An Electronic Theory of Isomerism.

I HAVE read with considerable interest the suggestion of Dr. H. S. Allen in NATURE for March 18 that the Langmuir atom could be applied with advantage to the study of organic compounds. Dr. Allen is, however, doubtful if the "cubical atom" of Langmuir will explain the existence of isomerides of the type of the three malic acids, the glutaconic acids, the cinnamic acids, α-, β-, and γ-sugars, etc.; and it is certainly difficult to give formulæ for the triple linkage on the cubical atom. These difficulties disappear with the Bohr atom (NATURE, February 19, p. 661) and the modification of the Langmuir atom proposed by Major A. E. Oxley (*ibid.*, March 25, p. 105). With both theories *n* and *s* valencies are obtained, and, so far as a qualitative examination of valency in organic chemistry is concerned, it is difficult to decide between the two models. Major Oxley has, however, shown that his theory can give an adequate explanation of the magnetic properties of organic compounds, and equal success may be obtained with a theory of optical activity.

The crucial test appears to lie in the calculation of the optical activity of substances in the crystal form, for it is probable that in the liquid condition a large number of isomeric forms exist.

The alterations in optical activity which occur with change of solvent and the phenomena of mutarotation and of racemisation appear to be connected with changes in the direction of rotation of electrons. These changes could, perhaps, be more easily explained by the small orbital motions demanded by the Langmuir theory than by the larger orbital motions in the theory of Bohr. W. E. GARNER.

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IN view of Dr. A. E. Oxley's remarks in NATURE of March 25, I should like to point out that the object of my letter was to inquire whether the supposition of stationary electrons is essential to Langmuir's theory. Langmuir himself expressed the hope that it would be possible to reconcile his theory with that of Bohr, "which has had such marked success in explaining, and even in predicting, new facts." I ventured to suggest that electrons revolving round the nucleus could form stable groups as required by Langmuir without needing to be stationary.

The difficulty of explaining diamagnetism on the theory of the astronomical atom is well known. Possibly the difficulty may disappear when the nucleus is better understood. If electrons are considered as point-charges, the supposition that they revolve in very small orbits without any constraining force seems arbitrary. Dr. Allen's theory of ring electrons is preferable, and undoubtedly removes certain difficulties. It appears, however, that to account for spectral lines the diameter of the orbits must be comparable with that of the atom, which implies that the electrons revolve round the nucleus.

Since the structure of the atom is still uncertain, would it not be preferable to avoid, if possible, in a chemical theory a statement as to the immobility of the electrons? S. C. BRADFORD.

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Percussion-Figures.

C. V. RAMAN describes in NATURE of October 9, 1919, percussion figures in isotropic solids. These figures are known in geology, and are found on rounded boulders of compact, homogeneous rocks, such as flint and quartzite. Albert Heim [1] described in 1871 the "percussion-cones" (Schlagconus) brought forth artificially on pieces of flint by a powerful short blow with a hammer. F. Mühlberg,[2] of Aarau (Switzerland) was perhaps the first geologist who described the percussion-figures (Schlagfiguren) on rounded boulders (1885). On some of the quartz-boulders from the River Aar, near Aarau, he found from hundreds to thousands of circular cracks, which he explained by the abrasion of boulders which formerly received coniform cracks through the numerous impacts during their transport through the river-bed.

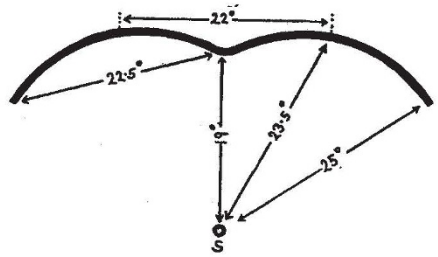
These percussion-figures must be intersecting figures of cones and the surface of the boulder, and, therefore, will form, on sufficiently great boulders, nearly circles, ellipses, and parabolas. Mühlberg described thus percussion-figures arising from torrent-action, whereas A. Bigot [3] (1907) emphasised that the "figures de percussion" arise from wave-action. He noticed them on the beaches of Basse-Normandie, particularly on quartzite boulders. Finally, P. N. Peach (1912) gave a very fine picture of the "bulbs of percussion" found on a rounded stone (chalk flint) dredged by the *Michel Sars* about 230 miles south-west of Mizen Head, Ireland. He pointed out that these figures indicate that "the stones had originally been dashed against each other by torrent- or wave-action."

Besides the term above-mentioned, Peach also uses the term "chatter marks," which seems to me less commendable, because this expression is also used by T. C. Chamberlin [5] for a special type of glacial striæ on the rock-bed. These curved figures were also described by Hagenbach in 1883, and afterwards called "arcs de Hagenbach" by L. Rollier.[6]

Batavia, Java, February 11. B. G. ESCHER.

A Peculiar Halo.

ON March 16 I observed a peculiar halo here; its form is best shown by a rough sketch. The angles were taken with a pocket slide-rule held at arm's length, and are, therefore, only approximations, but the relative values are probably fairly correct. The halo was brightest at the point above the sun, and faded off somewhat on each side; it ended rather abruptly at the points shown in the sketch. The



colours, with red nearest the sun, were not very pure, but they were purer in the arms than in the centre. The phenomenon was visible from 14.45 to 15.40, with intervals of disappearance when a sheet of alto-stratus became so thick that nothing could be seen through it but the glare of the sun. It was not possible to see any higher layer of cloud, but the halo probably had its origin in a layer of cirro-stratus. The measurements were taken at 15.40; a few minutes later the halo disappeared for the last time.

C. J. P. CAVE.

Sherwood, Newton St. Cyres, Devon,
March 20.

[1] *Vierteljahrschrift der Naturf. Gesellschaft in Zürich*, 1871, p. 140.

[2] *Programm der Aargauischen Kantonschule*, Aarau, 1885; *Die heutigen und früheren Verhältnisse der Aare bei Aarau*, p. 4.

[3] *Bull. tin de la Soc. géol. de France*. 4e série, tome iv. (1904), p. 598.

[4] Proc Roy. Soc. Edin., 1912; also Murray and Hjort, "The Depth of the Ocean," p. 205.

[5] 7th Ann. Rept. U.S. Geol. Survey, p. 218.

[6] *Bulletin de la Soc. Belfortaine d'Emulation*, No. 27, 1908.