References

BENEDETTI, E., PEDONE, C. & SIRIGU, A. (1973). *Acta Cryst.* B**29**, 730–733.

PEDONE, C. & BENEDETTI, E. (1972). *Acta Cryst.* B**28**, 1970–1971.

SHOEMAKER, D. P., DONOHUE, J., SCHOMAKER, V. & COREY, R. B. (1950). *J. Amer. Chem. Soc.* **72**, 2328–2349.

SRINIVASAN, R. & RAMACHANDRAN, G. N. (1965). *Acta Cryst.* **19**, 1003–1007.

SRINIVASAN, R., VARUGHESE, K. I. & SWAMINATHAN, P. (1973). The Stockholm Symposium on the Structure of Biological Molecules, Abstracts, p. 70.

TORII, K. & IITAKA, Y. (1970). *Acta Cryst.* B**26**, 1317–1326.

TROMMEL, J. & BIJVOET, J. M. (1954). *Acta Cryst.* **7**, 703–709.

Book Review

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

The physics and chemistry of DNA and RNA. By JOHN H. SPENCER. Pp.ix+143. Figs. 37, Tables 7. London: Saunders, 1972. Price £5·35.

X-ray diffraction analyses have contributed much to our understanding of the physics and chemistry of nucleic acids. Accurate single-crystal studies of relevant small molecules, from Furberg's 1950 work on cytidine onwards, have provided values of bond lengths and bond angles to be incorporated in polynucleotide structures and have suggested hydrogen bondings and likely conformations. Analyses of the lower resolution X-ray diffraction from oriented, polycrystalline fibers has provided more direct evidence about conformations of particular polynucleotide helices.

Helices are the dominant secondary structural features of nucleic acids and are usually stabilized by forming coaxial, anti-parallel pairs in which bases are hydrogen-bonded in the fashion discovered by Watson and Crick. These double helices form either by the intertwining of two long polynucleotide chains of complementary sequence, as in chromosomal DNA and the RNA genome of certain viruses, or by the folding of single-stranded chains in which there are appropriate local oligonucleotide sequences as occur in transfer and ribosomal RNA's where about three-quarters of all nucleotides occur in the helical portions of looped back chains. The tertiary structural arrangement of these helical regions is now being determined in transfer RNA single crystals but in the 1960s the development of accurate fiber diffraction analysis, mainly in Wilkins's laboratory, had revealed that only two kinds of nucleic acid double helices appear possible. In one series (*A*) the furanose rings are puckered C3′-*endo*, in the other series (*B*) they are C3-*exo* (or the similar C2′-*endo*). Watson–Crick-paired double helices containing ribose are restricted to *A*-type conformations but when only deoxyribose rings are present *B*-type or *A*-type helices are both possible. This has led to the attractive hypothesis that the *B* conformation of DNA is involved when DNA is the template for new DNA in replication and its *A* conformation is required when it is the template for RNA in transcription.

None of these studies are described in Dr Spencer's little book perhaps because he thinks 'X-ray diffraction is not an easy technique (and is) limited to a few laboratories'. Analytical ultracentrifugation, nuclear magnetic and electron spin resonance, however, do not fall into the category of ignored techniques.

Perhaps the most valuable feature of the book is the copious reference lists on those topics that the author finds particularly congenial but the accompanying text shows little sign of critical analysis of the results. The never-defined hemi-protonated structure of polycytidilic acid, the ancient three-stranded model of polyinosinic acid (that every technique suggests is four-stranded), the improbable left-handed helix of poly(dIC) . poly(dIC), all take their bow with no hint of dubiety. Speculative and erroneous models for transfer RNA and the ribosome are presented with a wealth of detail and illustration not vouchsafed more firmly established nucleic acid structures.

The best service an author of *The Physics and Chemistry of DNA and RNA* could provide would be to winnow the wheat from the chaff of twenty years of frenzied publication in this field. Dr Spencer has been too humble to attempt this.

STRUTHER ARNOTT

Department of Biological Sciences
Purdue University
Lilly Hall of Life Sciences
West Lafayette
Indiana 47907
U.S.A.

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).

Delays in despatch of *Acta Crystallographica*

Messrs Munksgaard wish to apologize to subscribers for the delays, very considerable in some cases, in the despatch of the journals of the International Union of Crystallography. The delays arose during transfer of the subscription records to modern electronic data-processing equipment; after the initial troubles this should result in improved service.

Some adjustment will be made to the air-freight surcharge in 1975, in order to compensate regular subscribers in North America for the failure to provide the prompt delivery that they could expect from this service.