

IN the study of the chemical actions involved in the dissolution of gold by sodium cyanide solutions it is necessary to know the extent of the hydrolysis of the latter, because it has been shown that this is an important factor in the rate of dissolution. An ingenious method for the estimation of the degree of hydrolysis of sodium cyanide solutions has been devised by Messrs. F. P. Worley and V. R. Browne (Chemical Society's Journal for December). A set of three flasks and three test tubes is set up in such a way that a current of air can be aspirated through all six vessels, the flasks alternating with the test-tubes. The latter contain an alkaline solution of sodium picrate; the first flask contains hydrocyanic acid of one concentration, the second the sodium cyanide solution, and the third hydrocyanic acid of a second concentration. The depth of the reddish-brown colour produced in the picrate indicator solution depends on the concentration of hydrogen cyanide vapour in the air current. Consequently, by varying the concentration of the hydrocyanic acid solutions until one is found which gives the same intensity of colour as the sodium cyanide solution, the concentration of hydrocyanic acid which has the same hydrogen cyanide pressure as the sodium cyanide solution is determined. It was shown that the amount of hydrogen cyanide removed from solution is too small to affect the degree of hydrolysis, and that the whole of the vapour was absorbed by one tube of picrate solution.

MESSRS. W. O. ROBINSON, L. A. Steinkoenig, and C. F. Miller have analysed the ashes of a large number of legumes, vegetables, grasses, trees, and bushes to determine whether the rare elements which have been found in certain soils occur in plants which have been grown on those soils. The results, together with analyses of the soils in question, are published in Bulletin No. 600 of the U.S. Department of Agriculture. Spectroscopic quantities of lithium were found in all the plants examined, and rubidium was present in the majority of cases, the quantity of it being larger than that of other rare alkalis. But plants containing 0.01 per cent. or more of rubidium oxide had been grown on soil in which rare alkali minerals are known to occur. Cæsium was detected in the ashes of timothy grass from Mount Mica, Paris, Me., the red raspberry from Beryl Mountain, Acworth, N.H., and the beets from Marlboro, N.H. Cæsium beryls have been found in the first two of these localities. Molybdenum was never detected; chromium and vanadium were occasionally found, though only in traces. Determinable amounts of barium were found in the ash of all the plants examined, and strontium in all except bean seeds. Very small quantities of titanium were present in the ash of all the plants. All the plant ashes analysed, except two, contained aluminium. Pine needles contain an exceptionally high amount of the latter element. The larger the amount of rubidium and cæsium, but not of lithium, present in the soil, the more is absorbed by the plant. There is no evidence that vanadium replaces phosphorus (as phosphoric acid) in its functions in the plant. The authors conclude that of the elements determined none need be considered in fertiliser practice except those commonly used, and sulphur, chlorine, and manganese in some cases. The appendix to the bulletin contains a detailed account of the analytical methods employed.

MESSRS. H. SOTHERAN AND Co., 140 Strand, have just issued a catalogue (No. 770) of rare and standard books on exact and applied science, which is of exceptional interest and value. It includes the scientific portion of the library of the late Lord Justice Stirling, and selections from the collections of George Rennie, F.R.S.; Samuel Roberts, F.R.S., and other men of

science, and gives particulars of a large number of very scarce works. The list is particularly strong in sets of journals of scientific societies. Among many rare volumes we notice the following:—The first edition of the *Opus Majus* of Roger Bacon; the Edizione Nazionale of Galileo's works; Borgo's "Libro de Abacho" (the first edition of the first printed treatise on arithmetic); the first Continental edition of Napier's "Logarithmorum Canonis Descriptio," etc.; the first edition of Gilbert's "De Magnete, Magneticisque Corporibus, et de Magno Magnete Tellure, etc.;" the first octavo edition of Newton's "Opticks," with MS. additions and corrections in Sir Isaac Newton's handwriting; and Dalton's "New System of Chemical Philosophy," complete. The catalogue is published at 2s. 6d. net.

OUR ASTRONOMICAL COLUMN.

GALACTIC CO-ORDINATES.—An interesting article on the galactic circle as a plane of reference for star places is contributed to the February number of *Scientia* by Dr. A. C. D. Crommelin. Following a comparison of the more familiar systems of co-ordinates, it is explained that catalogues of stars giving positions with respect to a plane which is independent of the earth's motions would have the great advantage that they would not get out of date as our present catalogues do, as only small corrections for proper motion would be required. The most obvious circle of reference is that provided by the Galaxy, for almost every feature either of distribution or of motion of the various classes of stars is based on the Galaxy as a plane of symmetry. It is difficult to give precision to the definition of the galactic circle, but from a consideration of eight determinations, Dr. Crommelin suggests that the adopted position of the north galactic pole, for the equinox of 1900, should be R.A. 12h. 42m. 37s., decl. $+27^{\circ} 32'$. It is further suggested that an actual star should be selected to mark the zero of galactic longitude, say α Cygni, which has an extremely small proper motion. The general adoption of some such scheme has been widely advocated, and will doubtless sooner or later be realised.

MOLECULAR SCATTERING OF LIGHT.—In a paper communicated to the Astronomical Society of France (*L'Astronomie*, January), Prof. Ch. Fabry gives an account of Lord Rayleigh's explanation of the blue coloration of the sky, and announces that the theory has been experimentally verified in his laboratory at Marseilles by M. Cabannes. Prof. Fabry suggests that several hitherto mysterious phenomena in the heavens may possibly be explained as effects of the scattering of light by gaseous molecules. In the case of the solar corona, for example, the portion of the luminosity which gives a continuous spectrum does not necessarily imply the presence of solid or liquid particles, but may be attributed to the diffusion of photospheric light by molecules of truly gaseous coronal matter. A density of only one-thousand-millionth part of that of atmospheric air would suffice to account for the observed intensity of the coronal light, and the polarisation of the light would be simply explained, as in the case of the light of the sky. A part of the luminosity of the tails of comets may be explained in a similar manner, and in this case the density must be less than one milligram per 1000 cubic metres, as otherwise the luminosity would be greater than any which has ever been observed. Other possible effects of molecular scattering are also suggested. It may be added that Prof. R. J. Strutt has also succeeded in observing the scattering of light by dust-free air in a laboratory experiment with artificial illumination (*NATURE*, October 25, 1917).

LEEDS ASTRONOMICAL SOCIETY.—The Journal and Transactions of this society for the year 1916 has been received. The number of members was fifty-two, and in view of the prevailing conditions, an average attendance of fourteen may be taken as an indication that the meetings continued to be interesting and helpful. Numerous observations of interest are recorded, and among the contributed papers, one by the Rev. I. Carr-Gregg on "The Invisible Universe," and another on "Sir William Herschel," by Miss C. A. Barbour, call for special mention. The editor is Mr. C. T. Whitmell, who has also made numerous contributions.

WAVE-LENGTHS OF HELIUM LINES.

ON account of its great intensity and the convenient distribution of the lines, the spectrum of helium furnishes a valuable source of standard wave-lengths in spectroscopic and optical work. A new series of determinations of the wave-lengths of the brighter lines which has been made by Mr. P. W. Merrill at the U.S. Bureau of Standards, Washington (*Astrophysical Journal*, vol. xli., p. 357, December, 1917), will therefore be generally welcomed. The highest possible precision has been aimed at, and as lines belonging to all the six series which constitute the spectrum of helium were included in the measurements, the new wave-lengths will also provide valuable data for computations of theoretical interest.

An interferometer of the Fabry and Perot type was used, and nine of the lines were compared directly with the fundamental standard—the red line of cadmium—by photographing the helium and cadmium spectra simultaneously on the same plate. Other wave-lengths were then determined from photographs of the helium spectrum alone. The adopted values for the twenty-one lines measured are given in the appended table, which also includes the values given by previous observers. The values given by Lord Rayleigh (two sets) and Eversheim were derived from interferometer observations, but those by Runge and Paschen were determined in the more usual way from grating photographs; the latter have been corrected from Rowland's scale to the international scale in order to make them directly comparable with the other values.

Wave-lengths of Helium Lines (in Å.).

Bureau of Standards	Rayleigh		Eversheim	Runge and Paschen
	a	b		
2945.104				106
3187.743				701
3613.641				641
3705.003				007
3819.606				605
3888.646				638
3964.727				727
4026.189				192
4120.812				821
4143.759				766
4387.928				934
4437.549				549
4471.477	... (478) ...	480 ...	493 ...	475
4713.143	... (171) ...	142 ...	154 ...	074
4921.929	... 925 ...	928 ...	922 ...	919
5015.675	... 680 ...	678 ...	683 ...	556
5047.736				641
5875.618	... 616 ...	623 ...	639 ...	650
6678.149	... 144 ...	147 ...	151 ...	14
7065.188	... 189 ...	197 ...	207 ...	22
7281.349				53

In the case of double lines the wave-lengths are those of the stronger components. From the general agree-

ment of individual determinations it is considered probable that the error is in no case so much as 0.003 Å., and that in most cases the errors are smaller than that amount. It is shown that the Kayser and Runge formula for spectral series, based upon three consecutive lines, will not reproduce accurately even the next member in any one of the six helium series.

THE CORAL-REEF PROBLEM.

FROM time to time recent work on the topography of coral-reefs has been referred to in NATURE, and the existence of submarine platforms from which atolls and encircling reefs rise has been very generally demonstrated. Prof. R. A. Daly regards these platforms as wave-cut plains, produced from coral banks and volcanic isles when the level of oceanic waters was lowered by ice-accumulation in Glacial times. The melting of the ice caused a general submergence of the platforms and of the adjacent coasts, giving rise to drowned valleys and all the features that have been attributed to a subsidence of the ocean-floor. The existing coral-reefs are thus for him post-Glacial, and grew up on the submerged platforms when warmer conditions were renewed.

In a summary of his views in *Scientia* (vol. xxii., p. 188, 1917) Daly points out that flat, reefless banks occur "in every ocean, inside and outside the tropical belt . . . covered with 45 to 100 metres of water." He urges that the inner walls of reefs are not well graded to the floors of the lagoons, and that the upper wall thus indicates a rise of water-level (whether we attribute it to flooding or subsidence) since the formation of the level inner floor. He believes that this floor is part of the platform, and is not due to infilling, though it is not clear why he should demand "millions of years" for such deposition within the wall (compare also his paper on "A New Test of the Subsidence Theory of Coral Reefs," *Proc. Nat. Acad. Sci.*, vol. ii., p. 664, 1916). He holds that "the mean depths of water above the flat floors of wide lagoons are nearly equal to the mean depths found on reefless banks," and that there is a close similarity of depth in the greater lagoons throughout the reef areas of the Pacific and Indian Oceans. Daly regards the reefs as "peripheral growths on wave-cut platforms," those nearer the centres of the platforms having been extinguished by mud and sand swept over the shoals.

On the other hand, Prof. W. M. Davis, in a series of critical papers, based on a recent visit to the Pacific isles, has greatly strengthened the Darwinian view. Thanks largely to his reasoning, even those who cannot find evidence for a general subsidence of ocean-floors are inclined to invoke block-faulting to explain the drowning of certain areas. Davis ("A Shaler Memorial Study of Coral Reefs," *Amer. Journ. Sci.*, vol. xl., p. 223, 1915) urges that if the lagoon floor is part of a wave-eroded plain from which the reefs rise, the sea would have cut cliffs in the surviving volcanic isles, the tops of which should appear as truncations of the spurs that bound the subsequently drowned valleys. Such cliffs occur in Tahiti ("Cliff Islands in the Coral Seas," *Proc. Nat. Acad. Sci.*, vol. ii., p. 284, 1916), but are very exceptional features. Davis regards them as emphasising the general absence of cliffs, even if they "are the work of abrasion during the lowered sea-stands of the Glacial period" ("Problems Associated with the Study of Coral-Reefs," *Sci. Monthly*, vol. ii., p. 564).

Davis, in his three papers in the *Scientific Monthly* (1915) and elsewhere, lays stress on the mature forms of the valleys in the reef-encircled isles as indications of their antiquity. These valleys cannot have been