

months' running. On the other hand, the installation at the works of Messrs. Guest, Keen, and Nettlefolds, Cardiff, shows a saving in fuel of 13.4 to 18.4 per cent. Most of the American plants have effected notable economies, varying from 10 per cent. saving in fuel and 12 per cent. increase in output, up to 20 per cent. saving and 20 per cent. increase. The explanation of these divergent results is to be found either in the variation in local conditions, or in differences of practice. In practice refrigeration is the system almost universally used. The desiccation of the blast by calcium chloride, which is the only alternative, is less costly as regards initial outlay, but it is probable that the running costs would be much higher. Typical refrigerating plants are described in the article.

#### OUR ASTRONOMICAL COLUMN.

COMET 1915e (TAYLOR).—The following preliminary elliptic orbit has been calculated by F. J. Neubauer and H. M. Jeffers, of the Berkeley Astronomical Department (Lick Observatory Bulletin No. 276):—Perihelion, 1916, January 27.906 G.M.T.,  $\omega = 342^\circ 54'$ ,  $\Omega = 114^\circ 52'$ ,  $i = 14^\circ 30'$ ,  $\log a = 0.48282$ , period 5.299 years.

The Copenhagen ephemeris for this comet proves to represent its positions very accurately. The large corrections given in this column on January 27 were in error; actually the differences were insignificant. An observation made at Bergedorf on February 1, and forwarded by Prof. E. Strömberg, shows that the corrections then required were only  $-3s$ . in R.A. and  $0'$  in declination.

SECONDARY NUCLEI OF COMET 1915a (MELLISH).—A series of photographs taken with the Franklin-Adams star camera at Johannesburg are reproduced in Circular No. 31 of the Union Observatory. The subsidiary nuclei were found to lie on a line almost tangential to the coma and not axially. On June 10 the brightest secondary was  $82''$  distant, and another about  $154''$ . The line joining these nuclei was in position angle,  $228.8^\circ$ . Other measures of the nuclei are given by Mr. Melotte in the *Observatory* for January.

ON THE MEAN DISTANCES AND LUMINOSITIES OF STARS OF DIFFERENT SPECTRAL TYPES.—Prof. C. V. L. Charlier has investigated statistically (*Meddelande, Lunds Astronomical Observatory*) the mean parallax of stars according to spectral type in relation to mean distances and luminosities for all stars down to mag. 6.0. It is found that the  $\beta$  stars deviate only slightly from the mean absolute magnitudes of these stars, whereas the K—and still more the M—stars are characterised by great fluctuations about their mean absolute magnitudes.

ANOMALOUS DISPERSION IN THE SUN.—The suggestion advanced by Julius that anomalous dispersion could be the cause of small alteration in wave-length of neighbouring Fraunhoferic lines was followed by a notable research leading to confirmatory results (*NATURE*, September 2, 1915). This work is now sharply criticised by Mr. Evershed in a letter to the January number of the *Observatory*, and by Dr. Royds (Kodaikanal Observatory Bulletin, No. xlviii.) Small wave-length shifts between sun and laboratory sources have been the subject of much minute investigation at Kodaikanal during the past few years by direct

measurement on large-scale spectrograms, and data derived from these studies now enable Dr. Royds to state that when the actual sun-minus-arc displacements are substituted for Albrecht's residuals the relative shift between the two groups of solar lines having a close companion on one side or the other is too small to establish anomalous dispersion in the sun. Evershed considers the case of close solar doubles. The effect of anomalous dispersion should be to increase the separation to a measurable degree as compared with the arc, but this is not found to be the case. Nevertheless it is recognised that it is difficult to explain away the grouping according to sign of the residuals in Albrecht's investigation.

#### BRITISH PRODUCTION OF SYNTHETIC DYES.

IN the *Times* of February 11 a Leeds correspondent comments on current developments of the problem of increasing the production of synthetic dyes. Whatever criticisms may be advanced against the Government scheme, it cannot be denied that the appointment of Prof. W. H. Perkin, the eldest son of the discoverer of mauve or aniline purple, to be head of the research department of British Dyes, Limited, is a most welcome augury of future progress. It is, however, a debatable point whether this department, endowed by the State to the extent of 100,000*l.*, ought in the public interest to be the monopoly of a single company, which under a new name and with the aid of a large Government subsidy is carrying on the business of one only of several competing firms.

The burning question of a year ago as to the desirability or otherwise of having chemists on the directorate of a colour works has now received a striking practical illustration in the less advertised developments recently effected in the firm of Messrs. Levinstein, Limited, of Blackley, near Manchester. In accordance with the best traditions of the Manchester school of economics, this firm of colour-makers, which practises the doctrine of self-help, has made very considerable extensions of its old-established works under the skilled guidance of their director, Dr. H. Levinstein, a college-trained chemist, a double graduate in science of the Universities of Manchester and Zürich, and a former pupil of Profs. Bamberger and W. H. Perkin. Without extraneous help, the Manchester firm has now to compete for home and foreign trade and for scientific assistance against a commercial rival enjoying preferential treatment from the State. It is obvious that the latter firm anticipates a further extension of favours from the Government, otherwise it would not be practicable to develop so large an area as a 250-acre site with the existing capital and with the comparatively small sum paid up by shareholders who are dye-users. A continuance of this policy of subsidies to one firm will handicap still further the meritorious efforts now being made by other less favoured undertakings.

The research work on dye production carried out in the dyeing department of the University of Leeds, under the auspices of the Board of Trade, by Profs. Green and A. G. Perkin and Dr. Oesch, formerly of the Berlin Aniline Company, is of the utmost importance in regard to the progress of the dye industry in this country. But if the effort to recover our lost supremacy in dyes is to be truly national the benefits of this university research should, at least to some extent, be at the disposal of other dye-producing works besides the exceptionally favoured successors of the old Huddersfield firm.