

gravitation, when it comes to light, will be of the same kind.

In particular, the molecular aspect of reaction in gases is passed under review. Reasons are brought forward for holding that in gases all ultimate reactions are of necessity mono- or bi-molecular. If this be so, the important work now proceeding with regard to the effect of impurities in promoting or inhibiting gaseous reactions must lead to fuller knowledge of the transient molecules or radicals which are formed in the destructive encounter of a pair of the reacting molecules, and are the carriers or intermediaries leading finally to poly-molecular change; while the same transient combinations may be approachable independently from another side as affording the interpretation of the complex banded spectra of emission or absorption in gaseous media.

The very remarkable and most fruitful and prophetic symbolic theories of molecular structure, especially for the complex molecules of organic chemistry, have not yet proved capable of dynamical interpretation; it seems necessary, however, to admit, on account of the wide range of physical properties that are nearly atomically additive, that stereochemical collocations do represent in some real way the actual aggregation of the atoms instead of mere symbolical representation of it. Recent investigation appears to bring out in certain cases a somewhat definite relation between the configuration of the molecule and the crystalline form of its physical aggregations, which, though reasonable, could not have been foreseen *a priori*; exact crystallographic measurements may thus in time afford another intimate clue to the molecular structures in related series of compounds.

A NEW METHOD OF STEREOSCOPIC PHOTOGRAPHY.

AN entirely novel suggestion for the production of stereoscopic photographs is proposed by Prof. G. Lippmann in the current number of the *Comptes rendus* of the Paris Academy of Sciences (March 2). Let a lens be constructed of a material possessing a refractive index n , the segments forming the front and back of the lens having the same centre of curvature and the ratio of the radius of curvature of the front segment to that at the back being $n-1$. The front surface is the receiving lens, and corresponds to the lens of the eye; the back surface is covered with the sensitive emulsion, and corresponds to the retina. Owing to the chosen relation between the curvatures of the two faces an image of a point is formed by the front surface on the back one. The system is reversible; a ray of light proceeding from any point of the receiving surface will pass out at the front over exactly the same path as that taken by the incoming light in acting on the sensitive film, and this will be true in spite of any imperfection of the lens surfaces.

Prof. Lippmann now imagines a material such as celluloid moulded back and front, so that the whole surface is covered with microscopic cells, each of which is an elementary cell possessing the properties of the single lens described above. The whole film resembles the compound eye of insects. This plate, sensitised, is exposed in full daylight to the objects to be represented, no photographic lens being required. The result of the operation would be a series of microscopic images fixed each on the "retina" of one of the cells. Seen from the side of the sensitive layer, the whole plate would present a uniformly grey appearance. But seen from the front and illuminated from behind the plate (supposed converted into a positive), the photograph would appear, and would possess the following peculiarities. It would appear in true relief, exactly as in nature, and shifting the eye about would produce a change in the photograph seen, the effect being as if the observer stood in front of a window. By stepping from side to side, in the latter case, fresh portions of the landscape would come into view, the whole always being bounded by the four sides of the window. In the case of such a plate as that described, the effect would be precisely similar.

As the author remarks in the paper, the technical difficulties in the preparation of such a plate would be very great. The chief difficulty would be the fulfilment of the con-

dition necessary for the clear definition of each image in each elementary cell; the ratio, of the radii of curvature must be equal to $n-1$. Considering the thickness of the film, this difficulty would appear to be insuperable, but it is to be hoped that an attempt will be made to put this idea into practice, however imperfectly.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—During the last four years the average income of the botanic garden has been 1708*l.*, to which the University chest has contributed 1175*l.*, the rest being made up of money from trust funds and from rents. The botanic garden syndicate now points out that the income is no longer sufficient to cover the expenses. The syndicate estimates that in future, if the gardens are to maintain their high position amongst kindred institutions, some additional income must be found, and it is recommended that the present grant from the University chest to the botanic garden be increased by the sum of 220*l.* per annum.

The next combined examination for sixty-seven entrance scholarships and a large number of exhibitions at Pembroke, Gonville and Caius, King's, Jesus, Christ's, St. John's, and Emmanuel Colleges will be held on Tuesday, December 1, and following days. Mathematics, classics, and natural sciences will be the subjects of examination at all these colleges. Some of the colleges allow candidates who intend to study mechanical sciences to compete for scholarships and exhibitions by taking the papers set in mathematics or natural science. The colleges desire it to be known that any candidate for a scholarship may signify in writing his wish not to receive the emolument of the same if elected thereto, and that such candidate may be elected to a scholarship which may be honorary only and without emolument, but shall carry with it all other privileges attached to the position of a scholar. The amount thus set free will serve to increase the number of scholarships or exhibitions open to other candidates.

GLASGOW.—Among the honorary degrees to be conferred by the University on April 22 are the following:—*LL.D.*: Mr. G. T. Beilby, F.R.S., chairman of the governors of Glasgow and West of Scotland Technical College; Colonel David Bruce, C.B.; F.R.S.; Dr. J. J. Dobbie, F.R.S., director of the Royal Scottish Museum, Edinburgh; Mr. R. Kidston, F.R.S.; and Dr. J. C. McVail, county medical officer, Stirlingshire and Dumbartonshire.

DR. R. STEWART MACDOUGALL, on his appointment to the lectureship in botany in Edinburgh University, has resigned his position as biologist on the staff of the Edinburgh and East of Scotland College of Agriculture.

MR. A. L. BOWLEY, reader in statistics in the University of London, will give a course of ten lectures on elementary applications of mathematics to statistical data at the School of Economics, at 7 p.m., on Thursdays, March 26 and April 2, resuming after the Easter vacation on May 7, and continuing thereafter for seven consecutive Thursdays.

THE Earl of Rosebery will visit University College on the afternoon of Thursday, March 26, and will formally open the new libraries and the new south wing, which includes lecture-rooms for the faculty of arts, the departments of geology, hygiene, and experimental psychology, also large extensions of the departments of applied mathematics, of mechanical, electrical, and municipal engineering, and accommodation for the new hydraulic laboratory.

THE first volume of the report of the U.S. Commissioner of Education for the year ending June 30, 1906, has been received from Washington. In addition to chapters summarising the progress made during the year under review in the various departments of American education, the report contains a series of excellent articles on educational administration in various European and other countries. A useful summary of the different sections of the report is provided in the commissioner's introduction,