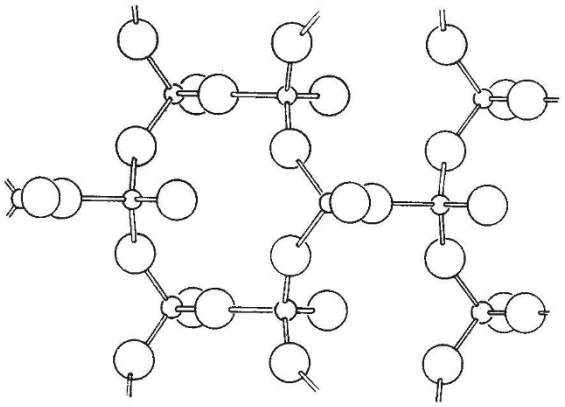
firmly. Hill, Faust and Hendricks[5] put the existence of a third form beyond doubt. They considered the modification as probably tetragonal (instead of orthorhombic, as found by us), as a result of optical investigation. According to their powder diagram data, however, it is certain that their crystals are identical with those described by us[4].



After the War, the paper of Hill *et al.* came to our knowledge; we resumed the X-ray investigation of the third form of phosphorus pentoxide and have now completely determined its crystal structure.

Space group $Pnam$—D_{2h}^{16}. $a = 9{\cdot}23$ A.; $b = 7{\cdot}18$ A.; $c = 4{\cdot}94$ A.

Four molecules P_2O_5 per cell.

P_I	in (4*c*) with	$x =$	$0{\cdot}244$,	$y =$	$0{\cdot}288$
P_{II}	,, ,,	,, $x =$	$-0{\cdot}098$,	$y =$	$-0{\cdot}156$
O_I	,, ,,	,, $x =$	$-0{\cdot}219$,	$y =$	$-0{\cdot}011$
O_{II}	,, ,,	,, $x =$	$-0{\cdot}142$,	$y =$	$0{\cdot}346$
O_{III}	,, ,,	,, $x =$	$0{\cdot}055$,	$y =$	$-0{\cdot}089$
O_{IV}	,, (8*d*)	,, $x =$	$0{\cdot}136$,	$y =$	$0{\cdot}282$, $z = 0{\cdot}000$

The structure consists of corrugated sheets, parallel to (100). One such sheet is shown in the accompanying diagram, projected along the *a*-axis. Two sheets run through the unit cell. The linking in the sheets is of the same general type as in vanadium pentoxide[6]. In details, the two structures differ considerably: the tetrahedra in phosphorus pentoxide are much less deformed than those in vanadium pentoxide, the binding in the sheet is more isotropic and the packing is more dense.

A full account of the structure analysis will be given elsewhere.

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Structure of Aluminium Soaps

In the course of a study of the water sorption of aluminium soaps, Shreve, Pomeroy and Mysels[1] found that pure aluminium laurate which had been dried *in vacuo* over phosphorus pentoxide at room temperature gave $2{\cdot}5 \pm 0{\cdot}4$ per cent of water when examined with the Karl Fischer reagent. They maintained, consequently, that the reagent gives misleading results because, under the conditions of the determination, soap molecules react with each other, or with free acid, to give water, thus:

$$2AlR_2OH \rightarrow R_2Al - O - AlR_2 + H_2O \quad (1)$$
$$AlR_2OH + HR \rightarrow AlR_3 + H_2O. \quad (2)$$

It occurred to us, however, that a simpler explanation would be that the water found by the Karl Fischer reagent exists as such in the authors' "dry" soap, but adsorbed on the molecule. Alternatively, it has been suggested by Schulman and McRoberts[2] that in aluminium soaps the aluminium atom acts as a hexavalent co-ordination centre for water, hydroxyl groups, fatty acid, etc.[3], and it is well known[4] that under the conditions of the Karl Fischer reagent, methyl alcohol can replace water molecules in a complex compound.

An opportunity to decide between these theories is presented by the reaction between aluminium alcoholate and a fatty acid. We prepared a solution of pure, redistilled aluminium *sec*-butylate in dry *sec*-butyl alcohol and added two equivalents of a pure vacuum-distilled synthetic long-chain fatty acid, thus:

$$Al(OBu)_3 + 2HR \rightarrow AlR_2OBu + 2BuOH. \quad (3)$$

The calculated quantity of water, dissolved in *sec*-butyl alcohol, was then added as follows:

$$AlR_2OBu + H_2O \rightarrow AlR_2OH + BuOH. \quad (4)$$

At this stage, there is thus no free water present as adsorbed molecules. Titration of this solution with the Karl Fischer reagent, however, resulted in the quantitative recovery of water according to equation (1) above, thus supporting the contention of the American workers.

This application of the Karl Fischer reagent as an analytical tool in the assessment of structure possesses interesting possibilities, and it is proposed to pursue this aspect further. Full details of the work will be published elsewhere.

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Structure of Vivianite and Symplesite

The role of water in the structure of crystals is so manifold that a great deal of experimental data must be accumulated before we can safely judge its significance. The following is another example for consideration.

C. W. Wolfe[1] ascribed the triclinic space group $C_i^1 - PI$ to symplesite; but we have found it has the