OUR ASTRONOMICAL COLUMN

A SEVENTH STAR OF THE ORION-TRAPEZIUM.—In addition to the well-known fifth and sixth stars in the trapezium of Orion, the former detected by Struve with the Dorpat refractor on November 11, 1826, and the latter by Sir John Herschel with Sir James South's large refractor at Kensington, on February 13, 1830, the elder Bond, soon after the mounting of the Harvard instrument, perceived, roughly in the direction of the sixth star, a fainter and more distant one, which is No. 24 of his memoir on the nebula published in 1848. M. O. Struve, with the telescope of similar dimensions at Pulkowa, could not see this star, a circumstance which might be attributable either to variability, or to the difference of altitude of the object at Pulkowa and at Harvard College. It was repeatedly observed by G. P. Bond, and is No. 636 of his catalogue printed in *Annals* of the Astronomical Observatory of Harvard College, vol. v., where its magnitude is estimated to be 13·3 on Argelander's scale. The Pulkowa measures gave for the sixth star position 128°·8, distance 3″·73 at the epoch 1858·78; from the Harvard differences of right ascension and declination we find, for the seventh star, position 136°, distance 12″·1. In Bond's later notes the following references to this star, amongst others, occur :—1863, January 19 and 23, difficult; January 30, easy, though faint; February 14, not difficult, though requiring attention and effort. 1864, February 3, under fine definition, though easily seen, probably fainter than in the previous year; February 29, readily seen and possibly brighter. Referring to the notes in 1850 and 1851, it is remarked that the star is "often mentioned in these earlier observations; as *certainly* seen on the dates 1850, February 7, March 2, March 5, March 11; it is not mentioned March 10, and was not seen March 12; not mentioned 1850, December 27, but seen again 1851, February 3." It was observed on several occasions in 1859 and 1860. On January 28, 1861, seen by glimpses, and on February 13 easily. On January 31, 1862, not seen. Some of these observations might appear to point to variability, but others seem to afford "another and quite different explanation of the phenomena." If we are not mistaken, this seventh star has been recently caught up with the Ealing reflector; but there are other telescopes in this country which should be competent to cope with it, and the star may deserve some attention.

LUNAR ECLIPSES.—In the small eclipse of the moon (magnitude 0·17) which will occur on the 28th of the present month, the first contact with the shadow takes place at Greenwich at 3h. 37m. P.M., and the last contact at 5h. 15m.; the moon rises at 3h. 46m. Of the eight lunar eclipses occurring within the following five years, only one, that of October 4, 1884, will be wholly visible in this country. The circumstances of these eclipses may be thus very briefly indicated :—

1880, June 22.—Invisible, the middle at 1h. 50m. P.M.
Dec. 16.—Total; beginning of total phase at 2h. 54m. P.M., the moon rising at 3h. 46m.
1881, June 12.—Invisible, the middle at 6h. 54m. A.M.
Dec. 5.—Nearly total (0·97); first contact with the shadow at 3h. 28m. P.M., the moon rising at 3h. 50m.
1883, April 22.—Invisible, the middle at 11h. 39m. A.M.
Oct. 16.—First contact with shadow at 5h. 59m. A.M., the moon setting at 6h. 25m.
1884, April 10.—Invisible, the middle near noon.
Oct. 4.—Total, visible throughout, the middle soon after 10 P.M.

PARALLAX OF A SMALL STAR.—Dr. Geelmuyden, of the Observatory at Christiania, by a series of observations extending over more than twelve months, finds "a notable parallax" for the ninth magnitude star, No. 11677 in Oeltzen's Catalogue from Argelander's northern zones. This star has a proper motion of 3″·04 in the direction 274°. The parallax appears to amount to about 0″·25, but the result is considered far from definitive. The position of this star is in R.A. 11h. 13m. 49s., N.P.D. 23° 30′ 2 for 1880.

NEW NEBULÆ IN ERIDANUS.—M. Block has detected at Odessa two nebulæ in this constellation, which are not found in Sir John Herschel's General Catalogue, the first in R.A. 3h. 28m. 9s., N.P.D. 116° 16′·5, the second in R.A. 3h. 33m. 48s. N.P.D. 116° 43′·7 for 1880. The former is pretty bright, and five minutes in diameter, the latter "considerably bright," with strong central condensation, and readily observed even with the moon above the horizon. The repeated discovery of uncatalogued nebulæ in these days becomes of much interest in connection with the question of variability.

PHYSICAL NOTES

PROF. STEINHAUSER, of Vienna, has recently pointed out that there exists a determinate relation between the size and relative position of the two views of a stereoscopic picture, the lenses of the camera with which it is taken, and the optical arrangements of the stereoscope in which it is to be viewed. If these relations are observed rightly, the effect of relief will be much more perfectly attained for all parts of the picture than if they are neglected. The eye-pieces of the stereoscope above the plane of the photographic pictures ought to be made as nearly as may be equal to the focal length of the objective of the photographer's camera, and this again should be about equal to the mean distance of easy vision, or, from ten to twelve inches. Herr Steinhauser, after developing the theory of the instrument in relation to this point, throws out three very definite and simple suggestions for the photographers. Firstly, that all stereoscopic pictures should be taken with lenses of equal focal length, say 15 centimetres; secondly, that all should be made of equal breadth, or about 75 millimetres; thirdly, that the distances between the centres of the objective-lenses should always be kept constant.

THE *passivity* of iron when employed as the positive pole of a nitric acid battery, or as positive electrode of a voltameter cell containing nitric acid, has recently been studied by M. Louis Varenne, who concludes that the passive state is due to a film of nitric peroxide which collects upon the surface of the iron and protects it from further chemical action. M. Varenne states that this film is apparent when the surface of the iron is examined under the microscope. He finds that the passive state ceases if a stream of carbonic dioxide or of hydrogen is passed through the liquid, and that solution proceeds apace. He also finds that nitric peroxide gas is evolved from the passive iron when it is placed *in vacuo*.

ANOTHER new instrument may shortly be expected from the *atelier* of Dr. König, which will probably settle for ever the dispute between himself and Mr. A. J. Ellis as to the correctness of his tuning-forks of normal pitch. It will indicate a variation of one vibration in ten thousand from the assigned pitch.

M. PELLAT finds that Latimer Clark's standard cell is not entirely free from variations in its electromotive force. He has found two similar cells may differ from one another by a quantity equal to the $\frac{1}{1000}$th part of the electromotive force of a Daniell's cell. M. Pellat employs an electrometer to measure the residual difference of potential when the two cells are connected up in opposition to one another, and believes that by this means his observations are free from possible errors due to polarisation when the galvanometer method of comparison is adopted.

HERR EDLUND has drawn attention to an electrical experiment that has not hitherto been thoroughly explained. Let an open metal tube or cylinder, capable of rotation about its axis, be placed over a magnet of double its own length, so that its lower end is opposite the middle of the magnet, while its upper end is opposite the magnet pole. Then let a current of electricity of sufficient strength be passed from one end of the tube to the other. The tube is found to rotate with a velocity which is independent of the resistance of the metal of which it is composed and of its thickness. Longitudinal slits cut in the tube do not affect its rotation. There is therefore here a complete conversion of electromotive force into ponderomotive force. W. Weber inferred that the resistance of the movable conductor to the passage of the current is the medium of this transfer of the energy, and argued that the first tendency is to rotate the current in the conductor, but that as this could not be done without moving electricity through the substance of the conductor, and therefore against its resistance, the principle of least heat requires that the energy should be transferred in an indefinitely short time to the conductor itself, which therefore rotates. Herr Edlund, however, sees in the experiment a confirmation of his "unitary" theory of electricity.

SIGNOR GUIDI, an Italian engineer, has suggested the employment of electricity in the preparation of steel in the following manner :—A dynamo-electric machine driven by steam or water power is caused to electrolyse water; the oxygen and

hydrogen gases thus furnished are to be employed in smelting the carboniferous ore of iron, which is reduced by the hydrogen at the high temperature of the flame, thus producing at one operation either steel or pure malleable iron at will. Signor Guidi states, however, that to turn out two tons daily would require the constant employment of a 120 horse-power engine.

GEOGRAPHICAL NOTES

THE Lisbon correspondent of the *Daily News* telegraphs that Ivens and Capello have arrived ill at Loanda, after two years' exploration. They are suffering from fever and other complaints induced by privation, and were almost without clothes. According to government instructions, they have completed a general map of Loanda. They explored the rivers Quango and Quanza, and the territories bordering on their basins. They could not descend the Quango to its confluence with the Zaire on account of the resistance of the hostile tribes. Capello appears quite old, and hardly recognisable. Ivens is better, though ill. Both are thorough scientific men. They bring important notes extending over 32 degrees, plans of the territories and the roads, and meteorological, magnetic, and geographical observations made with the excellent instruments they carried. They were well received by the chief of the Motiango territory, from which the German explorer, Schultz, was excluded; but the chief would not allow any white man to pass east at the peril of his life. They visited the highlands of Bihé, and explored several rivers to their sources. Nearly all their followers deserted them. They were received with great enthusiasm on their arrival at Loanda, and will go to Mossamedes to recruit, prepare their plans, and write out their observations. The period of their return to Lisbon is uncertain.

AT a late meeting of the Russian Geographical Society some details were communicated as to the expedition exploring North-Western Mongolia under M. Potanin. In a letter the traveller describes his route during July and August, which first led from Tsoosilan to the River Kharkiri, and thence to the Lake of Khirghisnor, layers of coal being found on the way. The banks of that lake being barren, the explorers halted near Lake Baganor, only six versts distant from the other sheet of water. Khirghisnor is a great deal larger than Lake Kharaous, and the Mongols asserted the existence of only two such immense reservoirs in the country—namely, the Oobsa and the Kirghisnor. From the latter the expedition marched south, with intent to strike the point where the waters of Lakes Kharaous and Durganor fall into Dzabchin. On August 4 the travellers came to the salt lake Dzerennor, and not till the 9th did they reach the banks of the River Tachteteli, that being the name applied to the mingled volumes of the large lakes flowing into the Dzabchin. Marching round the southern part of Lake Kharaous, the explorers then arrived at the town of Kobda on September 1, with rich scientific collections of all kinds. M. Potanin intended again making for Oolangol, thence proceeding to Oolookem.

THE committee of the Dutch Arctic Expedition have made known their determination to fit out, for the third time, their little sailing schooner *Willem Barents*. The cost of the new expedition is estimated at a little over 1,000*l*.

AFTER the presidential address and the paper on Sumatra read at the first meeting of the session, the new number of the Geographical Society's periodical gives us some notes on the Cocos or Keeling Islands, from the pen of Mr. H. O. Forbes, who went out to the East in October of last year for the purpose of investigating the fauna and flora of certain districts in the Malay Archipelago. While in Java, before commencing this work, he availed himself of an opportunity of paying a visit to these far-away islands, in order to ascertain what changes had occurred since the visit of H.M.S. *Beagle* in 1836; these are shown on the map accompanying his paper. Next we find a note on the boundary line between Chili and Bolivia, illustrated by a map, which explains to some extent the existing disturbances in South America. The geographical notes furnish an account of the progress being made towards Lake Tanganyika by Dr. Mullen's successors, the late Mr. Frank Oates's researches in Matabeleland, and Major Biddulph's tour in Chitral and Yassin. There is also some information of interest respecting Transcaucasia.

A CONTRACT has been concluded by the Molala Shipbuilding ompany, Sweden, to construct a steamer of Molala Bessemer teel, of 100 horse power, to trade between China and Siberia.

FROM the Abstract Report of the Indian Surveys for 1877-8 we see that a large amount of work was done during the season by the various departments, all now united under one organisation. Some interesting and important details are given of various trans-frontier explorations.

THE October *Bulletin* of the Paris Geographical Society begins with a long and valuable paper by M. Wiener on the Dead City of Gran-Chimu and the city of Cuzco. The paper is accompanied by large and careful plans of the two cities, and we believe is a valuable contribution to a puzzling problem. Admiral Fleuriot de Langle has a paper on African migrations, and M. Jules Girard on the subsidence of the surface of the Low Countries. M. Hamy gives an interesting *compte rendu* of M. G. Retzius's recent work on Finnish Ethnology.

THE ROYAL SOCIETY

THE anniversary meeting of the Royal Society was held on December 1, and a somewhat long address was read by the President Mr. Spottiswoode. After referring to some of the losses by death which the Society had sustained, he passed on to business which has occupied the attention of the Council during the current year.

Two important contributions to the Society's funds are announced. First, an unconditional bequest of 1,000*l*. by the late Mr. Sidney Ellis, of Leicester; and secondly, a legacy by the late Sir Walter Trevelyan, "the interest of which is to be applied to the promotion of scientific research."

The Royal Society, as is well known, possesses a rather extensive gallery of portraits, almost exclusively of Fellows of the Society, but among them also a fine painting of Lord Chancellor Bacon. Many of these portraits, however, have, through the lapse of time, begun to show signs of decay. Acting under the advice of Mr. F. W. Burton, F.S.A., Director of the National Gallery, the Council has entrusted the pictures which seemed most to require attention to the care of Mr. Dyer, of Orchard Street, who is now engaged upon them. Some of the portraits require lining, and others cleaning, or partial restoration. As will be seen from those which have been returned to their places, the work appears to have been done in a satisfactory manner. The present appearance of the pictures has been much improved, and it is hoped that these interesting portraits of those who have gone before us may now be passed on in an unimpaired condition to future generations.

Among other acquisitions 973 portraits of Fellows of the Royal Society, formed by the late J. P. Gassiot, Esq., F.R.S., have been bought during the past year. The collection consists mainly of engravings, many of which are of great artistic merit, and in excellent condition.

During the past year a small but perhaps not unimportant change in the mode of dealing with the papers to be read at the weekly meetings has been made. This consists first, in deciding a week earlier than heretofore, what papers should be advertised for reading: and secondly, in reading each week as many as practicable of those in hand, so as to leave as few as possible to stand over. The weekly journals are now able to announce to the public the papers which will be read at the Royal Society (as has in fact long been the case with other Societies) during the next week. But the main object of this arrangement has been early publication; that is to say, publication both in its technical sense of reading before the Society, and in its more widely accepted sense of appearance in the Society's Proceedings. When this was first proposed, it was feared there would soon arrive a period of scientific famine, and that occasions might occur when the Society would meet with no papers before it. Whether this would be so great a calamity as was at first imagined is still an open question, for such has been the scientific fertility of the season, that the threatened catastrophe has never yet actually occurred.

"But so far from suffering by a deficiency of matter we have more often found our difficulties in the number of papers to be read in a single evening. And on such occasions the Secretaries have been good enough to take especial pains to make themselves masters of the contents of the papers, and to communicate in a few words to the meeting the substance of each. It is, I believe, not too much to say that the 'reading' of papers carried out in this way has been the most agreeable and instructive, and has been particularly provocative of intelligent and pertinent discussion. . . . .

"There is a possible alteration in our arrangements which