electrodes, and small quantities of inert gas and sodium. The lamp operates from A.C. mains, of voltages from 215 to 230, in association with a rectifier which provides heating current for the filament and the requisite low voltage for the glow discharge. The visible spectrum of the lamp immediately after starting is due chiefly to the inert gas, but the heat generated by the discharge vaporises some of the sodium, and the spectrum of sodium gradually supersedes that of the gas. Maximum brilliancy is attained within 10–15 minutes after starting the lamp, and the spectrum then consists entirely of sodium lines, the yellow *D* lines being by far the most intense. The other lines, situated in red, green and blue regions, can be removed, or reduced to very low intensity, by using a yellow gelatine filter or a potassium bichromate cell. The brightest portion of the source consists of a central cylinder about 2·5 cm. long and 2·5 cm. in diameter. A Dewar flask and a polished metal radiation shield are provided with the lamp for maintaining it at the appropriate operating temperature. The lamp is simple to operate, provides a highly intense and steady source of the *D* lines, and has many obvious laboratory applications, particularly in colorimetry, polarimetry and refractometry.

Detection of Traces of Carbon Monoxide in Air. The extremely poisonous character of carbon monoxide and its presence in the exhaust gases of motor-car engines render the easy detection of traces of this compound a necessity of modern life. The lowest concentration of carbon monoxide in air which will produce fatal results when breathed is said to be not greater than 0·1 per cent and has been computed by Hempel to be about 0·05 per cent. In the *Chemiker-Zeitung* of February 25, Dr. W. Ackermann of Breslau describes the results of comparative tests made with the two reagents which have hitherto been regarded as being most sensitive to carbon monoxide, namely, diluted ox-blood and palladous chloride. Hæmoglobin is said to absorb carbon monoxide about 130 times as readily as oxygen, but differentiation between the absorption spectra in the two cases is only possible after the addition of a reducing agent (ammonium sulphide), when the characteristic bands disappear unless carbon monoxide has been absorbed. On the other hand, the gas reduces palladous chloride very readily to the free metal and the colour and transparency of the reagent may be observed during the whole course of the experiment. Even when no deposit can be seen by the naked eye, its presence can sometimes be revealed by filtering the solution. The results are very striking. By passing 1 litre of air containing varying small amounts of carbon monoxide through the reagents for one hour, it was possible to detect 0·015 per cent of the gas by the palladous chloride method, as against 0·13 per cent by the hæmoglobin method.

Astronomical Topics

Geddes's Comet. This comet has now been observed for more than eight months, but is still a fairly easy object, and is likely to be followed for most of 1933, if not longer. *Astronomische Nachrichten*, No. 5934, contains a fine series of observations extending from June to December, made by J. Tretter at Cordoba Observatory (Argentine).

The comet is now in north declination 10°, and is observable for most of the night. Since its orbit is probably hyperbolic, it is important to keep it under observation. It was observed by M. Beyer at Hamburg on March 1. It was an oval nebulosity 2′ in diameter, the combined light being of mag. 9·7, and the nucleus of mag. 11·6. An ephemeris for the whole year is given in the Handbook of the British Astronomical Association for 1933; the error of the ephemeris does not exceed 2′ or 3′.

Variable Stars in the Globular Cluster M.53. It was the study of cluster-variables that led to the important law correlating period with absolute magnitude; this law permitted determinations of distance to be made in the case of objects beyond the range of all previous methods. Herr E. Grosse, of the Bergedorf Observatory, has made a study of the variables in Messier 53, in Coma Berenices (*Astr. Nach.*, 5901). Light curves are given for thirty-four variables. Most of these are of the characteristic cluster type, with rapid rise and slow decline, but a few of them conform more closely with regular sine curves.

The distance of the cluster is determined as 19,500 parsecs; Prof. Shapley had found 18,200 parsecs by rougher methods (diameter of cluster, total light, and magnitude of brightest stars). Grosse's value places the cluster 3,700 parsecs from the galactic plane. Its diameter was reckoned from the angular distance of the outer variables from the centre, and found to be 89 parsecs, about the same as Messier 3 and Messier 5. It is estimated that 7 per cent of the stars in M.53 are variable; in ω Centauri the percentage is 4, in M.3 it is 15.

Minor Planets. The volume of "Kleine Planeten" for 1933, just published by the Berlin Rechen-Institut, gives evidence of the zeal of many astronomers both in discovering new planets and in keeping the known ones sufficiently observed. The planets with permanent numbers now extend to 1,223, having increased by 40 during the year. Each year a list is given of planets for which observations are specially desired. 35 of the objects thus listed last year have been re-observed. Orbit elements are given for all the numbered planets. Dr. Witt gives a revised orbit of 433 Eros, which he discovered in 1898; the new elements, for 1925, Jan. 1·0 U. T. are: M 204·560°, ω 177·945°, Ω 303·710°, *i* 10·830°, Φ 12·879°, *n* 2,015·258″, *a* 1·4581. The interesting planet 944 Hidalgo, which travels out to Saturn's orbit, has been out of sight for ten years; it may possibly be seen by southern observers next September, its magnitude being 15·4.

The remarkable planet discovered by M. Delporte a year ago, which approaches the earth within ten million miles, has now the number 1,222, and the name Amor; an ephemeris is given for next October, but as its magnitude is 21, its recovery can scarcely be expected. The tenth Trojan planet, 1,208 Troilus, was in opposition on December 31, 1932, in north declination 55°, magnitude 15·2. Eros is in opposition on June 27 in south declination 36°, magnitude 11·1.