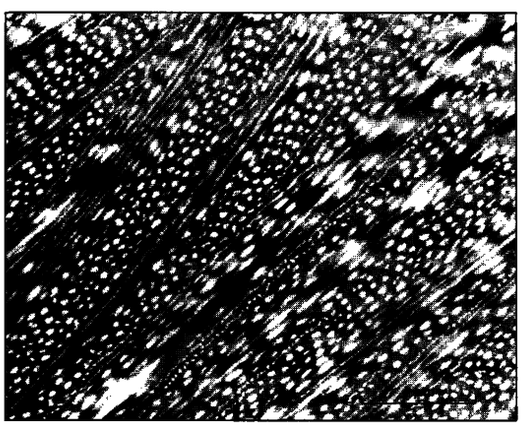
that these materials play a more dynamic part in developmental biology than is generally appreciated. For instance, the net orientation of cellulose fibers in the cell wall of a plant controls the direction in which the cell will expand, so it is at this level that we have to explore the control of shape of the plant in growth (both at the meristem and an increasing size) and wound healing. This adaptation of directional properties applies to insects in all stages, egg to adult; to cysts and egg capsules of a huge variety of animals; to silk; and to nutshells and to bone. We still do not know how the orientations are achieved or controlled, but with such a wide variety of materials and mixtures capable of self-assembly, there is likely to be a variety of mechanisms. Neville devotes a chapter to this problem and recognizes two main classes—remote (chemical) control and more immediate directed control, where cellular structures can be seen to match with those of the extracellular material. A further possibility is mechanical orientation. The chapter on biomimicry interestingly introduces more artificial liquid crystalline materials but regrettably says little about how they might be used.

There are a few elementary mistakes, such as the generalizations that all mammalian bone is osteate, that the roots of plants carry virtually no stresses, that glass fibers are brittle because they have small scratches on the surface, and that the high resilience of resilin can only be due to the randomness of arrangement of its constituent chains. These errors do not reduce the impact of the work, which is full of insight. For instance, only with the evolution of cell walls made with fibers ordered in such a way as to support large forces can plants have developed sufficient rigidity to support themselves and become large. Can one see these orientations in the petrified cell walls of *Rhynia*, that famous first land plant? As usual, Neville is generous with his ideas and produces blueprints for a dozen or so projects, some to be pursued in well-known holiday resorts. This book is such a good read that I wouldn't mind taking it along too.



"Transmission electron micrograph of a section through the eggcase protein of a praying mantis (*Sphodromantis tenuidentata*). This was fixed *in situ* in the oothecal gland and was in a liquid crystalline phase prior to fixation. The system is seen to be orthogonal. From work by B. M. Luke and A. C. Neville. Stained with uranyl acetate and lead citrate." [From *Biology of Fibrous Composites*]

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Other Books of Interest

Science Advice to the President. WILLIAM T. GOLDEN, Ed. Second edition. AAAS Press, Washington, DC, 1993. xii, 329 pp. Paper, $29.95; to AAAS members, $23.95.

Science and Technology Advice to the President, Congress and Judiciary. WILLIAM T. GOLDEN, Ed. Second edition. AAAS Press, Washington, DC, 1993. xxiv, 529 pp. Paper, $29.95; to AAAS members, $23.95.

The efforts of William Golden in the years just after the Second World War were instrumental in establishing a mechanism for science advice to the U.S. presidency that has continued, with various interruptions and modifications, to the present day. In 1980 Golden brought together under the title *Science Advice to the President* (Pergamon Press) a collection of observations and reflections by those who had served as presidential science advisers and by other knowledgeable commentators (see *Science* **209**, 371 [1980]). This was followed by two further compendia expanding the scope of the coverage: *Science and Technology Advice to the President, Congress, and Judiciary* (Pergamon, 1988; see *Science* **239**, 1077 and 1082, and **240**, 1552 [1988]) and *Worldwide Science and Technology Advice to the Highest Levels of Government* (Pergamon, 1991; see *Science* **252**, 1565 [1991]). The first two of these works have now been reissued, reprinting without change the contents of the original versions but with new prefatory material and some additions to cover more recent developments.

The principal additions to *Science Advice to the President* are contributions from the two most recent presidential advisers, John H. Gibbons and D. Allan Bromley. Gibbons proffers four pages on "President Clinton's first 100 days," optimistic in tone but "draw[ing] few conclusions from [his] experience to date." Bromley, who served in the Bush administration, provides an essay of some 40 pages (a harbinger of his book-length memoirs soon to be published under the title *The President's Scientists* by Yale University Press) in which he comments on issues ranging from office location and personnel recruitment through earmarking, science and mathematics education, "critical technologies" enterprises, environmental affairs (especially the Nordwijk and Rio conferences), and international issues related to science and technology. He also provides a list of key figures of the Bush-era science apparatus. In addition to the contributions by Gibbons and Bromley, John McTague, who served briefly under Reagan, provides a few paragraphs on events of his tenure.

In the new version of *Science and Technology Advice* the original 85 articles are augmented by an account of the efforts of the Carnegie Commission on Science, Technology, and Government (1988–1993), of which Golden, with Joshua Lederberg, was co-chairman. The commission focused its analysis on the decision-making apparatus rather than specific policy issues, and in a chapter added at the end of the book Golden lists the categories of organizations examined, summarizes activities focused on the three branches of the federal government and state governments, names members and other associates of the commission, and lists publications resulting from its activities. As does its companion volume, the book has a name but not a subject index.

—Katherine Livingston

A Positron Named Priscilla. Scientific Discovery at the Frontier. MARCIA BARTUSIAK and eight others. National Academy Press, Washington, DC, 1994. viii, 348 pp., illus., + plates.

This is a book conceived in the spirit—and presumably as an offshoot—of the National Academy of Sciences' "Frontiers of Science" symposiums, which (in the words of Bruce Alberts's foreword) bring together "some of the nation's and the world's top young researchers . . . to report on their current work to peers *outside* their discipline." Here, however, the intended audience is larger—"everyone interested in the course of science"—and the expositors are "top science writers." In the essay that gives the volume its title T. A. Heppenheimer discusses the "trapping and manipulating" of atoms and subatomic particles by optical and magnetic means (Priscilla being a captive of Hans Dehmelt). Heppenheimer also contributes a paper on the top quark and Higgs particle, and Elizabeth Maggio writes about fullerenes. Methods of studying the sun's interior, discoveries due to the Magellan