proof could never be given. Again and again had the most unlikely channels developed into fruitful watercourses. We must trust the instinct of our leaders and let them advance unhampered, in the faith that where they felt so much enthusiasm, where they seemed to see their way so clearly and so well, we too, in time, or our descendants, should be able to enter with their aid, and should realise that the remote and at first sight hopelessly inaccessible region was full, after all, of human interest, and of that which contributed to the enrichment of life.

Referring to the present state of electrical knowledge, Dr. Lodge spoke as follows:—

"We are in the beginning of a great era in connection with the pure science of electricity. The almost despised and neglected subject of electrostatics, as known to Franklin, is rearing its head again and pressing to the front.

"The experiment of a charged rod and pith balls is typical of much, perhaps typical of all that goes on in electricity; and how much this means some of us are beginning to guess. It is to the works of Larmor and the late Prof. Fitzgerald that we must look for an explanation of the nature of an electric charge —that blank, that absolute void so wisely left by Clerk Maxwell in his scheme, and by Helmholtz in his—a void occupied only by the isolated brilliant surmise contained in the phrase 'one molecule or atom of electricity.'

"But even before we understand the nature of an electric charge we shall find that the labours of J. J. Thomson have enriched the science of our times with what appears likely to be a unifying and comprehensive generalisation such as philosophers of all time have groped after, for which some of them have strongly hoped."

Concluding his address, Dr. Lodge illustrated with a few simple experiments the most recent views of the nature of the electric current. The atom was ordinarily associated with a charge, and force was required to separate them. This atomic charge, when separated, was known as an electron.

In the electrolyte there was a bodily transfer of atoms with their atomic charges.

In a metallic conductor the charges were handed on as electrons from atom to atom.

But it was in the discharge through highly rarefied gases that the electric current was in its most simple form, for here there was a flow of electrons travelling by themselves, of disembodied charges or electric ghosts. It was interesting to notice that, with their enormous speed of one-tenth of that of light-wave propagation, these electrons were the fastest moving of all known terrestrial objects.

A revolving electron was a magnet. A vibrating one could start light vibrations. And it might even be that inertia itself —that familiar but unexplained property of matter—was but electromagnetic inertia in disguise.

Prof. Perry, in thanking the chairman for his address, remarked that the country was now very much alive to the need for improvement in the scientific education of practical men. All the scientific world was watching to see what Dr. Lodge was going to make of the great problem that was before him of the Birmingham University.

He deprecated the tendency in this Institution to array professors and engineers against one another, and advocated the cultivation of a spirit of mutual helpfulness as between men whose various endowments must be interdependent if they were to be fully utilised.

Prof. Perry congratulated the new local section on its successful start and on its locality, saying that the people of Birmingham were very early in introducing scientific methods of manufacture. The stress of international competition called for the greatest activity in scientific methods in all our centres. The Institution of Electrical Engineers was doing a great work and had a great future before it in binding together the best thinkers in a great association for the common good.

Prof. Threlfall seconded the motion, and the meeting concluded with a feeling reference to the untimely death of Prof. G. F. FitzGerald, who was chairman of the Dublin local section of the Institution.

THE TAMNAU MINERALOGICAL ENDOWMENT.

IN the year 1879 occurred the death of Dr. Friedrich Tamnau, a rich Berlin banker, who was also an enthusiastic collector of minerals; his collection was well known, and was frequently used by mineralogists; a considerable portion of it was given to the Berlin Museum during his life-time, and at his death the remainder was bequeathed to the technische Hochschule at Charlottenburg.

Dr. Tamnau's services to the science of mineralogy did not end with his death. He left to the University of Berlin a sum of 36,000 marks for the purpose of founding a mineralogical travelling fund.

By the statutes of the founder it is enacted that when the fund has accumulated to a sufficient extent it shall be employed in sending away a young and promising mineralogist to some interesting locality, in order to study the modes of occurrence of fine or rare minerals, to collect, and to report upon them. It is expressly stipulated that the fund is to be applied to mineralogical, not geological, purposes. The specimens are to go in the first instance to the Berlin University collection, then to the technische Hochschule, but they may also be given or exchanged to other collections. The administration of the fund is in the hands of three trustees; those named by the founder to hold office at the beginning were Profs. von Rath, of Bonn, Groth, of Strassburg, and Websky, of Berlin.

The first application of the Tamnau fund was made in sending Dr. Tenne, of Berlin, on a successful mineralogical tour in southern Spain.

Two of the original trustees are dead, and the fund is now administered by Profs. Groth, of Munich, Klein, of Berlin, and Bauer, of Marburg.

The second award, 10,000 marks, was made in 1896. Dr. F. Grünling, the well-known assistant of Prof. Groth, first at Strassburg and subsequently at Munich, and now curator of the State collection of minerals in Munich, was commissioned to undertake a mineralogical expedition in Ceylon.

The valuable results of Dr. Grünling's tour have now been published. A triple Heft (Nos. 3-5) of the thirty-third volume of Groth's *Zeitschrift für Krystallographie und Mineralogie* is almost entirely occupied by the scientific work done upon the material which was brought back from Ceylon, and those who wish to see the excellent results of a wise scientific endowment wisely administered cannot do better than glance over this publication.

Dr. Grünling brought back rich collections, especially of the dolomite and the minerals which it contains, of the graphite and of the gem-stones; among the latter the most remarkable are the tourmalines, which constitute a unique series of beautiful crystals.

All these minerals have now been examined by various workers in Prof. Groth's laboratory. The graphite has been the subject of exhaustive study by Dr. Weinschenk, the lecturer on petrology in the University of Munich, who has already published papers on the subject in the *Zeitschrift für Praktische Geologie* and in the *Abhandlungen* of the Bavarian Academy of Sciences. The dolomite has been analysed by Dr. Schiffer, whose results have been given as an inaugural dissertation. And now has appeared this triple Heft of Groth's *Zeitschrift*, containing a general description of Ceylon and its minerals by Dr. Grünling, a research upon the chrysoberyl, the sillimanite and the blue spinel by Dr. Melczer, and a voluminous report upon the tourmaline crystals by Dr. Worobieff, whose memoir occupies nearly 200 pages, and is in reality a crystallographic monograph of the mineral

The fact that so much has been achieved will suggest to the reader that the collection and scientific study of Ceylon minerals has been sadly neglected by our own countrymen. A perusal of Dr. Grünling's paper serves but to strengthen this conviction.