

Citation:

F.M.Jaeger, Crystallographic and molecular symmetry of position isomeric benzene derivatives, in: KNAW, Proceedings, 6, 1903-1904, Amsterdam, 1904, pp. 406-408

the very least 4) thickly pressed on one another, and pushes them forward in its course. It shoves before it the 7th and 8th, which remain situated on its top, overlapping one another for the greater part (c. f. fig. III and fig. VI). This however cannot be done without a considerable stretching, especially of the 9th and in a somewhat less degree of the 6th. Like the first floral leaves of an opening bud, on whose top are lying the 7th and 8th, the 9th dermatoma remains situated on the caudal, the 6th on the cranial side (see fig. VI) to the right. Caudally the 10th and cranially the 5th dermatoma are staying behind like the basal floral leaves of this bud.

The altogether different influence, exerted on the cranial dermatomata by the growth of the extremity in caudal direction, will be treated separately afterwards, but only the lateral portions pass on the extremity. Neither the conception of SHERRINGTON, representing the dermatomata passing as an unbroken whole on the extremity, nor that of BOLK, representing their latero-ventral parts (the 7th and 8th as a whole) moving roundabout an axis like the links of a chain, are capable of satisfying us completely, albeit our fundamental thoughts are the same, and borrowed from theirs.

Keeping provisorily to a mechanical conception, we regard the ranging of the dermatomata on the extremity as a consequence of the stretching of the lateral parts, caused by an impulsive force, beginning to act on the middle of the seventh and eight dermatoma, and operating from centrum towards periphery in a caudal direction.

We hold it therefore not impossible that anatomy, in admitting or rejecting a homology between the skin-branches of the lateral intercostal nerves and those of the plexus brachialis, may either confirm or refute our conclusions.

Chemistry. — Professor FRANCHIMONT presents to the Library the dissertation of Dr. F. M. JAEGER on: "*Crystallographic and molecular symmetry of position isomeric benzene derivatives*" and gives a brief explanation of the same.

(Communicated in the meeting of November 28, 1903).

After MITSCHERLICH at the beginning of last century had discovered isomorphism and LAURENT some years later had pointed out certain form-analogies in the aromatic substitution-products, there appeared in 1870 the masterly researches of GROTH on morphotropy. From all this it might be surmised that, as all chemical and physical properties of organic compounds depend not only on their compo-

sition, but also on their chemical structure in the broadest sense this would also be the case with the crystalline form. Dr. JAEGER has, however, perceived that the relation between form and structure cannot be quite so simple and only stands a chance of being discovered by a very delicate investigation of properly chosen series of objects and he justifies the choice of the six isomeric tribromotoluenes used in his research: by their high molecular weight and the slight difference in chemical properties, so that practically, only the relative position of the groups of atoms in the molecule causes a difference and because the number of isomers is not too small.

Dr. JAEGER has prepared these substances, which were only known as fine needles, in a form suited to measurement and an accurate examination of them showed that four of them belong to the monoclinic, one to the rhombic and one to the tetragonal system. The last two are those with the vicinal position of the three bromine atoms. Of the first four there are two which exhibit an isomorphism bordering on identity and which can form mixed crystals in all proportions.

The densities of the four monoclinic forms do not differ greatly, that of the rhombic isomer, however, is smaller and that of the tetragonal form still smaller so that a higher symmetry of form is accompanied by a lesser density.

He further determined the fifteen possible melting point lines of the binary mixtures of the six isomers and obtained very notable results, some of which have already been mentioned by Dr. VAN LAAR at the last meeting.

From the isomorphism bordering on identity of the two monoclinic forms we may certainly conclude that there is great similarity in the structure of their chemical molecules although these are not expressed in our chemical formulae; they are the compounds 1. 2. 3. 5. and 1. 2. 4. 6. if CII_3 stands on 1. This similarity appears, however, if we keep in view the analogy which exists, in a certain sense, between the group CH_3 and a bromine atom, which has been noticed in a number of cases and which may be referred to a similarity in space relationships, volume perhaps. A conformity already pointed out by GROTH in 1870 and which has been since observed by many chemists, for instance in cases of so-called sterical obstacle.

The relations found by Dr. JAEGER between chemical and crystallographic symmetry have given rise to a number of problems, which he is now engaged in solving, for instance whether the isomorphism of the two monoclinic tribromotoluenes remains intact when substi-

tuting the other H -atoms by feeble morphotropic groups such as $\bar{N}O_2$.

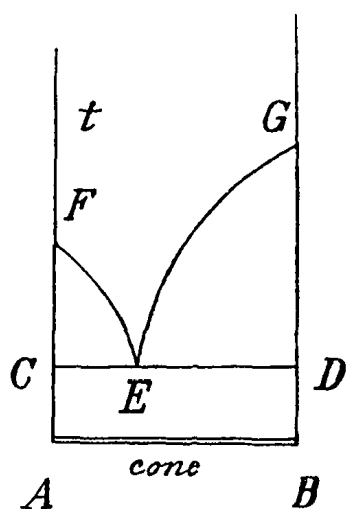
In regard to this, he recently informed me that both form a dinitroderivative, but with a different melting point and that not only the isomorphism is completely preserved, but that even the typical twin formation in certain solvents takes place with both in exactly the same manner, so that it looks as if one were dealing with the same material.

Chemistry. — “*The sublimation lines of binary mixtures*”. By Prof. H. W. BAKHUIS ROOZEBOOM.

(Communicated in the meeting of November 28, 1903).

From the consideration of the p, t, x -representation of the equilibria for solid, liquid and gaseous phases of binary mixtures given by me a short time ago¹⁾ it may be deduced in what manner the evaporation of the mixtures of two *solid* substances, or inversely their condensation on cooling a mixture of vapours, takes place at a constant pressure by a change of temperature.

It is only necessary to take a t, x -section at constant pressure through the figure at such a height, that no other equilibria occur than those between solid and vapour or between solid and solid. This is possible as long as we keep below the pressure of the quadruple-point where solid A , solid B , liquid and vapour coexist.



The adjoined figure then indicates the general character of the section, in which the vertical axis represents the temperature and the horizontal axis the concentrations of the mixtures.

F is then the sublimation temperature of the pure substance A , G , that of pure B . These temperatures are depressed along the lines FE and GE until, below the point E , total condensation of the vapour mixture to solid $A +$ solid B occurs.

Conversely the sublimation commences at the temperature given by the line CED and one of the two solid substances then disappears according to the concentration, unless the composition corresponds with E , in which case they both sublime simultaneously.

¹⁾ These Proc. V, p. 279.