instead of the value 58·7 generally accepted by chemists. This result, which is confirmed in a letter just received from Prof. B. Walter, of Hamburg, is based on the law that the secondary Röntgen rays from a chemical element have a specially high penetrative power with regard to the material from which they originate; for other elements this specific penetrative power falls off proportionately as the atomic weight of the element differs from that of the substance producing the rays. Prof. Walter points out, however, that the general properties utilised by Mr. Barkla as a basis for his considerations were in the main published by him in the year 1905 (*Annalen der Physik*, Bd. 17, p. 561; *Fortschritte auf dem Gebiete der Röntgenstrahlen*, Bd. 8, p. 297). Referring to the fact that Mr. Barkla does not accept a specific power of penetration such as Prof. Walter suggested, but holds the opinion which was generally accepted previously, that a selective absorption takes place, Prof. Walter says that this assumption is shown in his papers to lead to contradictions in the case of the *primary* Röntgen rays. In his opinion, it cannot be correct in the case of the *secondary* rays, because the phenomena in question become all the more apparent for these rays the *thinner* the absorbing laminæ be made. According to Mr. Barkla's conception, exactly the opposite should be true.

WHILST cuprous chloride and bromide have long been known, the existence of cuprous sulphate has been recognised mainly as a disturbing factor in the copper voltameter. Owing to the formation of this salt, the copper deposited on the kathode is liable to be partially redissolved $Cu + CuSO_4 = Cu_2SO_4$, causing the deposit to be too light; on the other hand, if the cupric solution has been saturated with metallic copper, the deposit is too heavy, since twice as much copper is deposited per coulomb from the cuprous as from the cupric salt. The recent experiments of Foerster and Blankenberg (*Berichte*, xxxix., 4428–4436) have added much to our knowledge of this salt. By enclosing ammonium cupric sulphate with metallic copper in sealed tubes they were able to ensure the formation of a large proportion of cuprous sulphate, and actually succeeded in isolating a double salt of the formula $Cu_2SO_4,4NH_3,H_2O$. When quite dry, the salt can be kept for some weeks in sealed tubes, but it is immediately decomposed by dilute sulphuric acid, giving rise to metallic copper and cupric sulphate. It is of interest to note that a solution containing initially 0·05 mol. $CuSO_4$, 0·95 mol. NH_3, and 0·15 mol. $(NH_4)_2SO_4$, became quite colourless when saturated with metallic copper, and when electrolysed gave a kathode deposit 55 per cent. greater than that obtained from a cupric solution in series.

A POPULAR article upon the planet Saturn and its system, by Mr. E. V. Heward, appears in the May number of the *Fortnightly Review*.

EXCELLENT work is being done by the Central Technical College Old Students' Association, the official organ of which, the *Central*, forms a very creditable addition to periodical engineering literature. In the current issue (vol. iv., No. 11) there are original articles on the construction of a new railway, by Mr. A. C. Cookson, and on electrical test-shop measurements, by Mr. Percy Good.

WE have received from Mr. C. Baker, of High Holborn, London, an advance proof of his new quarterly catalogue of second-hand scientific apparatus. The list contains particulars of more than a thousand separate items, and is worth examination.

OUR ASTRONOMICAL COLUMN.

COMET 1907*a* (GIACOBINI).—No. 4173 (p. 336, April 27) of the *Astronomische Nachrichten* contains a new set of elements for comet 1907*a*, computed by Miss Lamson, in which the time of perihelion passage is given as March 17·6 A daily ephemeris, calculated by Prof. Kreutz and based on these elements, is also given, and extends to May 22. The comet is at present apparently travelling very slowly and nearly due north in the northern limits of Orion, its computed positions for May 9 and May 22 respectively being $\alpha=6h.\ 11m.$, $\delta=+14°\ 7'·4$ and $\alpha=6h.\ 14m.$, $\delta=+17°\ 5'·8$. The brightness of this object is now about one-quarter of that at the time of discovery, when it was of the eleventh magnitude.

THE TEMPERATURE OF THE SUN.—An excellent popular description of the apparatus and methods by which MM. Millochau and Féry determined the solar temperature during 1906 is given by the former observer in *La Nature* (No. 1770, p. 338, April 27). As previously recorded in these columns (see NATURE, No. 1932, p. 40, November 8, 1906), the observations were made at Meudon, Chamonix, the Grands Mulets, and the summit of Mont Blanc during July and August last. The instrument used was the pyrheliometric telescope devised by M. Féry in 1902, and described and illustrated in the paper under notice. Essentially it consists of a reflecting telescope, having a mirror of 103 mm. diameter and 80 cm. focal length, in the focus of which is placed a thermoelectric couple, which is connected with a galvanometer reading directly to about one-hundredth of a millivolt. The couple is composed of two wires, one of iron, the other of constantan, soldered together at their point of intersection, the joint being covered with a carefully blackened, very small and very light disc. A bent eye-piece, placed behind the reticule bearing the couple, enables the observer to direct the telescope to any desired portion of the solar disc. The results obtained gave a temperature of 5663°, absolute, for the centre of the solar disc, considering the sun as an ideal black body, or, as M. Guillaume terms it, an "integral radiator." Correcting this value for the probable absorption in the solar atmosphere, M. Millochau obtains 6130° absolute as the effective temperature of the sun's interior.

PHOTOGRAPHY OF THE INFRA-RED SOLAR SPECTRUM.—In No. 14 (p. 725, April 8) of the *Comptes rendus* M. Millochau records some results he has obtained in the photography of the infra-red region of the solar spectrum. The plates employed were specially prepared by plunging them for about ten minutes into distilled water to which several drops of acetic acid had been added, then into a saturated alcoholic solution of malachite green, and finally washing and drying them. They were then rendered much more sensitive by exposing them for 30 seconds at a distance of 75 cm. to a 4 candle-power electric lamp, according to the method suggested by Major-General Waterhouse in 1875.

With plates thus prepared the solar spectrum was photographed, in the region 0·750 μ to 0·950 μ, on such a scale that one Angström unit = 0·1 mm., the photographs showing that the structure of the A band in the solar spectrum is identical with that of the B band. Another photograph showed the Z band resolved into lines.

A plane-grating spectrograph of 3 cm. aperture and 60 cm. focal length was employed, and with this apparatus the A band, under good conditions, could be photographed in ten, and the extreme region in thirty, minutes.

THE ORBIT OF α DRACONIS.—The following elements have been found for the orbit of α Draconis from spectrograms secured at the Dominion Observatory, Ottawa, by Mr. J. S. Plaskett:—period = 51·42 days, $\epsilon=0·322$, $\omega=20°·3$, $m_0=294°$, T = 1906 July 11d. 4h., velocity of system = −18·4 km. per sec.

In No. 2, vol. i. (March–April) of the Journal of the R.A.S. Canada, where the above is published, Mr. Plaskett also gives a very interesting description of the methods employed in adapting a Brashear universal spectroscope to the requirements of line-of-sight spectrography.