

off's method for the determination of halogens in organic compounds, Dr. F. Schultz claims to have made the method more accurate and even applicable to the determination of bromine in highly brominated hydrocarbons. Stepanoff's method (*Ber.*, 1906, 39, 49) of estimating halogens by treating the substance in alcoholic solution with sodium, thereby converting the chlorine, bromine, or iodine present into the sodium salt, possesses obvious advantages over the Carius tube method. Various modifications have been suggested from time to time, but the method has not hitherto been considered accurate for highly brominated hydrocarbons. In his paper in the May number of the *Collection of Czechoslovak Chemical Communications*, Dr. Schultz describes how he carried out the reaction by gradually adding sodium to the boiling butyl alcohol solution of the bromine compound. Hexabromobenzene, pentabromotoluene and hexabromonaphthalene were examined. After the sodium had all been introduced, boiling under a reflux condenser was continued for an hour. Water was then added before filtration and the acidified solution was precipitated with silver nitrate and 'back-titrated' with ammonium sulphocyanide. The results were in very good agreement with the theoretical values.

Oxidation-Reduction Potentials in Bacteriology.—It is now well known that living cells require a constant hydrogen ion concentration in their environment if they are to live and function normally, and in higher animals mechanisms have been developed to maintain this concentration in the tissue fluids constant at a

point close to neutrality. The reducing power of the environment is probably similarly regulated, a balance being struck between the reducing and oxidising tendencies just as there is a balance between the hydrogen and hydroxyl ions. The oxidation-reduction potential can be measured by suitable indicators or potentiometrically. L. F. Hewitt, in a publication, "Oxidation-Reduction Potentials in Bacteriology and Biochemistry", recently issued by the London County Council (pp. 70. Price 2s.), describes a series of investigations on the oxidation-reduction conditions produced by bacteria in the medium by which they are surrounded, and has found striking differences of behaviour between different micro-organisms. Thus aerobes are in general able to reduce ordinary aerobic culture media until a moderately intense reducing level is reached; anaerobes, on the other hand, cannot effect any reduction in ordinary aerobic cultures, but if the medium is partially reduced to begin with, for example, by exclusion of the oxidising effect of air, they are able to establish very much more intense reducing conditions than the majority of aerobes. Pneumococci, again, do not maintain the level of reducing intensity after the logarithmic phase of growth, highly oxidising conditions being gradually established owing to the formation of peroxide. The virulence of hæmolytic streptococci is maintained in culture by opposing the reducing effects of the organisms, through increasing their oxygen supply. It seems possible that a systematic classification of organisms will result from studies of the oxidation-reduction potentials in bacterial cultures.

Astronomical Topics.

Distance of the Great Nebula in Orion.—A *Bulletin* dated June 11, from Science Service, Washington, D.C., gives a summary of a new determination of the distance of this nebula, made by Dr. R. J. Trumpler at the Lick Observatory, and reported by him to the Astronomical Society of the Pacific at Pasadena. He states that three different methods give the distance as 1800 light-years, which is about three times as great as the value generally given; thus Kapteyn gave the parallax of the nebula as 0.0055", implying a distance of 590 light-years. As there is evidence of association between the nebula and many of the bright stars in Orion, their distance is generally taken to be about the same; if the new distance applies to Rigel, it must be of extraordinary brilliance. The table in Russell, Dugan, and Stewart's standard work gives its absolute magnitude as -5.8 with a parallax of 0.006"; at three times the distance it would have absolute magnitude about -8.2. The new value gives the diameter of the nebula, neglecting its faint extensions, as 26 light-years. Dr. Trumpler has also investigated the colour of the stars in the nebula; he finds that they are slightly redder than stars of the same type elsewhere, which he ascribes to the absorptive effect of the nebula on their light.

The Cape Observatory.—The report of the Cape Observatory for 1930, which has just come to hand, states that the transit circle observations include the sun, Mercury, Venus, and Vesta (which is used to check the equator point), zodiacal stars, and stars south of -30° Decl. down to mag. 7.5. There is the welcome news that the heliometer observations of the outer planets since 1897 will shortly be published. They are likely to help in the determination of Pluto's mass.

Proper motions of stars in the Cape astrographic zone are being deduced by comparing recent photographs, taken through the glass, with those taken several years ago.

The relative trigonometrical parallax of Nova Pictoris came out as -0.013". Another determination was made by co-ordinating the increase of brightness with the expansion indicated by the spectroscope. The value 0.0015" was obtained, which makes the absolute magnitude at maximum -7.9.

The report shows that even before the end of 1930 the Eros programme was in full swing; the most important southern observations would be those made in January and February.

1930 was the driest year at the Cape since 1841, the rainfall being 16.46 in. The extremes of temperature were 104.0° and 35.8°, the annual mean being 63.7°.

New List of Astronomers and Observatories.—Prof. P. Stroobant and the other members of the staff of Uccle Observatory have just published a new edition of their useful list. The first edition appeared in 1907 and is now out of date; the new one is brought out under the auspices of the International Astronomical Union, which has assisted in the cost of publication. Very full particulars are given of the observatories; the names of all members of the staff, the department that they are attached to; details about the instruments, and the work for which they are used. The list of astronomers has references to all the pages on which they are mentioned. Full details are also given of the astronomical societies, with a description of their special objects, their dates of meeting, their publications, etc. They are arranged in order of their dates of foundation, the Royal Astronomical Society coming first. Finally, there is a list of astronomical periodicals, with particulars about their special fields of work, dates of publication, and subscription prices. Altogether the volume is one which all astronomers will find most useful; it is printed and edited by Messrs. Casterman, Tournai; the price is not stated.