An interesting paper on sparks as indicators of the different kinds of steel was contributed by Mr. Max Bermann, Budapest, at the meetings of the International Association for Testing Materials, held in Copenhagen early in September. An abstract appears in *Engineering* for September 17, from which we learn that the author stated that the influence of the emery-wheel on the nature of the sparks was far outweighed by that of the quality of the steel. It seems from the author's experiments that the spark ray gives a precise indication of the quality of the metal, and may be so applied in practice. Pointed branching lines denote carbon steel (Siemens-Martin); leafy ends of the branching lines indicate Siemens-Martin steel containing a high percentage of carbon; spark pictures, with a blossom-branch-like appearance, are obtained from ordinary tool steel, and so forth. The author states that the spark test is so sensitive that it gives clear indication of a difference of 0·01 per cent. of carbon, and could be resorted to in the course of the Siemens-Martin process for testing the bath and also for the inspection of the finished material.

Among other interesting articles in the August number of *The Central*, the organ of the Old Students' Association of the Central Technical College, City and Guilds, is one on pipes for use underground, by Mr. H. A. Humphrey. In this article the writer emphasises the great value of a proper covering for steel pipes. Thin bituminous coatings, obtained by dipping in hot mixtures, is liable to be destroyed in places by the subsequent handling of the pipe. What is wanted is a coating which has elasticity and offers greater mechanical protection. The South Staffordshire Mond Gas Company followed the recommendation of the author for its mains, extending over an area of 120 square miles, a great portion of which lay in the "Black Country," thus rendering the mains liable to subsidences and to attacks from sulphur and acid compounds. The steel pipes were coated once with asphaltum, then wrapped round with Hessian or canvas, and afterwards again coated with asphaltum, the result giving a thick, tenacious coating of sufficient elasticity and strength. Five years' experience is now available, and has proved that even under the worst conditions such a coating, when properly applied, is an absolute preservative against corrosion.

OUR ASTRONOMICAL COLUMN.

Observations of Mars.—Further results of his observations of Mars are published by M. Jarry-Desloges in No. 4358 of the *Astronomische Nachrichten* (p. 224, September 24).

Changes are becoming more numerous, and the canals more visible. The observations made at the Massegros Observatory (Causse de Sauveterre) showed a new canal on Libya, but the Hellespontus was no longer visible. The Indus was seen to be intercepted at the estuary of the Oxus, and Syrtis Major and the Baie du Méridien were intersected. Since September 3, both at the Revard and the Massegros stations, a clear band traversing the Auroræ Sinus was recorded. The Revard plateau observing station is being dismantled before it becomes snowbound, and the instruments are to be remounted on the plains of the Beauce.

Having occasion to examine some of Prof. Lowell's 1907 photographs of Mars, M. Antoniadi was struck by the absence of the dark band which, according to visual observations, is circumjacent to the polar snows. Whilst recognising the possibility that this may be due to the photographic encroachment of the neighbouring bright area, M. Antoniadi does not think that this is the probable explanation; he would rather believe that in the visual observations the phenomenon is a subjective one, the appearance of a dark band being produced by contrast with the bright cap.

Some interesting letters, describing the observed phenomena, and drawings, communicated by MM. Jarry-Desloges and Antoniadi to Signor Schiaparelli, are published by the latter in No. 9, vol. iii., of the *Rivista di Astronomia* (Turin).

The Recent Magnetic Storm and Aurora.—From Mr. Basil T. Rowswell we have received an account of an auroral display observed by him, at St. Martin's, Guernsey, on the night of September 25, the date of the magnetic storm described in Nature for September 30 (p. 395). On going into the garden at 8 p.m. (G.M.T.) Mr. Rowswell was struck by the appearance of a rosy glow, at an altitude of about 60°, in the E.N.E. sky. This glow brightened and then faded away, or was obscured by misty clouds and, possibly, moonlight, until at 8.10 p.m. no trace of it was to be seen; nor could it be discerned at 9 p.m. when the sky was partially clear. That it was a true auroral display which he observed Mr. Rowswell has no doubt, and he suggests that, had the sky been clear, a good, if brief, display might have been seen at Guernsey.

Elements and Ephemeris for Halley's Comet (1909*c*).—A set of elements, computed by the Russian Astronomical Society, for Halley's comet is published in No. 4358 of the *Astronomische Nachrichten*. The perturbations for the period November 15·9, 1835, to December 13, 1909, were computed by the method of mechanical quadratures, and the time of perihelion passage is given as 1910 April 23. An ephemeris which accompanies the elements gives positions for every tenth day from September 4 to December 23, and agrees fairly well with the position determined, for September 11, from Prof. Wolf's photograph.

Double-star Observations.—In No. 4350 of the *Astronomische Nachrichten* Prof. Doberck compares the observations of a number of double stars, made by various observers, with the data deduced from the published orbits. For twenty-three objects he gives the places where the orbits were published, the years in which observations were made, and the differences, for each observer, in angle and distance. The names of the observers are given in abbreviated form in accordance with a comprehensive list published by Prof. Doberck in No. 4346 of the same journal.

A Newly discovered Nebula Cluster in Cetus.—In No. 4352 of the *Astronomische Nachrichten* Prof. Wolf announces the discovery of a small cluster of nebulæ in the constellation Cetus. The position of the cluster is $\alpha = 2\text{h. } 50\text{m.}$, $\delta = +5{\cdot}4°$ (1855·0), in a region which is generally very barren in these objects. The new object is very faint, with a central condensation, and has a filamentous appearance.

Observations of Variable Stars.—No. 4352 of the *Astronomische Nachrichten* is devoted to the discussion of twenty stars of which the variability is doubtful or small. The observations were made, photometrically, at Potsdam, by Herr W. Münch, during the period September, 1908, to March, 1909, and are discussed at some length.

Terrestrial Refraction in Egypt.—No. 33, vol. iii., of the *Cairo Scientific Journal* contains an interesting discussion of some observations of vertical refraction made by Mr. Xydis at Alexandria. The observer found a well-marked diurnal variation which, in November, 1908, gave for k, the coefficient of refraction, values ranging from 0·0497 (at 9h.) to 0·1186 (at 17h.); frequently the value, which is usually positive, was found to be negative. The observations are also discussed by Messrs. Craig and Keeling, the latter pointing out the difficulties inherent to observations of vertical refraction, especially when settings are made on a sea horizon. Observations made at Helwan Observatory in November, 1908, showed the refraction to vary between 0·781 and 0·101, and, when compared with others made in June, showed that k is much smaller in summer than in winter, the values ranging, in June, from 0·368 to 0·076. It also appears that the refraction in Egypt varies much more than in European countries.