

stains chemically related to Congo-red and so far tested for similar properties, only Congo-rubin has been found to produce a certain induced anisotropy with amyloid; this effect, however, is not so readily reproduced as in the case of Congo-red. Trypan-red and trypan-blue may or may not have a very slight similar effect.

The following preliminary conclusions have been drawn from the observations: the double-refringence produced by the interaction of amyloid and Congo-red is an essential and not an accidental one; this is evident by its being largely independent of the refractive index of the imbibition liquid. The amyloid-protein substructure seems to include reactive groups in a certain regular distribution and arrangement in space which allow the Congo-red molecule complexes to fit in by means of corresponding reactive groups in such a way as to create a crystal-like structure.

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Stabilization of Penicillin Solutions by Phosphate

ALTHOUGH penicillin in aqueous solution is rather more stable than was originally supposed, there is, nevertheless, an appreciable loss of activity in a few days at room temperature and in a few minutes at 100° C. We have found it possible greatly to stabilize penicillin solutions by the addition of phosphate (Sørensen's buffer solution). That this is not due to an effect on pH was shown by parallel experiments with penicillin in water alone, the pH of which was carefully regulated to that of the phosphate solutions.

The degree of stabilization depends on the sample of penicillin, the concentration of penicillin in the solution, and the concentration of phosphate. For example, in 15 min. at 100° C. and a concentration of penicillin of 5 u./ml., one sample lost 50 per cent of its activity in water and 5 per cent in *M*/15 phosphate; a second sample lost 25 per cent in water and 5 per cent in phosphate (see table). Different samples differ also in the amount of phosphate which gives maximal protection; with a concentration of 5 u./ml. penicillin, one sample was protected most by *M*/100 phosphate; a second by *M*/30 phosphate, whereas with a third there was increasing protection with increasing phosphate concentration up to and apparently beyond *M*/3 phosphate.

DESTRUCTION OF PENICILLIN SOLUTIONS AT 100° FOR 15 MIN. IN THE ABSENCE AND PRESENCE OF PHOSPHATES. FIGURES GIVE PERCENTAGE PENICILLIN DESTROYED. PHOSPHATE CONCENTRATION *M*/15.

Sample	Concentration of penicillin							
	5 u./ml. phos-water phosphate		50 u./ml. phos-water phosphate		500 u./ml. phos-water phosphate		5,000 u./ml. phos-water phosphate	
1	50	5	10	15	30	10	35	5
2	50	5	50	10	70	20	50	15
3	25	5	—	—	5	10	30	10

There are several practical applications of these findings. Perhaps the most important is that solutions of penicillin, which frequently become con-

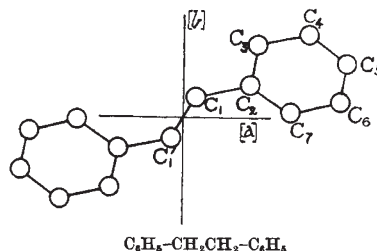
taminated with organisms such as *Ps. pyocyanea*, may be sterilized by boiling for a few minutes in the presence of phosphate, with but little loss in potency. Secondly, if only small quantities of penicillin are required out of the usual phial of 100,000 units, the addition of phosphate will make it possible to keep the unused portion of the solution for several days with little loss of activity.

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Structure of Dibenzyl

WITH the early work of J. M. Robertson¹ as a sound basis, the crystal structure of dibenzyl has been determined more accurately, using more than seven hundred experimental structure amplitudes in modern three-dimensional Fourier methods, including the new syntheses devised by A. D. Booth². For the first time in Great Britain, professional aid was enlisted for the laborious calculation of the final Fourier synthesis and theoretical structure factors through the co-operation of the Scientific Computing Service.



The molecule of dibenzyl has a centre of symmetry, and with the nomenclature shown in the figure the interatomic dimensions are as follows:

C'_1-C_1	1.48 A.	C_4-C_5	1.36 ₅ A.
C_1-C_2	1.50	C_5-C_6	1.36 ₅
C_2-C_3	1.37	C_3-C_4	1.39
C_2-C_7	1.36	C_6-C_7	1.39

$C'_1C_1C_2 = 115^\circ$; all angles associated with the benzene rings, $120 \pm 1^\circ$. The C'_1C_1 bond is inclined at 72° to the plane of the benzene rings.

The atomic parameters were derived directly from the maxima of the Fourier peaks, and no assumptions were made about the fine details of the structure. It is therefore possible to get a measure of the accuracy of the analysis from the geometry of the molecule; for example, the opposite sides of the benzene ring are parallel and C_1-C_2 is collinear with C_2-C_5 within 0.5° . Discrepancies of this order suggest that the values given above are reliable to ± 0.01 A. and $\pm 1^\circ$.

The special interest of these results lies in the acyclic single-bond distances, which are shorter than the normal value of 1.54 A. The system of two benzene rings separated by three single bonds is analogous to the 1:5-dienes and polyisoprenes, and that it should possess unusual structural features is in keeping with observations on this class of compounds instanced by the chemistry of certain carbalkoxyl derivatives of hexadiene³ and the structure of geranylamine hydrochloride⁴.