

making. Marked differences of opinion exist as to the desirability of permitting such treatment of flour, and it is held by some that a material of such importance and of such widespread consumption should not be subjected to any manipulation beyond what is necessary to convert it into a wholesome food. A reasoned discussion of this question was presented to the Reale Istituto Lombardo di Scienze e Lettere in December of last year (*Rendiconti*, vol. 65, parts 19-20) by Prof. Bertarelli, director of the Institute of Hygiene of the University of Pavia. Both chemical and physical methods of treating flour are considered in this communication and a useful and critical summary is given of the opinions expressed by different authorities and of the decrees regarding such treatments promulgated in various countries. Bertarelli finds that flour bleached by the electrical process contains nitrites corresponding usually with 0.1-0.2 gm., and at most with 0.5 gm., of sodium nitrite per 100 kgm. and considers that these quantities are far too small to constitute a danger to the consumer. The use of 'improvers' containing, for example, persulphates or peroxides, is also strongly defended.

Estimation of Bismuth in Copper. The estimation of small quantities of impurities in copper has assumed a new importance since the introduction of Customs duties on metals. The most important impurity in this respect is bismuth, and a memorandum has been received from the Fiscal Policy Sub-Committee of the Brass and Copper Industries, dealing with this

question. The proportion of bismuth to be estimated does not exceed 0.020 per cent, and very much smaller proportions have sometimes to be considered. It is not certain that any method is in use which can be trusted for quantities less than 0.002 per cent, but this point is being investigated. The quantity of copper to be taken for the analysis is not stated in the memorandum, but apparently it is of the order of 10 gm. A colorimetric method is recommended, depending on the yellow colour produced when bismuth sulphate reacts with an excess of potassium iodide. A small addition of iron is recommended when the bismuth is being precipitated from the nitric acid solution by ammonia. The mixed hydroxides must be re-precipitated to remove copper, and each precipitation demands at least six hours to be complete. The hydroxides are dissolved in sulphuric acid, and brought to a slightly acid condition, the iron being then reduced to the ferrous state by sulphurous acid. The colorimetric comparison is made with a solution which has been carried through all the analytical operations, but to which no sample has been added. The standard solution should contain 0.001 gm. bismuth per c.c., and not more than 4 c.c. should be required to produce the match. The Committee bases these recommendations on the experience of competent analysts, but submits them for criticism. Suggestions as to the best analytical procedure should be sent to the Secretary, Mr. Lester Smith, c/o Squiers and Co., King's Court, 115 Colmore Row, Birmingham.

Astronomical Topics

Meteor of June 4. A brilliant meteor much brighter than the moon was observed in evening twilight on June 4 at 8^h 32^m G.M.T. Observations have been received from Hanwell, Surbiton, Rye, Arundel, Hindhead; and a satisfactory computation of the height and other details of the object has been made by Mr. A. King as follows: height 75 miles at appearance, 44 miles at disappearance; length of path 83 miles; speed 22 miles per second. The radiant was in Libra at 235° - 12°.

Photography of Faint Nebulae. A useful paper on this subject has recently been published by K. Haidrich of Vienna (*Astr. Nach.* No. 5932-33). He discusses the nebular spectra, and the distribution of light at different wave-lengths and also the sensitivity of various kinds of photographic plates at these wave-lengths. Even the gaseous nebulae are not all alike in their spectra; some give emission spectra, while others appear to derive their light by reflection from neighbouring stars, generally of type *B*. Then there are the obscure nebulae, discussed by Father Hagen, the light of which is mainly red or yellow (some of the light is said to come from sodium). The spiral nebulae give continuous spectra, resembling those of stars of types *G* and *K*. It is clear that no single process is suitable for the photography of all kinds of nebulae, and that more than one method must be followed before it can be asserted that no nebulosity is present in a particular region. The tables given in the paper of the sensitivity of various kinds of plates at different wave-lengths should be of use to photographers.

Greenwich "Astrographic Catalogue", Vol. 6. This volume concludes the publication of the results

obtained from photographs taken with the Greenwich astrographic equatorial during the last forty years. The earlier volumes gave the measured positions of the stars in the zone between Decl. 64° and the pole; a second series of plates was taken in order to give the means of obtaining the proper motions of the stars. The brighter stars had previously been observed on the meridian at Kasan or by Carrington at Redhill; for the fainter stars the motions are deduced by comparing the earlier Greenwich plates with the later ones. Owing to the shorter time-interval, an annual motion of 0.03" has been taken as the minimum for the adoption of a proper motion for these stars. A diagram in the introduction shows the distribution of proper motions in different directions. It shows that the larger motions belong to Stream I; half the stars of this stream have motions greater than 0.05", while the number in Stream II is less than a quarter.

Determinations of the solar apex were made; grouping the stars by spectral type, the R.A. of the apex is 257° for types *B8*, *B9* and *A0*; it increases steadily as the type grows later, being 275° for *G5* and *K0*. A general solution without regard to type, but limited to stars in the B.D., gave 272° for the R.A. of the apex. Stars with annual motion exceeding 0.2" were not included in these investigations.

A list is given of the cases of two or more stars that appear to have common motion. There is one pair, separated by more than ten degrees, that have a large common motion of 1.1"; but a more certain case of connexion is that of a pair about 70' apart with a motion of 0.66".

Another list gives measures of stars separated by less than 30"; the differences of their motions are given, which in many cases makes it possible to decide whether they are physical or optical pairs.