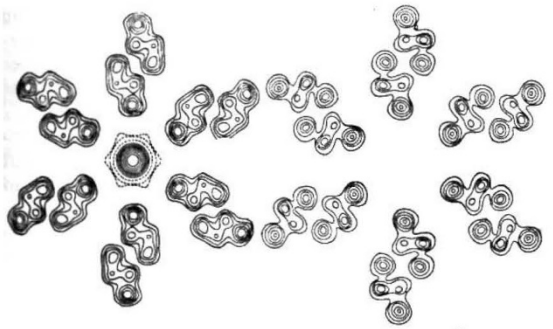

a *b*

occupied by other molecules, and is so occupied in the clathrate compounds. In any structure regarded as composed of spherical atoms of fixed radius, a part of the total space is represented by the unoccupied small cavities between spheres in contact, and even in a closest packed arrangement of equal spheres this is a considerable proportion. The 7½ per cent mentioned above is in addition to the space of this sort.

β-Quinol is the first example of a special type of molecular compound. It is composed of two giant molecules which, although not linked by bonds of any sort, are held together in a manner much firmer than corresponds to van der Waals' interaction. Furthermore, the two molecules cannot be separated without the breaking of bonds, for example, hydrogen bonds, although these bonds do not connect the two molecules.

The state of the molecules may be described as follows. Let the skeleton of a steel-frame building represent a portion of the indefinitely extended three-dimensional giant molecule. Let a second identical framework be constructed displaced relative to the first so that each junction of girders in one framework is at the space centre of a compartment of the other framework. There is no join between the two systems of girders, and there is therefore some freedom of independent movement of the two; but they cannot be separated since each makes a multiple enclosure of the other and thus imprisons it. If the girders are regarded as quinol molecules and the junctions between them are taken to be hydrogen bonds, the description applies in all essentials to β-quinol.

The imprisonment of one molecule by the other means that β-quinol is to be regarded as a special type of clathrate compound. Although a similar arrangement of molecules occurs in the compounds mentioned above, the complete absence of any enclosed molecules removes all possibility that they might play any part in the union of the two giant molecules. It is thus demonstrated that two molecules, which in this case happen to be identical in composition and structure, may be united as firmly as though there were hydrogen bonds between them, although, in fact, no such bonds exist.

Details of the crystal structure of β-quinol will be published elsewhere.

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Use of Ultra-Violet Fluorescence in Paper Chromatography

It has been shown[1] that, by the action of chymotrypsin, insulin is broken down into a number of peptide fragments of comparatively small molecular weight, and a more massive residue. The higher molecular weight material can be precipitated by means of trichloro-acetic acid. Attempts have been made to separate the lighter peptide mixture, and the most effective method so far found has been paper partition chromatography[2].

With phenol as the mobile phase, the mixture is resolved into four broad bands each of which can be further resolved by the use of collidine. It has been found during these experiments that the α-amino-acids and peptides can be detected on the filter paper sheets by drying off the solvent and examining the sheet under illumination from a 'Hanovia' lamp in a darkroom, using a ⅜ in. thick Wood's glass filter.

De Ment has noted[3] the fluorescence of the common α-amino-acids and a few dipeptides in the solid state when illuminated with light of 3650 A. wave-length. On paper chromatograms this fluorescence can be seen even though drying has only been done at 37° C., but the intensity increases markedly when higher drying temperatures are used. The quality of the fluorescent light is visually about the same for all the acids and peptides, a whitish-violet colour standing out against the dark violet of the filter paper. Using this method, it is possible to mark out the positions of the substances and cut out the spots or bands for elution, without sacrificing material for ninhydrin testing. Sheets marked in this way and afterwards tested with ninhydrin have shown the coincidence of the markings and the colours; but the ninhydrin test is the more sensitive one, since 20 μgm. of an amino-acid per square inch of paper is about the least visible under the ultra-violet light used. The chief drawback of the method is that extraneous fluorescent substances can be obtained from the paper and solvents used. These impurities may not produce a chromatograph pattern until they have been eluted from a sheet and run with a different solvent on a fresh chromatogram.

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Inhibition of the Photodynamic Action of 3 : 4 Benzpyrene

It has gradually become apparent that the carcinogenic activity of 3 : 4 benzpyrene is linked with sulphur metabolism[1]. Some experiments have, therefore, been carried out to attempt to determine whether another biological property of 3 : 4 benzpyrene, namely, its photodynamic action, is involved with sulphur. These were done by measuring the photodynamic activity of the benzpyrene in the presence of sulphur containing compounds.

For this purpose thick cultures of Paramecia were used as a biological indicator. Irradiation was from a mercury-vapour lamp screened with a glass filter opaque to radiations of less than 3,300 A. Exposures