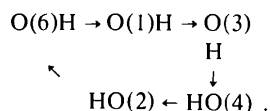
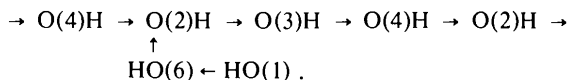


In (1) the proposed hydrogen-bonding scheme consists of closed loops, with the donor-acceptor sequence:



The hydrogen bond H...O distances range from 1.70 to 2.13 Å, the longest being that from the anomeric hydroxyl O(1)H to O(3), and the shortest from O(6)H to the anomeric O(1). The O-H...O angles are exceptionally linear, ranging from 179.6 to 179.9° (a rather unlikely circumstance because of the well-known geometrical factor).

In (2) the position of one hydrogen, H(O4), was poorly defined and placed in an unlikely position which was only 1.797 Å from H(O3). A more reasonable position is that deduced from the structure (1) which places it close to the line between O(4) and O(2) at a hydrogen-bonding distance of 1.89 Å from O(2). The hydrogen-bond scheme for structure (2) consists of infinite chains with two-link side chains, *i.e.*



The H...O bond distances then span a narrower range, from 1.89 to 2.02 Å, and the O-H...O angles have values from 114 to 180°. The anomeric O(1)H...O(6) remains the longest hydrogen bond, making an unusually small O-H...O angle. The anomeric O is not a hydrogen-bond acceptor.

Our interest in this problem arises from the prediction by Tse & Newton (1977) and the observations by Jeffrey, Gress & Takagi (1977) and Jeffrey & Lewis (1977) that anomeric hydroxyls in simple pyranoses are generally strong hydrogen-bond donors, but very weak acceptors. The hydrogen-bonding proposed in (1) provided one of the few strong exceptions to this hypothesis, whereas that in (2) is in better agreement, especially if the true position for H(O1) is closer to the line between O(1) and O(6), thereby shortening the H...O bond distance. For this reason, we favor the hydrogen-bonding scheme (2). Final resolution of this question must come from a neutron diffraction study, which must await the growth of suitable crystals, an experiment which hitherto has been unsuccessful.

This research was supported in part by NIH Research Grant GM-21794.

### References

- ABRAHAMS, S. C. & KEVE, E. T. (1971). *Acta Cryst.* A27, 157-165.  
 JEFFREY, G. A., GRESS, M. E. & TAKAGI, S. (1977). *J. Amer. Chem. Soc.* 99, 609-611.  
 JEFFREY, G. A. & LEWIS, L. (1977). *Carbohydr. Res.* In the press.  
 NYBURG, S. C. (1974). *Acta Cryst.* B30, 251-252.  
 OHANESSIAN, J. & GILLIER-PANDRAUD, H. (1976). *Acta Cryst.* B32, 2810-2812.  
 SHELDRIK, B. (1976). *Acta Cryst.* B32, 1016-1020.  
 TSE, Y.-C. & NEWTON, M. D. (1977). *J. Amer. Chem. Soc.* 99, 611-613.

## International Union of Crystallography

### Structure Reports

Volumes 40B and 41A of *Structure Reports* have recently been published. Volume 40B, covering the literature for organic compounds for 1974, is bound in two parts (viii + 582 pages and ii + 645 pages) and costs 320 Netherlands guilders. Volume 41A, covering the literature for metals and inorganic compounds for 1975, (viii + 477 pages) costs 150 Netherlands guilders. A 47-page supplement for 1974-1975 to Section A (Metals and Inorganic Compounds) of the 60-Year *Structure Index* is being sold with Volume 41A, and is included in the price for that volume. Additional copies of the supplement are available at a price of 10 Netherlands guilders.

Orders for these publications may be placed direct with the publisher, Bohn, Scheltema & Holkema, Emmalaan 27, Utrecht, The Netherlands, with Polycrystal Book Service, PO Box 11567, Pittsburgh, Pennsylvania 15238, USA, or with any bookseller.

### World Directory of Crystallographers

#### Fifth Edition

The Fifth Edition of this most useful Directory has just been published on behalf of the International Union of Crystallography by Polycrystal Book Service, PO Box 11567, Pittsburgh, Pennsylvania 15238, USA, from whom copies may be ordered direct at a price of US \$10.00 post free. It contains short biographical data on 7641 scientists from 71 countries, arranged in alphabetical order by countries, and by individuals within the countries. The biographical data include full name and title, address, year of birth, highest degree, field of study, university and year of highest degree, present position, telephone number and major scientific interests. There is also a comprehensive name index.

The General Editor of the Directory is Dr S. C. Abrahams and the Associate Editor is Dr A. L. Bednowitz. Crystallog-

raphers have completed Data Input Forms and have submitted them to the national Sub-Editors. The Directory has been produced by a computer-controlled experimental printer from punched cards or magnetic tapes prepared by the Sub-Editors. All National Committees for Crystallography, and also all Sub-Editors for countries not represented

in the Union but included in the Directory, have been given the opportunity to compile block orders for copies at a specially reduced price. These orders had to be submitted before the Directory was printed, but many countries took this opportunity to secure low-priced copies of the Directory for the personal use of their crystallographers.

## Notes and News

*Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).*

### **Current Awareness Profile on Crystallography**

A new publication entitled *Current Awareness Profile on Crystallography* is being published fortnightly by the Chemical Information Center, which is part of the Department of Chemistry of Indiana University. Each issue represents a computerized search of two consecutive issues of *Chemical Abstracts*, using the Chemical Abstracts Condensates tapes. Marketing restrictions on the use of these tapes currently prevent sales of the profile in some countries in Europe and elsewhere. The profile excludes all

references to citations from *Acta Crystallographica*, since inclusion of these citations would have increased the cost of the profile by about 40% and it was felt that most potential subscribers to the profile would scan *Acta Crystallographica* in any case. However, the profile does include citations from *Journal of Applied Crystallography*.

For subscribers in the USA the annual subscription is US \$37.50. Further information may be obtained from the Chemical Information Center, Department of Chemistry, Room 003, Indiana University, Bloomington, Indiana 47401, USA.

## Book Review

*Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.*

**Protein crystallography.** By T. L. BLUNDELL and L. N. JOHNSON. Pp. xiv + 565. New York, San Francisco: Academic Press, 1976. Price £17.00.

*Protein Crystallography* is a book in the series *Molecular Biology, an International Series of Monographs and Textbooks*.

Because of its importance for modern biochemistry and biology, protein crystallography attracts workers from many disciplines, such as biology, chemistry, physics and mathematics. It is indeed of great importance, and a mark of real progress, that now for the first time a book is available which is comprehensible to workers from all these various disciplines.

This book gives excellent and comprehensive information about all aspects of protein crystallography, reflecting the steps usually followed in a successful protein crystal structure analysis. It provides first of all the necessary fundamentals of biochemistry, such as the principles of protein structure and both theory of and practical experience in crystallization of proteins. It then explains the principles

of crystallography and X-ray diffraction. Based on this background knowledge, the chapters that follow discuss the methods of protein crystallography from isomorphous replacement and data collection to the calculation and interpretation of electron density maps. The concluding chapters give brief surveys of neutron diffraction,  $\gamma$ -ray resonance, electron microscopy and the achievements of protein crystallography.

Besides clear and exact descriptions of all these problems each chapter conveys the fascination of the methods and results of modern protein crystallography. Therefore the book can be used by students and scientists as an introduction to protein crystallography. It is especially useful for those who intend to do research in this field, and for the specialist it is a detailed review of the techniques used up till now in protein crystallography.

HELMUT FORMANEK  
SIBYLLE FORMANEK

*Botanisches Institut  
Universität München  
Federal Republic of Germany*