solutions which contain three hundred times as much magnesium oxalate as that present in the saturated solution of the hydrated salt. Electrical measurements show that the equivalent conductivity decreases at an abnormally high rate as the concentration increases. This and other phenomena furnish strong evidence in support of the view that polymerised molecules are present in the solution in considerable proportion.

A SECOND edition of Mr. Borchardt's "Arithmetical Examples," to which twenty-four pages of new exercises, oral and otherwise, have been added, has been published by Messrs. Rivingtons.

A "GEOMETRICAL Political Economy," by Mr. H. Cunynghame, C.B., is about to be published by the Oxford University Press. The work is an elementary treatise on the method of explaining some of the theories of pure economic science by means of diagrams.

THE October issue of the *Popular Science Monthly* is devoted entirely to the Cambridge meeting of the British Association. Dr. Pritchett, president of the Massachusetts Institute of Technology, contributes "A Traveller's View of the British Association Meeting," and in addition are included the presidential addresses of the Prime Minister, Prof. Horace Lamb, Mr. W. Bateson, Mr. Francis Darwin, Mr. Henry Balfour, Mr. Douglas Freshfield, Prof. C. S. Sherrington, and the Hon. Charles A. Parsons.

OUR ASTRONOMICAL COLUMN.

ENCKE'S COMET.—The absence of further observations of Encke's comet has caused some doubt to be expressed as to the correctness of Herr Kopff's conclusion regarding the identity of the object which he obtained on his photograph of September 11.

In the *Astronomische Nachrichten*, No. 3970, the same observer states that he has obtained confirmatory evidence which places the identity beyond doubt, although the comet is still extremely faint and diffuse. On a photograph exposed on September 17, at 13h. 29.2m. (Heidelberg M.T.), the same object appeared in the following position :—

R.A. = 1h. 40.6m., dec. = +26° 14'.

On comparing this position, and the one determined in the first observation (September 11), with the interpolated values obtained from the ephemeris published by MM. Ocoulitsch and Kaminsky, it is seen that the ephemeris requires the following approximate corrections :—

−0.7m. and −6'.0.

Herr P. Gotz, of Heidelberg, was unable to find the comet on September 6 with a 6-inch telescope.

STRUCTURE OF THE OXYGEN BANDS IN THE SOLAR SPECTRUM.—In the September number of the *Astrophysical Journal* Mr. O. C. Lester, of the Sloane Physical Laboratory, Yale University, discusses the results recently obtained by him in a research as to the nature of the oxygen bands in the solar spectrum, of which the B group is a typical example.

The purpose of the research was to investigate the relations existing between the lines of each band and between the several bands, including in the latter two bands above a which do not appear to have been discussed previously.

The results may be summarised as follows :—(1) More accurate measures of the wave-lengths of the lines in groups A, B, and a have been made, the a' band has been measured for the first time, and a new group (a'') at λ 5377.2 has been discovered and its lines measured. (2) It has been shown that the oxygen absorption spectrum consists of two distinct series of bands, instead of one, which occur in pairs similarly to the series of lines in a band. (3) Deslandre's first law concerning the distribution of lines in a spectral band, viz. $N = a + bn^2$ (where N = the vibration frequency number, a and b are constants, and n takes on all integral values from o to n), is shown to be inadequate to represent the line series of the several bands. A modification of this formula suggested by Mr. Lester is

$$N = a + kn + c^{-1}n^2,$$

and this represents the series within the limits of observational errors; c and k are constants which are different for each series, although the differences are but small.

RECURRENT MARKINGS ON JUPITER.—From the inspection of several thousand drawings of Jupiter made during the last half-century, Mr. Denning has arrived at the conclusion that "features exhibiting various peculiarities of appearance and rates of motion are common to certain latitudes and break out from time to time, enduring for certain unknown intervals, then disappearing to be replaced by similar phenomena." Some exceptional outbreaks, no doubt, only take place at long intervals, whilst the evidences of others remain visible for long periods.

Mr. Denning suggests that if the old drawings could be collected and suitably discussed, considerable light might be thrown on the physical changes which are ever taking place. The value of this discussion must, in a measure, depend upon the continuity of the observations, and it is suggested that, as Jupiter is now being continuously observed and delineated, there will in a few years be ample material for such a discussion.

In the meantime Mr. Denning suggests that further insight into the wonderful atmospheric phenomena of the planet might be obtained from a study of the large number of drawings made by Schwabe between 1830 and 1860, and the 300 or 400, or more, made by Schmidt between 1843 and 1880 (the *Observatory*, October, 1904).

COMPARISON OF THE INTENSITIES OF PHOTOGRAPHIC STELLAR IMAGES.—The second chapter of the "Instructions to Variable Star Observers," of which the first chapter was summarised in these columns on September 15, is published in the October number of the *Bulletin de la Société astronomique de France*. Variable star observers will find many points of interest and instruction in the present chapter, which deals with the details of obtaining suitable photographs, and afterwards comparing and reducing the plates.

OBSERVATIONS IN THE SOUTHERN HEMISPHERE.—The Lick Observatory expedition to the southern hemisphere installed its apparatus at Santiago de Chile during the southern winter of 1903, and commenced observations on September 11 (1903).

A detailed description of the instruments in use, the observations and results, is promised for a later publication, but in the meantime Prof. W. H. Wright records several important results obtained with a powerful three-prism spectroscope attached to a Cassegrainian reflector of 94 cm. aperture, in No. 2, vol. xx., of the *Astrophysical Journal*.

The stars β Doradus, w Velorum, l Carinæ, κ Pavonis, and τ Sagittarii, have been found to have variable radial velocities.

Observations of α Centauri have also been made, and indicate an average difference between the radial velocities of the two components of about 5.17 km. One probable explanation as to the cause of this difference is that it is due to the relative orbital motion of the two components, and if this is true the parallax of the system may be determined, because the visual orbit of the pair is already well known. Dr. Palmer made the computation, and obtained the following results :—

$$\pi = 0.76''$$
$$a = 3.46 \times 10^9 \text{ km.}$$
$$m_1 + m_2 = 1.9.$$

a = mean distance between components in kilometres, m_1 and m_2 = the respective masses of α_1 and α_2 Centauri in terms of the sun's mass.

The relative masses of the components, as previously determined, is about 51 : 49 in favour of the brighter. The spectrum of the latter is of the solar type, whilst in that of the fainter the iron lines are more pronounced and the calcium absorption is exceedingly heavy.