viz., carbon dioxide, ammonia, and sulphur dioxide. The use of these charts is explained in a note by the chairman of the committee, Sir J. A. Ewing. The chart for carbonic acid uses Dr. Mollier's figures, but with British units of pressure and with some additions based on the recent researches of Prof. Jenkin and Mr. Page. For the other two substances the experimental data available are much less complete. For ammonia, the chart must be regarded as no more than provisional; values given by Prof. Goodenough and Mr. W. E. Mosher have been adopted. The chart for sulphurous acid is also provisional; values given by Dr. J. Hýbl have been employed. Tables giving the properties of these substances are also included.

ERRATUM.—In NATURE of April 29, p. 238, col. 1, line 10 from bottom, for "solstice" read "equinox."

OUR ASTRONOMICAL COLUMN.

COMET 1915*a* (MELLISH).—The following is a continuation of the ephemeris of Mellish's comet (1915*a*) taken from *Astronomische Nachrichten*, No. 4796:—

		R.A. (true) h. m. s.		Dec. (true) ° ′ ″		Mag.
May 6	...	18 53 31	...	−14 46·2		
8	...	57 6	...	16 25·9	...	6·5
10	...	19 0 55	...	18 17·3		
12	...	5 2	...	20 22·2	...	6·2
14	...	19 9 32	...	−22 42·1		

The comet is rapidly moving southwards, and is situated a little to the north of π Sagittarii

A third series of elements and an ephemeris of this comet are published by Mr. R. T. Crawford, of the Berkeley Astronomical Department, in the Lick Observatory Bulletin, No. 270. It is pointed out that there seems to be a similarity between these elements and those of comet 1748 II., and computations are being undertaken to test the possibility of the identity.

ORBIT OF JUPITER'S NINTH SATELLITE.—A more rigorous reduction of the elements of the orbit of the ninth satellite of Jupiter is given by Seth B. Nicholson in the Lick Observatory Bulletin, No. 271, this being a continuation of the investigation previously published in the Bulletin, No. 265 (see this column for April 1). The following are the new elements derived:—

Epoch and Osculation = 1914 August 21·0 G.M.T.

$$\left.\begin{aligned} M &= 135^\circ\ 57'\cdot2' \\ \omega &= 359^\circ\ 53'\cdot5' \\ \Omega &= 310^\circ\ 30'\cdot6' \\ i &= 156^\circ\ 57'\cdot9' \end{aligned}\right\} 1914\cdot0$$

$$e = 0\cdot1105$$
$$\mu = 0^\circ\cdot4518$$
$$P = 2\cdot182 \text{ years}$$
$$\log a = 9\cdot2192$$

As a result of the alteration in the elements it is stated that the errors in the final elements do not exceed 2 per cent. of their values. An ephemeris for the coming opposition is promised at an early date.

THE SATELLITES OF URANUS.—Two communications regarding measures of the satellites of Uranus are published in the Lick Observatory Bulletin, No. 269. The first, by Prof. R. G. Aitken, were made in 1914 with the 36-in. refractor using a 350 power eyepiece An interesting opportunity presented itself on July 21 to estimate their relative brightness. The four satellites were all south of the planet, Ariel and Umbriel almost in line with it, and only a few seconds of arc apart. Ariel was seen at the first glance, and was conspicuously visible while measuring the other satellites; Umbriel was seen with much more difficulty, and made no impression on the eye except when special efforts were made to see it. By direct comparison it was estimated to be from $\frac{1}{2}$ to $\frac{3}{4}$ magnitude fainter than Ariel. The latter appeared to be a magnitude fainter than Titania; Oberon, from $\frac{1}{4}$ to $\frac{1}{2}$ magnitude fainter than Titania. While these observations were being made the sky was very clear, the seeing good, and the planet screened by an occulting bar. Measures of the satellites were made by Mr. S. B. Nicholson from photographs taken with the Crossley reflector at the Lick Observatory during 1914. The positions of Uranus and of the satellites were measured in rectangular co-ordinates, so that the distances of the satellites from either Uranus or one of the outer satellites could be obtained.

THE GREENWICH SECTION OF THE ASTROGRAPHIC CATALOGUE.—The third volume of the Astrographic Catalogue 1900·0 deals with the Greenwich Section, declination +64° to +90°, and is deduced from photographs taken and measured at the Royal Observatory. The first portion contains a catalogue of 2212 stars within 3° of the north pole in standard rectangular co-ordinates. In the original scheme of publication this, the third volume, should have included a general discussion of results, but the Astronomer Royal has deferred this discussion for a fourth volume. The present catalogue includes: (1) stars used as reference stars for the astrographic plates; (2) other stars contained in the catalogues of the *Astronomische Gesellschaft;* (3) stars contained in Carrington's Catalogue (1855·0); and (4) stars in the Bonn Durchmusterung Zone, 80°. The right ascensions and declinations depend throughout on the places of stars observed with the transit circle at Greenwich in the years 1897 to 1905. The proper motions given in the Greenwich Catalogue have been used in forming the constants of the plates. In the main catalogue the epoch is 1900·0. The stars are arranged in zones of declination 1° wide, and the photographic magnitudes are on the scale of Prof. E. C. Pickering's north polar sequence.

RECENT PAPERS IN THE "ASTRONOMISCHE NACHRICHTEN."—The following is a continuation of the chief contents of some of the earlier numbers of the *Astronomische Nachrichten* referred to in this column last week:—No. 4785: Trial of the photographic magnitude-scale of the bright Pleiades stars, by E. Hertzsprung. No. 4784: Observations of Halley's comet 1910 II., made at the Chamberlin Observatory of the University of Denver, by Herbert A. Howe. No. 4783: Photographic observations of some bright double stars, by E. Hertzsprung; observations on the brightness and form of comets, by M. Ebell. No. 4782: The special motions of stars with known parallaxes, by R. Klumak. No. 4781: Observations of planets and comets made with the 360-mm. refractor of the Copenhagen Observatory, by C. F. Pechüle and E. Strömgren and R. Andersen. No. 4780: Observations of the planet Venus, by W. Rabe; definite orbit of comet 1906 VII. (Thiele), by E. Waage. No. 4779: Observations of the planet Mars, by H. E. Lau; observations of the variables U Sagittæ and R. S. Vulpeculæ, by M. Maggini. No. 4778: Test for variability of 113 Herculis and α Sagittæ, by E. Hertzsprung; photographic measures of the magnitude difference between the two components of ν Draconis, by E. Hertzsprung; observations of the variables *o* Herculis, *g* Herculis, and RZ Cassiopeiæ, by M. Maggini. No. 4777: Mean elements of sixty minor planets, by M. Brendel; ephemeris for Polarissima (BD +89° 37′) for 1915, by L. Courvoisier.