

VANT HOFF'S "STEREOCHEMISTRY."

Stereochimie. Nouvelle Edition de "Dix Années dans l'Histoire d'une Théorie." Par J.-H. van't Hoff. Rédigée par W. Meyerhoffer. (Paris: Georges Carré, 1892.)

THE second edition of this work was very fully reviewed in these columns in 1887 (vol. xxxvii. p. 121), and we will therefore content ourselves with noticing briefly the new matter contained in the present edition.

We must, however, premise that the stereochemistry of the carbon compounds is based on the assumption that the four monad atoms or groups satisfying the four affinities of a carbon atom are situated at the solid angles of a tetrahedron, the centre of which is occupied by the carbon atom itself, and on the allied conception of the "asymmetric" carbon atom—"asymmetry" arising when the four attached atoms or groups are dissimilar, in which case two enantiomorphic arrangements are possible for any given set of four such atoms or groups (see the notice already referred to). In the first French edition, which bore the title "La Chimie dans l'Espace," the author discussed the greatly increased possibilities of isomerism to which this new theory led. Since then chemists have used the theory as a guide in the search for cases of isomerism, and numerous new isomeric compounds have been discovered, the existence of which could not have been predicted as long as the old constitutional formulæ written in one plane were employed. The history of this branch of organic chemistry has, during the past seven or eight years, been one continuous triumph for the theory. One of the most striking proofs of the value of these stereochemical views is to be found in Emil Fischer's well-known researches on the sugar group. In the group of the glucoses of the aldehyde-alcohol type, for example, the presence of four asymmetric carbon atoms has to be assumed, and the theory predicts the existence of no fewer than sixteen isomerides with a normal carbon chain, as compared with the one form admissible under the older view. Several of the predicted forms have been prepared, and the relative distribution of the positive and negative asymmetric carbon atoms within the molecule has been determined by E. Fischer. This and other work confirmatory of the theory, is described and discussed in the present volume.

The theory of the asymmetric carbon atom owes its origin to the difficulty of otherwise explaining the optical rotatory power of various organic compounds. Quite recently, P. A. Guye has suggested that the numerical value of this optical rotatory power is dependent upon the relative masses of the substituting atoms or groups attached to the asymmetric carbon atom, and that if two of the four different substituting radicles are of equal mass the rotatory power will cease. He was unable to verify this view in all strictness, since, in the cases of this kind which he studied, such as that of methyl-ethyl-aldehyde (C_2H_5) $(CH_3) CH (COH)$, in which $C_2H_5 = COH = 29$, there was optical activity. The probable explanation is, that, as suggested by Guye, not only the masses of the groups, but also the interatomic distances, of which the atomic volume is a measure, come into play here. However, by varying the weight of a given group

NO. 1219, VOL. 47]

attached to an asymmetric carbon atom—thus, by substituting successively different homologous radicles—it was found possible to produce a concomitant variation in the rotatory power of the compound, to make it increase or decrease at will, and even to change its sign. This variation is shown in ascending the series of the esters of tartaric acid and its di-acetyl and di-benzoyl derivatives. But whereas the weight of the alkyl-group in the esters determines the amount of the rotatory power, no such influence can be perceived in the case of the metallic salts of tartaric acid, all of which display in solution the same rotatory power, irrespective of the atomic weight of the metal. The clue to this anomaly is furnished by the electrolytic dissociation theory of Arrhenius, according to which the dissolved salts are present in the form of their dissociated ions, so that, in the case of the dissolved metallic tartrates, it is the ion $CO_2(CH.OH)_2CO_2$ which is alone responsible for the rotation. Arrhenius's theory thus receives striking confirmation from an unexpected quarter.

The subject of compounds containing closed chains is fully discussed in the present edition, and the "cis" and "trans" isomerism discovered by von Baeyer is described.

The relative position of the substituting groups in the stereo-isomerides is also discussed.

The concluding chapter deals with the stereochemistry of nitrogen—a question which had not emerged when the previous edition was published. Some of the information given under this heading is rather meagre; but doubtless the omissions are intentional and they are largely compensated for by a very complete bibliography of the subject.

The work is in every sense authoritative, and we cordially recommend it to all interested in the most recent developments of organic chemistry. F. R. J.

OUR BOOK SHELF.

Die Fossile Flora der Höttinger Breccie. By R. von Wettstein. With 7 plates. (Vienna: Imperial Printing-Office, 1892.)

THE Höttinger Breccia is a formation about 50 feet thick in the neighbourhood of Innsbruck, and situated about 1200 metres above sea-level. The upper part consists of about 35 feet of coarse conglomerate, with fossils chiefly confined to a bed some 3 feet thick, while the remainder is occupied by alternating beds a foot or two in thickness of white or reddish sandstones and breccias, which are for the most part very fossiliferous. It has been well known to collectors of fossil plants for upwards of thirty years, and though at first regarded as of tertiary age, is now uniformly recognised as quaternary, possibly inter-glacial, or more probably post-glacial. The lower part is characterised by the occurrence of many herbaceous plants, such as the violet, strawberry, coltsfoot, *Prunella*, &c., which are replaced above to some extent by *Cornus sanguinea*, *Rhamnus Frangula*, an alder, willow, &c., indicating, perhaps, a change in the forest growth without necessarily implying any considerable interval of time. The flora is almost wholly of existing species, and in the main does not differ essentially from that which might be found in a similar situation at the present day; but six of the species no longer flourish at such an altitude, and a few others, like the box, are absent in Northern Tyrol,