

interested get the largest share of the discussion. Analytic properties of the S-matrix and Regge poles loom large, but in fact they did loom large during the period covered in the middle of the book. The author is fair in his judgment, granting that the achievements of "nuclear democracy" were less than promised, with field theories, particularly gauge field theories of quarks and leptons, central to high-energy physics by 1980.

What is in this book for those under 40, who know the Conferences only as gigantic assemblies of strangers, no longer held in Rochester or even bearing that name? (As James Thurber might say, What is the Rochester Conference doing in Singapore?) First of all, it is an eyewitness account of an exciting time—perhaps the most exciting time—in particle physics. The account starts with pion-nucleon interactions and the (3,3) resonance, strange particles and the τ - θ puzzle; moves into the wonderful discoveries of parity nonconservation and the V - A theory of weak interactions; proceeds to the myriad hadronic resonances, SU(3) symmetry and Regge high-energy behavior; goes on to quarks, CP violation, deep inelastic scattering and electroweak unification; then to the November 1974 revolution, QCD and finally to the W and Z gauge bosons. This jaunty account of the regular "Rochester" gatherings illuminates with personal vignettes the more detailed pedagogical story of particle physics told in such books as Robert Cahn and Gerson Goldhaber's *Experimental Foundations of Particle Physics* (Cambridge U. P., New York, 1988, reviewed in *PHYSICS TODAY*, April, page 76). Old timers will argue whether the true story has been told in some instances, but all will catch the flavor of intimacy in the early conferences, with the patriarchs and brash youngsters making common cause. The reader will have to judge how well the author picks the salient feature from each of the larger, more formal meetings.

For the young and old, the last chapter of the book may prove a surprise. It is perhaps the most important part of the book. Contrary to the expectations of some, this chapter, entitled What Was Happening?, is a patient and persuasive defense of scientific realism as applied to science in general and particle physics in particular. The author believes wholeheartedly in the idea of a convergent realism as the achievement of science. In this scheme successive descriptions have ever greater breadth and precision, but are built on the earlier concepts, extend-

ing rather than overthrowing them. To those who argue that advances are matters of consensus, not necessity, he says, "Our tale would then indeed have been one of a roundabout, a ceaseless circling which never got anywhere." (With this statement, should not the title have a question mark?)

Some readers will be bored with this defense, not seeing the point of jousting with philosophers on whether the Standard Model is a product of our culture and sociology or our best attempt so far to describe the real world. What do nonscientists know about it, anyway? However, for the vast majority of physicists, who perhaps have somewhat muddled views about reality and scientific realism, Polkinghorne's discussion provides a succinct summary of an appealing and defensible point of view, not the least bit theological. The Reverend Polkinghorne intrudes only in the final two sentences and in a charming picture, collar and all, on the inside of the dust wrapper.

Particle physicists over 50 will be reminded by this book of the good old days when physics was a calling, not a profession, and they were full of pepper. Lost innocence regained and all that. The book is recommended to beginning physicists for a glimpse at the ebb and flow of progress in the search for an understanding of the basic forces that govern the universe and for freeze-frame sketches of many of the heroes of modern physics. All readers are advised to ignore the distracting footnotes: These are collected chapter by chapter at the end of the book and almost always merely cite pages in ancient Proceedings of the Rochester Conferences that your physics library does not have.

Because this book, though slight and personal, purports to be a bit of history, it is not vindictive to point out a number of errors in the hope that the author and publisher will correct them before reprinting. It is Malvin, not Marvin Ruderman (page 48), Marty Block, not Bloch (page 57 and in the index), Madame, not Mrs. C. S. Wu (Mrs. Luke Yuan) (page 62), Eyvind Wichmann, not Wickman (page 81), Pief, not Peeff Panofsky (page 124) and Kiev, 1959, not 1958 (page 130). The National Accelerator Laboratory is west, not south, of Chicago (page 134)—the author is thinking of Argonne National Laboratory—and the caption of the picture on page 51 is incorrect—Pierre Noyes is on Dyson's right; Hans Bethe is nowhere to be seen.

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Introductory Nuclear Physics

Samuel S. M. Wong
Prentice-Hall, New York,
1990. 486 pp. \$56.20 hc
ISBN 0-13-491168-7

Most physics departments offer general survey courses in nuclear physics for graduate students and/or advanced undergraduates. In the 1960s and '70s, several excellent textbooks were available that were well suited to such courses and were widely used. In more recent years nuclear physics has evolved considerably, partly because of the successful description of hadrons in terms of the quark model. (For example, there is much current activity in studying relativistic collisions of heavy nuclei to explore the possible formation of a quark-gluon plasma.) Accordingly, the classic textbooks are no longer satisfactory for a modern course in nuclear physics, and there has been a growing need for an up-to-date treatment of the subject.

Samuel S. M. Wong's *Introductory Nuclear Physics* fills this need admirably. The basic topics of nuclear physics are presented at just the right level for a one-semester graduate course, and there is an emphasis on current developments throughout the book. For example, on long-studied topics like nucleon-nucleon scattering phase-shift analysis, Wong has tried to provide the latest results whenever possible. He has also written numerous sections on intriguing recent discoveries like the EMC effect (first observed by the European Muon Collaboration), which suggests that nucleon-structure functions may depend on the nuclear environment. Particularly valuable is the selection of homework problems, which are well chosen and instructive. Many of the problems require the calculation of interesting quantities, for example, cross sections and energies. In my opinion, students badly need to perform such exercises. Yet another nice feature of the book is that all equations are ingeniously written so that both the cgs and SI forms are immediately apparent in a single equation.

While the book could be used in principle for an advanced undergraduate course, the author uses quantum theory from the very beginning. It is essential therefore that students should have taken a basic quantum mechanics course.

My main criticism of the book is that it omits any discussion of experimental techniques. Most physics courses tend to emphasize theory, and students are often weak in their

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$$\int_{-\infty}^{\infty} e^{i\omega t} dt = \int_{-\infty}^{\infty} e^{i\omega t} \delta(t) dt$$

$$\prod_{j=1}^n \left(\sum_{k=1}^m a_{jk} x^k \right) = \sum_{k=1}^m \left(\sum_{j=1}^n a_{jk} x^k \right)$$

Chemistry:

benz[a]anthracene

Hydroquinone

Languages: Будем полагать, что в фокальной плоскости идеальной оптической системы наблюдается смесь пространственно-временных сигналов $E(x, y, z, t)$ и $\omega(x, y, z, t)$. Обычно считают, что оптический сигнал E представляет собой огибающую медленно дифференцируемую в среднекартесийском пространстве переменных x, y, z , а $\omega(x, y, z, t)$ — гармонический процесс типа белого шума с нулевым средним.

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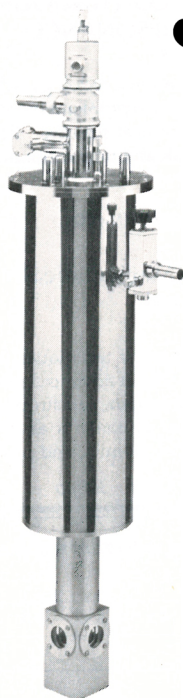
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understanding of how measurements are made and what the capabilities of modern detectors are. The author has correctly noted in the preface that proper coverage would unreasonably expand the book, but I would think that even a brief treatment would be beneficial for today's students. The book does not describe the energy loss and scattering that occur during the passage of particles and radiation through matter; these are important topics for practicing physicists. A lesser criticism is that the book contains a few inevitable typographical errors (for example, "magnetic dipole momentum" near the bottom of page 63), but these are so obvious that they should not confuse the reader; such minor flaws can easily be addressed by any course instructor. The main message is that Wong has written a fine and thoroughly up-to-date new textbook on nuclear physics that is most welcome.

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NEW BOOKS

Atomic and Molecular Physics

Advances in Photochemistry, Vol. 15. D. H. Volman, G. S. Hammond, K. Gollnick, eds. Wiley, New York, 1990. 390 pp. \$95.00 hc ISBN 0-471-63289-9. *Compilation*

Aspects of Electron-Molecule Scattering and Photoionization. *AIP Conference Proceedings 204.* Proc. Conf., New Haven, Conn., July 1989. A. Herzenberg, ed. AIP, New York, 1990. 214 pp. \$70.00 (\$56.00, AIP members) hc ISBN 0-88318-764-7

Molecular Processes in Space. *Physics of Atoms and Molecules.* T. Watanabe, I. Shimamura, M. Shimizu, Y. Itikawa, eds. Plenum, New York, 1990. 261 pp. \$65.00 hc 0-306-43496-2. *Compilation*

Noble Gas and High Temperature Chemistry. *Structure and Bonding 73.* Springer-Verlag, New York, 1990. 262 pp. \$89.00 hc ISBN 3-540-52124-0. *Compilation*

The Theory of Coherent Atomic Excitation, Vols. 1–2. B. W. Shore. Wiley, New York, 1990. 774 pp. \$123.00 hc ISBN 0-471-52417-4. **Vol. 1: Simple Atoms and Fields.** hc ISBN 0-471-61398-3. **Vol. 2: Multilevel Atoms and Incoherence.** hc ISBN 0-471-52416-6

Cosmology and Relativity

The Early Universe. *Frontiers In Physics 69.* E. W. Kolb, M. S. Turner. Addison-Wesley, Redwood City, Calif., 1990. 547 pp. \$48.50 hc ISBN 0-201-11603-0