OUR ASTRONOMICAL COLUMN.

COMET 1917*a* (MELLISH).—Prof. Strömgren announces that from observations made on March 22, 23, and 24 (Copenhagen) Mrs. J. Braae and J. Fischer-Petersen have calculated the following orbit and ephemeris :—

$T = 1917$ April 9·4463 G.M.T.
$\omega = 106° 51' 66''$
$\Omega = 92° 47' 32''$ 1917
$i = 22° 48' 92''$
$\log q = 9·41464$

Ephemeris : Greenwich Midnight.

1917	R.A. h. m. s.	Decl. ° ′	Log r	Log Δ	Mag.
April 11	0 43 49	+11 30·3	9·4295	9·8894	4·6
15	0 25 7	5 48·7	9·5156	9·9206	5·2
17	0 20 53	3 32·6	9·5672	9·9407	5·6
19	0 18 45	+1 39·0	9·6172	9·9608	5·9

THE APRIL LYRIDS.—This shower of meteors, though occasionally offering a brilliant display, is, in the majority of years, very slightly visible. It is unfortunate that the period is not definitely known, though there are indications that its best returns occur at intervals of a little more than sixteen years. This feature is by no means supported on conclusive evidence, but it is a point worthy of further investigation.

Abundant showers of Lyrids were observed in 1803, 1851, 1884, and 1901, and it will be interesting to determine whether or not an unusual exhibition of these meteors is presented this year or in 1918. The time of maximum will possibly be at about midnight on April 21, and as there will be no moonlight to interfere, it will be easy to ascertain the character of the display should the weather prove suitable. If the meteors reappear at the time mentioned it will be important to observe the time of maximum and the horary number visible. The position of the radiant is already well known, and it moves eastwards, like that of the August Perseids. Though the chief activity of the Lyrids seems confined to a few hours, yet there are occasional specimens certainly seen between April 16 and 26, and possibly on dates still further removed from the night of maximum.

VARIABILITY OF URANUS.—Prof. E. C. Pickering has announced an interesting discovery which has followed from a series of photometric observations of the light of Uranus, made by Mr. Leon Campbell with the primary object of investigating possible changes in the light-emission of the sun (Harvard Circular, No. 200). The observations revealed a variation in the light of the planet amounting to about 0·15 magnitude in a period of 0·451 day, these figures being based upon 2960 settings. The period of variation agrees very closely with that of the rotation of the planet derived from spectroscopic observations by Lowell and Slipher, and Prof. Pickering concludes that the variation in light is due to unequal brightness of different portions of the planet. If the variations in brightness prove to be permanent, photometric observations will give the rotation period of the planet with a high degree of accuracy.

THE "ANNUAIRE ASTRONOMIQUE" FOR 1917.—The issue of this well-known publication for the current year contains the usual astronomical information in a convenient and interesting form, together with a review of the progress of astronomy. It forms a valuable work of reference for astronomical data of all kinds, including a catalogue of minor planets arranged in the order of their distances from the sun, a list of temporary stars which have been visible to the naked eye, a list of stars with large proper motions, and so on. Among the 140 illustrations we note a useful set of diagrams from which one can readily ascertain the visibility of each of the principal planets on any night of the year. M. Camille Flammarion is to be congratulated on having so successfully conducted this publication for more than half a century.

HEAT ECONOMY IN METAL MELTING.

THE outstanding feature of the proceedings at the annual meeting of the Institute of Metals, held at Burlington House on March 21 and 22, was a general discussion on metal melting, organised by the council. Whether it was chiefly due to the fact that this subject aroused an unusual amount of interest among the members, or that war problems in metallurgy have created a desire to discuss those problems more freely than hitherto, the fact remains that in the last three months the institute has added more new members than it did in the previous two years; that the attendance was very much larger than it has ever been at any other meeting in the course of its history; and that the discussions on the various papers contributed were of unusual fullness and value.

Special appropriateness attached to the fact that Sir George Beilby, the president of the institute, in entering on his second year of office, presided over a discussion which must have been of considerable interest to him in his capacity of Director of the Fuel Research Board set up by the Committee of the Privy Council for Scientific and Industrial Research. Although coke constitutes the fuel most generally used in metal and alloy melting, only one paper was contributed dealing with its use. On the other hand, four papers were concerned with coal-gas, and these included one on the practice of the Royal Mint, and another on the application of the high-pressure gas system installed by the City of Birmingham Gas Committee. Of the remainder one paper dealt with producer gas, another with oil fuel, and a third with an electric resistance furnace. All these papers dealt with the melting of metals and alloys in crucibles, *i.e.* in quantities which seldom exceed 200 lb. in weight. The one paper on the subject dealing with principles rather than practice was by Dr. Carl Hering, an expert on furnace construction, and was entitled "Ideals and Limitations in the Melting of Non-Ferrous Metals." This, in many respects the most suitable for discussion, was not discussed by any of the speakers, and will be briefly commented on in this article.

Dr. Hering enumerates the directions to which perfection points as follows :—A reduction in (i) the loss of heat, (ii) the loss of metal, (iii) the number of bad castings, (iv) the consumption of equipment, and (v) the cost of labour and plant per lb. of good castings. As these are not all independent factors, economy may sometimes result from increasing some if others are thereby reduced more greatly, *e.g.* increased plant cost may save more in labour cost, and an increase in bad castings may even be warranted by the great saving of heat and labour due to working faster

With regard to heat losses, Dr. Hering points out that one of the first things to bear in mind in all high-temperature thermal operations is that insulation against heat loss is in practice at best very poor; that the ideal in this direction is the vacuum jacket of the Dewar thermos bottle, but that this, unfortunately, is impracticable for metal melting. Hence, so long as the metal is hot, just so long will this loss continue. Heat losses, however, depend not only on the thermal insulation, but quite as much also on the length of time during which they take place, so that reducing