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#### Short communications

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#### The structure of Guinier-Preston zones. II

Errors occur in the above article by K. Toman (*Acta Cryst.* (1957), **10**, 187). In Table 1, column  $\pi^2c_n$ , 0.10 and 0.35 should read -0.10 and -0.35. In Table 3, column  $\pi^2c_n$  (scale factor = 1), -0.12 should read 0.12.

### Book Reviews

*Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 99, Livingston Street, Brooklyn 2, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.*

#### The Barker Index of Crystals. A Method for the Identification of Crystalline Substances.

By M. W. PORTER and R. C. SPILLER. Vol. II: Crystals of the Monoclinic System. Part I: Introduction and Tables. Pp. vi + 383. Parts 2 and 3: Crystal Descriptions M. 1–M. 1800 and M. 1801–M. 3572. Published for the Barker Index Committee. Cambridge: Heffer. 1956. Price £10.

Le premier volume de l'*Index de Barker* parut en 1951; il a fait l'objet de divers comptes-rendus (voir références). Nous souhaitons aujourd'hui la bienvenue au deuxième volume, consacré aux cristaux monocliniques. Il porte à 6500 le total des substances désormais déterminables par la méthode de Barker. Seul reste en souffrance le système triclinique: il fera son apparition sous peu, comme troisième et dernier volume.

Le plan de l'ouvrage reste inchangé. En une cinquantaine de pages et 43 figures, M. H. Hey (du British Museum) montre comment on applique la méthode au cas monoclinique. Cette introduction, qui inclut 19 exemples traités en grand détail, se termine par un choix de 25 exercices (pour tel cristal, dont on donne les faces par les coordonnées angulaires de leur normale, il s'agit de calculer les angles paramétriques et de les retrouver dans l'*Index*). Pour les professionnels, un tableau synoptique condense les instructions en une page. Nous retrouvons, reproduite en 16 pages, l'élégante 'Table des Tangentes Multiples' qu'imagina Barker pour faciliter le

calcul des zones orthogonales. Soient  $c(001)$ ,  $r(101)$ ,  $a(100)$ ,  $m(110)$ ,  $b(010)$ ,  $q(011)$  les faces entre lesquelles se situent les angles paramétriques; Barker donnait ces derniers dans l'ordre  $cr$ ,  $ra$ ,  $am$ ,  $bq$ . La table déterminative les permute cycliquement (heureuse innovation!) de façon à mettre en tête l'angle de classification  $am$ , suivant les valeurs croissantes duquel les substances se trouvent rangées. La table donne par surcroît l'angle  $ca$ , presque toujours superflu, mais indispensable dans certains cas de cristaux 'sous-développés'.

Trois tables déterminatives auxiliaires sont basées sur les indices de réfraction ( $\sim 800$  substances), la densité ( $\sim 1000$  substances) et le point de fusion ( $\sim 1870$  substances). Ici, les substances sont désignées uniquement par leur numéro d'ordre, numéro sous lequel figure leur description cristallographique dans la partie systématique de l'ouvrage. Cette dernière comprend deux gros tomes. Pour nous épargner de les compiler trop souvent, on nous offre (autre nouveauté, dont coût 46 pages) la liste des noms de substances en regard des numéros d'ordre. La table déterminative principale continue néanmoins à donner le nom, en plus du numéro. Compte tenu des deux répertoires alphabétiques, l'un en anglais, l'autre en allemand (pour les quelques 3450 descriptions tirées de Groth), il appert que le nom de chacune des 3572 substances est imprimé six fois. Le Barker Committee, franchement, n'est pas regardant!

Si l'on considère qu'un même point de fusion appartient généralement, à 2 ou 3° C. près, à cinquante composés ou davantage, on ne peut qu'être frappé de l'inefficacité

de ce fameux critère d'identification, pris à lui seul, bien entendu. A un degré moindre, il en va de même de la densité. Quant aux indices de réfraction, ils ne sont connus que pour un petit quart du total des substances. On se demande vraiment s'il n'eût pas mieux valu inclure ces propriétés, à titre de critères de vérification, dans une table déterminative unique.

Il n'est peut-être pas inutile de signaler que la grande majorité des substances de l'*Index* ne possèdent pas encore leur diagramme de poudre. Pour toutes celles-ci, la goniométrie supplée heureusement à la carence des rayons X.

En ce qui concerne le travail accompli, on doit admirer sans réserve le soin méticuleux, la minutie des calculs, la rigueur des standards qui régissent cette révision critique des constantes cristallines. Les cristallographes saluent avec gratitude la mémoire de R. C. Spiller; leur reconnaissance va aussi à Dr Mary Porter qui continue sans faillir à diriger cette énorme entreprise.

### Références

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vantages offered by synthetic peptides over fibrous proteins in structure determination. Other examples are provided by the very striking near identity of X-ray photographs of  $\beta$ -poly-L-analine and tussah silk and the clues given to the collagen structure by polyglycine II and poly-L-proline. At times the argument of the book becomes rather involved with the explanation of many different lines of study; at other times, one suspects there are hidden complications one would like more fully discussed, for example, the infra-red spectra of crystalline acetanilide. But the main story seems convincing.

Perhaps the most useful feature of the book is the record it provides of interesting observations, many of them hitherto unpublished, made in the course of the authors' researches. Some of these seem to have important bearings on protein structures. The relative stability of the  $\alpha$  configuration compared with  $\beta$ , for example, depends markedly on the size of the side chain and on polymer length. Polyglycine has never been found in the  $\alpha$  form;  $\alpha$  and  $\beta$  are almost equally stable chain types for poly-L-alanine. A 10-mer of the copolymer of *dl*-phenyl alanine and *dl*-leucine was found to be entirely  $\beta$ ; only at about 50 residues length was the polymer present as pure  $\alpha$ . Dilute solutions of  $\alpha$ -poly- $\gamma$ -benzyl-L-glutamate show many of the effects earlier observed in tobacco mosaic virus gels and some interesting new phenomena. Poly-L-lysine is extremely similar in its reactions with enzymes and in blood-clotting to the protamines,—and so on.

In conclusion I should add two quite separate points. The authors are to be congratulated on the part they have played in developing this fascinating field. The book is beautifully produced.

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**Synthetic Polypeptides.** By C. H. BAMFORD, A. ELLIOTT and W. E. HANBY. Pp. xiii+445 with many figs. and tables. New York: Academic Press; London: Academic Books. 1956. Price \$ 10.00.

This is not the moment for a complete and considered text book on synthetic polypeptides. But it is a moment at which it is very useful to have a book to give some account of the present state of fact and theory in this most interesting and rapidly developing field. If there are points at which stop-press news has had to be inserted in the present text, there is also a record of definite achievement worth serious consideration for the future.

The book is concerned with the preparation of synthetic polypeptides, their physical and chemical properties and particularly the evidence provided by infra-red spectroscopy and X-ray diffraction on their structure and transformations. It develops very largely as an argument concentrated on the discovery that synthetic polypeptides can be obtained, either by solution in different solvents or by other physical means, in  $\alpha$  and  $\beta$  chain configurations obviously related to  $\alpha$  and  $\beta$  keratins. The detailed correlation of the X-ray diffraction patterns of  $\alpha$ -poly- $\gamma$ -methyl-L-glutamate and  $\alpha$ -poly-L-alanine with the Fourier transform of the  $\alpha$  helix of Pauling, Branson & Corey is easily the most important single episode in the book and the best example of the ad-

**Rheology: Theory and Applications. Vol. I.**

Edited by FREDERICK R. EIRICH. Pp. xiv + 761. New York: Academic Press; London: Academic Books. 1956. Price \$ 20.00; £ 7.5.0.

This book is the first of three in which it is intended to survey the whole subject of the deformation and flow of materials in a series of articles by leading authorities. The articles in this first volume serve partly to introduce the subject to the newcomer and partly to lay down the basic physical and chemical principles of rheological behaviour. The later volumes will discuss topics such as linear viscoelasticity and relaxation in greater detail, and study the behaviour of particular substances such as plastics, rubbers and pastes.

In the past rheology has largely stood apart from crystal plasticity and dislocation theory, for it has grown up round the ideal Newtonian liquid and has gradually extended its coverage to more complex materials that retain some feature in common with this ideal liquid—usually the ability to flow under constant stress. Crystal plasticity, on the other hand, has grown up round crystal elasticity and the concept of an ideal solid that deforms but does not flow under constant stress. The discoveries of creep in crystals and of elasticity in liquids might have brought rheology and crystal plasticity together, but the molecular processes of flow in liquids and crystals have