

classed correctly as helix, strand, turn, or irregular. It now seems clear that the secondary structure is determined to a significant degree by interactions in the three-dimensional structure between residues distant in the primary structure. The most striking demonstration of this is that 80% of pentapeptides with the same sequences have different conformations in unrelated proteins (although the relevance of this observation is disputed by the editor on p. 220). The more adventurous now attempt to incorporate tertiary structure into their predictions by using concepts such as amphipathicity (discussed here by Finer-Moore *et al.*) and hydrophobic moments (Rose and Dworkin; Eisenberg *et al.*) and distinguishing between different classes of tertiary structure.

Most attempts to predict protein tertiary structure concentrate upon finding patterns in sequences that are compatible with a single conformation that is already known, and there have been some noteworthy successes of this approach. In 1979, Ptitsyn, Finkelstein, and Murzin predicted the unknown protein uteroglobin to have four α -helices and proposed that it had a four-helix bundle structure, like that found in several known proteins. When the crystal structure was subsequently determined, the four helices were confirmed, but the dimeric molecule had them packed together somewhat differently. This structure also contained two unnatural disulfide bonds, however, and the natural protein demonstrates considerable flexibility, so the verdict on this prediction needs to be reserved. More recently, in 1987, Crawford, Miermann, and Kirschner analyzed the sequences of ten tryptophan synthase α -subunits and noticed that eight repeated β -strand/turn/ α -helix/turn motifs were predicted. This suggested that the tertiary structure is an eightfold α/β barrel of the type observed first in triosephosphate isomerase and subsequently in at least 15 additional proteins with apparently unrelated sequences. The crystal structure of the α -subunit entirely confirmed this prediction. Interestingly, another prediction was misguided by experimental evidence that the protein contained two independent domains. In the same year, Pearl and Taylor were able to match the sequence of an HIV protease with the acid protease structure and to propose a model for the HIV protease that was largely confirmed. Regan and De-Grado reported the successful preparation of a four-helix protein that had been designed entirely de novo. Although the exact structure has not yet been determined experimentally, all the evidence is consistent with its being the intended conformation. The folded conformation is remarkably stable, which

is perhaps the most impressive demonstration of the advances that have been made. Unfortunately, none of these accomplishments are mentioned in this volume.

Other shortcomings of the volume are common to multi-author works: the unevenness of presentation (one chapter, Fasman's account of the development of the subject, is 124 pages long, whereas six are no more than 16 pages), that half of the chapters were apparently completed three years before publication, others one year, and that some authors fail to address the topic of the volume, concentrating instead on their usual interests. For readers in quest of the Holy Grail of protein prediction, however, this will hardly be noticed, for they will be engrossed in the large amount of detailed information available.

THOMAS E. CREIGHTON

Medical Research Council Laboratory of
Molecular Biology,
Cambridge CB2 2QH, United Kingdom

Books Received

Adaptive Control and Identification. Conflict or Conflux? J. W. Polderman. Centrum voor Wiskunde en Informatica, Amsterdam, 1989. vi, 117 pp. Paper, Dfl. 17.80. CWI Tract 67.

Agroecology. Researching the Ecological Basis for Sustainable Agriculture. Stephen R. Gliessman, Ed. Springer-Verlag, New York, 1990. xiv, 380 pp., illus. \$89. Ecological Studies, vol. 78.

Air Pollution and Forests. Interactions Between Air Contaminants and Forest Ecosystems. William H. Smith. 2nd ed. Springer-Verlag, New York, 1990. xvi, 618 pp., illus. \$98. Springer Series on Environmental Management.

Algorithms for Diophantine Equations. B. M. M. de Weger. Centrum voor Wiskunde en Informatica, Amsterdam, 1989. viii, 212 pp. Paper, Dfl. 33. CWI Tract 65.

Aluminum Alloys. Contemporary Research and Applications. A. K. Vasudevan and R. D. Doherty, Eds. Academic Press, San Diego, CA, 1989. xxii, 702 pp., illus. \$149. Treatise on Materials Science and Technology, vol. 31.

Biochemistry of Cell Walls and Membranes in Fungi. P. J. Kuhn *et al.*, Eds. Springer-Verlag, New York, 1990. xiv, 327 pp., illus. \$89.

The Biology of Human Leukemia. Alvin M. Mauer, Ed. Johns Hopkins University Press, Baltimore, 1990. xii, 239 pp., illus. \$55. Johns Hopkins Series in Contemporary Medicine and Public Health.

Bioluminescence and Chemiluminescence. Studies and Applications in Biology and Medicine. M. Pazzagli *et al.*, Eds. Wiley, New York, 1989. vi, 646 pp., illus. \$154. *Journal of Bioluminescence and Chemiluminescence*, vol. 4. From a symposium, Florence and Bologna, Italy, Sept. 1988.

Biophysical Chemistry. Molecules to Membranes. P. R. Bergethon and E. R. Simons. Springer-Verlag, New York, 1990. xiv, 340 pp., illus. \$59.

Bioprocesses and Engineering. N. Hardman *et al.* Springer-Verlag, New York, 1989. viii, 180 pp., illus. \$69.50. Advances in Biochemical Engineering/Biotechnology, vol. 40.

Chemical Modeling of Aqueous Systems II. Daniel C. Melchior and R. L. Bassett, Eds. American Chemical Society, Washington, DC, 1990. xvi, 556 pp., illus. \$89.95. ACS Symposium Series, vol. 416. From a symposium, Los Angeles, CA, Sept. 1988.

Colony-Stimulating Factors. Molecular and Cellular Biology. T. Michael Dexter, John M. Garland, and Nydia G. Testa, Eds. Dekker, New York, 1990. xiv, 475 pp., illus. \$135. Immunology Series, vol. 49.

Computers, Pattern, Chaos and Beauty. Clifford Pickover. St. Martin's, New York, 1990. xviii, 400 pp., illus. \$29.95.

A Dissection and Tissue Culture Manual of the Nervous System. Abraham Shahar *et al.*, Eds. Liss (Wiley), New York, 1989. xxiv, 371 pp., illus. Comb bound, \$75.50.

Diterpenes of Flowering Plants. Compositae (Asteraceae). F. Seaman *et al.*, Springer-Verlag, New York, 1990. vi, 638 pp., illus. \$99.

Einstein and the History of General Relativity. Don Howard and John Stachel, Eds. Birkhäuser Boston, Cambridge, MA, 1989. xii, 445 pp. \$69. Einstein Studies, vol. 1. From a conference, North Andover, MA, May 1986.

Éléments de Physique Statistique. Bernard Diu *et al.* Hermann, Paris, 1989. xii, 1001 pp., illus. Paper, 460 F. Enseignement des Sciences, no. 37.

Emotion Concepts. Zoltán Kövecses. Springer-Verlag, New York, 1990. viii, 230 pp. \$49.

Encyclopedia of Artificial Intelligence. Stuart C. Shapiro, Ed. Wiley-Interscience, New York, 1990. 2 vols. xxvi, 1219 pp., illus. Paper, \$79.95.

Energetic Charged Particles in Space. S. Biswas, S. Ramadurai, and G. Gloeckler, Eds. Published for the Committee on Space Research by Pergamon, Elmsford, NY, 1989. viii, 209 pp., illus. Paper, \$70. Advances in Space Research, vol. 9, no. 12. From a meeting, Espoo, Finland, July 1988.

Essays on the Trial of Galileo. Richard S. Westfall. Vatican Observatory Publications, Vatican City, 1989. (U.S. distributor, University of Notre Dame Press, Notre Dame, IN). xii, 103 pp. Paper, \$9.95. Studi Galileiani, no. 5.

Evolution and Ecology of Unisexual Vertebrates. Robert M. Dawley and James P. Bogart, Eds. New York State Museum, Albany, 1989. vi, 302 pp., illus. Paper, \$30. Museum Bulletin 466. From a symposium, Albany, NY, June 1987.

Evolutionary Dynamics of a Natural Population. The Large Cactus Finch of the Galapagos. B. Rosemary Grant and Peter R. Grant. University of Chicago Press, Chicago, 1990. xi, 350 pp., illus. \$65; paper, \$24.95.

Expert Systems. Applications to Urban Planning. T. J. Kim, L. L. Wiggins, and J. R. Wright, Eds. Springer-Verlag, New York, 1990. xiv, 268 pp., illus. \$39.

Flight Strategies of Migrating Hawks. Paul Keringer. University of Chicago Press, Chicago, 1989. xvi, 375 pp., illus. \$60; paper, \$19.95.

History of Rocketry and Astronautics. Kristan R. Latu, Ed. Published for the American Astronautical Society by Univelt, San Diego, CA, 1989. xii, 356 pp., illus. \$50; paper, \$35. AAS History Series, vol. 8. International Academy of Astronautics History Symposium, vol. 3. From symposia, Baku, U.S.S.R., 1973, and Amsterdam, the Netherlands, 1974.

History of Rocketry and Astronautics. Frederick I. Ordway III, Ed. Published for the American Astronautical Society by Univelt, San Diego, CA, 1989. xii, 318 pp., illus. \$50; paper, \$35. AAS History Series, vol. 9. International Academy of Astronautics History Symposium, vol. 4. From symposia, Lisbon, Portugal, 1975, Anaheim, CA, 1976, and Prague, Czechoslovakia, 1977.

Human Plasma Lipoproteins. J. C. Fruchart and J. Shepherd, Eds. DeGruyter, Hawthorne, NY, 1989. xx, 398 pp., illus. \$128. Clinical Biochemistry, vol. 3.

Innovative Applications of Artificial Intelligence. Herbert Schorr and Alain Rappaport, Eds. AAAI Press, Menlo Park, CA, and MIT Press, Cambridge, MA, 1990. xvi, 363 pp., illus. Paper, \$19.95.

Interactions Among Aptitudes, Strategies, and Knowledge in Cognitive Performance. Wolfgang Schneider and Franz E. Wienert, Eds. Springer-Verlag, New York, 1990. xviii, 316 pp., illus. \$49. From a conference, Munich, F.R.G., July 1988.

Molecular and Cellular Mechanisms of Human Hypersensitivity and Autoimmunity. Edward J. Goetzl, Ed. Liss (Wiley), New York, 1989. xvi, 194 pp., illus. \$90. UCLA Symposia on Molecular and Cellular Biology, vol. 105. From a symposium, Keystone, CO, April 1988.

The Monte Carlo Methods for Semiconductor Device Simulation. C. Jacoboni and P. Lugli. Springer-Verlag, New York, 1989. x, 356 pp., illus. \$98. Computational Microelectronics.

The Myth of Heterosexual AIDS. Michael Fumento. Basic Books, New York, 1990. xvi, 411 pp. \$22.95. A New Republic Book.

The Natural Environment and the Biogeochemical Cycles. G. H. Dury *et al.* Springer-Verlag, New York, 1990. xii, 192 pp., illus. \$69. The Handbook of Environmental Chemistry, vol. 1, pt. E.

Neuropsychological and Behavioral Aspects of Diabetes. Clarissa S. Holmes, Ed. Springer-Verlag, New York, 1990. xvi, 283 pp., illus. \$65. Contributions to Psychology and Medicine.

PDEs and Continuum Models of Phase Transitions. M. Rasle, D. Serre, and M. Slemrod, Eds. Springer-Verlag, New York, 1989. viii, 229 pp., illus. \$29.70. Lecture Notes in Physics, vol. 344. From a seminar, Nice, France, Jan. 1988.

Perceptions of Animals in American Culture. R. J. Hoage, Ed. Smithsonian Institution Press, Washington, DC, 1989. xviii, 151 pp., illus. Paper, \$11.95.

Periodic Systems and Their Relation to the Systematic Analysis of Molecular Data. Ray Hefferlin. Mellen, Lewiston, NY, 1989. xxvi, 629 pp., illus., + plates, microfiches in pocket. \$89.95.

Poleward Flows Along Eastern Ocean Boundaries. S. J. Neshyba *et al.*, Eds. Springer-Verlag, New York, 1989. x, 374 pp., illus. \$59. Coastal and Estuarine Studies, vol. 34. From a workshop, Monterey, CA, Dec. 1986.

Postharvest Biotechnology of Flowers and Ornamental Plants. D. K. Salunkhe, N. R. Bhat, and B. B. Desai. Springer-Verlag, New York, 1990. xii, 192 pp., illus. \$69.50.

A Practical Guide to Protein and Peptide Purification for Microsequencing. Paul T. Matsudaira, Ed. Academic Press, San Diego, CA, 1989. xiv, 131 pp., illus. Comb bound, \$24.95.

Presentation of Clinical Data. Bert Spilker and John Schoenfelder. Raven, New York, 1989. xvi, 553 pp., illus. \$80.

Seismicity in Mines. Sławomir J. Gibowicz, Ed. Birkhäuser Boston, Cambridge, MA, 1989. vi pp. + pp. 283-680 pp., illus. Paper, \$49.50. Reprinted from *Pure and Applied Geophysics*, vol. 129, no. 3/4 (1989).

Selective Incapacitation and the Serious Offender. A Longitudinal Study of Criminal Career Patterns. Rudy Haapanen. Springer-Verlag, New York, 1990. xvi, 160 pp., illus. \$49. Research in Criminology.

Sex Chromosome Abnormalities and Human Behavior. Psychological Studies. Daniel B. Berch and Bruce G. Bender, Eds. Published for the American Association for the Advancement of Science by Westview, Boulder, CO, 1990. xiv, 243 pp., illus. Paper, \$32.95; to AAAS members, \$26.36. AAAS Selected Symposia series, vol. 112.

Shading Our Cities. A Resource Guide for Urban and Community Forests. Gary Moll and Sara Ebenreck, Eds. Island Press, Washington, DC, 1989. xviii, 333 pp., illus. \$24.95; paper, \$17.95.

The Social Psychology of Intergroup and International Conflict Resolution. Ronald J. Fisher. Springer-Verlag, New York, 1990. viii, 277 pp., illus. \$69.50. Springer Series in Social Psychology.

Space Enterprise. Beyond NASA. David P. Gump. Praeger, Westport, CT, 1989. x, 220 pp., illus. \$19.95.

Spectroscopic Characterization of Minerals and Their Surfaces. Lelia M. Coyne, Stephen W. S. McKeever, and David F. Blake, Eds. American Chemical Society, Washington, DC, 1990. x, 480 pp., illus. \$94.95. ACS Symposium Series, vol. 415. From a symposium, Los Angeles, CA, Sept. 1988.

Subduction Zones. Part 2. Larry J. Ruff and Hiroo Kanamori, Eds. Birkhäuser Boston, Cambridge, MA, 1989. vi, 282 pp., illus. Paper, \$35.50. Reprinted from *Pure and Applied Geophysics*, vol. 129, no. 1/2 (1989).

Supercollider 1. Michael McAshan, Ed. Plenum, New York, 1989. xviii, 822 pp., illus. \$135. From a symposium, New Orleans, LA, Feb. 1989.

Synchrotron Radiation in Chemistry and Biology III. E. Mandelkew, Ed. Springer-Verlag, New York, 1989. xii, 229 pp., illus. \$79.50. Topics in Current Chemistry, vol. 151.

Technology Choice. A Critique of the Appropriate Technology Movement. Kelvin W. Willoughby. Westview, Boulder, CO, and Intermediate Technology Publications, London, 1990. xii, 350 pp. Paper, \$32.95.

Vision and the Brain. The Organization of the Central Visual Systems. Bernard Cohen and Ivan Bodis-Wollner, Eds. Raven, New York, 1989. xxvi, 364 pp., illus. \$125. Research Publications, Association for Research in Nervous and Mental Disease, vol. 67. From a conference, New York, Dec. 1987.

Visual Pattern Analyzers. Norma Van Surdam Graham. Clarendon (Oxford University Press), New York, 1989. xvi, 646 pp., illus. \$95. Oxford Psychology Series, no. 16.

Visual Perception. The Neurophysiological Foundations. Lothar Spillman and John S. Werner, Eds. Academic Press, San Diego, CA, 1989. xviii, 531 pp., illus. \$85; paper, \$44.50. Based on a conference, Badenweiler, F.R.G., June-July 1987.

War on Waste. Can America Win Its Battle with Garbage? Louis Blumberg and Robert Gottlieb. Island Press, Washington, DC, 1989. xxiv, 301 pp. \$34.95; paper, \$19.95.

NASA VIDEOS & SLIDES

NASA VIDEOS WERE SHOT BY THE ASTRONAUTS WHILE WORKING IN SPACE AND TALKING BY 2-WAY RADIO-TELEPHONE TO FLIGHT CONTROLLERS IN HOUSTON.

First Moon Landing

July 1969

30 Min. Video/Sound & Color... \$20

"Rover Auto" on Moon

April 1972

30 Min. Video/Sound & Color... \$20

Last Moon Landing

December 1972

30 Min. Video/Sound & Color... \$20

Space Shuttle

30 Min. Video/Sound & Color

SHUTTLE FLIGHTS Hi Lites... \$20

ALL 4 ON ONE-2 HR CASSETTE

ONLY \$25 Plus \$3 Shipping Fee

MONEY-BACK GUARANTEE!

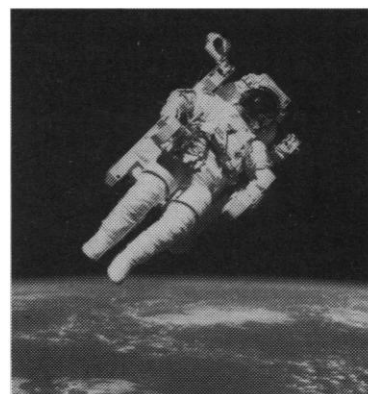
MOVIE NEWSREELS - P.O. BOX 2589 P
Hollywood, California 90078

☐ Enclosed Find \$ _____ Videos VHS or BETA

ADD 10% FOR SHIPPING (MIN. SHIPPING CHARGE \$3)

Visa, Mastercard & Diners. Give Card # & Expiration Date.

Call: (213) 467-2448



COLOR SLIDES

1. SATURN - Voyager I & II 18 Slids...\$9
2. MARS - Viking I & II 20 Slids...\$10
3. JUPITER - Voyager I 20 Slids...\$10
4. JUPITER - Voyager II 20 Slids...\$10
5. URANUS - Voyager II 20 Slids...\$10
6. NEPTUNE - Voyager II 20 Slids...\$10
7. APOLLO 8, 9 & 10 18 Slids...\$10
8. APOLLO 11 - 1st MOON LANDING 24 Slids...\$12
9. APOLLO 12 - 2nd Moon Landing 30 Slids...\$15
10. APOLLO 13 - Lunar Orbit 24 Slids...\$12
11. APOLLO 14 - Frau Mauro 48 Slids...\$24
12. APOLLO 15 - Hadley Rille 48 Slids...\$24
13. APOLLO 16 - Rover-Descartes 24 Slids...\$12
14. APOLLO 17 - MOON LANDING 54 Slids...\$27

Circle No. 143 on Readers' Service Card

POSTER YOUR WALLS WITH SCIENCE

SCIENCE cover posters are once again available. These beautiful, full-color reproductions are suitable for framing, and the sturdy mailing tube keeps them crease-free during shipment. Only \$7.95, U.S. postage paid.

MARK quantity in box.

☐ #01 LOCOMOTIVE IN CHINA
9 February 1979 (18 x 24)

☐ #02 LIGHTNING OVER ST. LOUIS
27 July 1979 (20 x 28)

☐ #03 CHEETAH AND CUB
29 July 1983 (20 x 28)

☐ #04 SNOWSHOE HARE
2 December 1983 (20 x 28)

☐ #05 CATHEDRAL WINDOW/DNA
MOLECULE
23 December 1983 (20 x 28)

☐ #06 NEURONS IN MOTOR CORTEX
26 September 1986 (18 x 24)

☐ #07 BYRD GLACIER, ANTARCTICA
28 November 1986 (18 x 24)

☐ #08 COMBINATION OF SPACE
COVERS IN SCROLL FORMAT
1 June 1979, 23 November 1979,
10 April 1981 (12 x 37)

☐ #09 MOONS OF URANUS
9 September 1988 (18 x 24)

☐ #10 CATERPILLAR/YOU ARE WHAT
YOU EAT
3 February 1989 (18 x 24)

☐ #11 ATMOSPHERIC LAYERING ON
EARTH'S EDGE
10 February 1989 (18 x 24)

_____ Total number ordered @ \$7.95

\$ _____ Subtotal

\$ _____ For shipment to California, add
applicable sales tax.

\$ _____ Total

☐ Check enclosed Please charge my:

☐ Mastercard ☐ Visa

Card # _____ Exp. _____

Name _____

Address _____

City _____

State/Zip _____

MAIL TO:

AAAS Books, Dept. 8
P.O. Box 753
Waldorf, MD 20604

Order
yours now,
while supplies last!