Second, the "burdens": From the well-defined high ground of achievement, Holton is forced to descend into the less precise regime of burdens, where we do not have the friendly guideposts of symmetry and invariance to help us find our way. Linear, logical thinking will need more than a third axis if we are to succeed here because issues such as the arms race are driven by vague, less clearly defined driving forces such as mirror imaging, deterrence, marginal cost, countermeasures, hidden agendas and governmental debates that often are too politically pragmatic. However, Holton gets very high marks for leading the deeply philosophical into thinking about the responsibility of being a scientist. Certainly Einstein felt his burdens in his own end game, the manifesto he wrote with Bertrand Russell in 1955, in which he encouraged us to consider our burdens by stating: "We have to learn to think in a new way. We have to learn to ask ourselves, not what steps can be taken to give military victory to whatever group we prefer; for there no longer are such steps." These words stimulated the establishment of the Pugwash movement, through which the international science community has considered its collective burdens. My guess is that Einstein would consider the Pugwash legacy equivalent to his trio of papers from 1905. The real question is, how can we do better to ensure the good uses of science and to avoid the bad uses of science? One possibility that has occurred to me is a science court—with penalties for errors of commission and omission. Holton suggests the use of "combined mode" research to expand the study of basic concepts along with their implications. In fact, this approach is the hallmark of studies produced by the Congressional Office of Technology Assessment, but unfortunately only a few universities have really taken up this call since professional rewards come from digging deep rather than broad. I was encouraged to read in Jan Beyea's letter in PHYSICS TODAY (October, page 152) that he is drawing up a list of possibilities for physicists who wish to devote 10% of their time to applying physics to societal problems—much in the manner of lawyers doing *pro bono* work. With some hard work, we might yet agree with Einstein and remove some of the dice-playing in our universe.

In summary, Holton's book on the advancements and burdens of science is a good supplemental and broadening text for first-year graduate students (as well as more mature practitioners). By staying on the philosophical high road, Holton avoids the politization of discussing specific burdens, thus making it more likely that his book will be used as a starting point in graduate courses.

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BOOK NOTES

Uranometria 2000.0, Volume 1: The Northern Hemisphere to −6°

Wil Tirion, Barry Rappaport and George Lovi
Willmann–Bell, Richmond, Va., 1987. 43 pp. + 259 charts. $39.95 hc ISBN 0-943396-14-X

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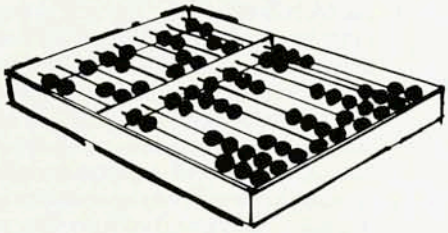

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Leverrier and John C. Adams of the perturbations on the orbital motions of the planets then known is often considered one of the major triumphs of Newtonian physics. Johann Galle received Leverrier's prediction and that very evening located the planet using up-to-date star charts. Of course, Newtonian physics itself was inspired by Johannes Kepler's analysis of Tycho Brahe's careful positional measurements. So charting the heavens has had an ongoing significance even into the present, when the sky is being mapped in many different wavelengths. The quasar 3C 273 and the black hole candidate Cyg X-1 had first to be located and cataloged before their exotic characteristics could stimulate physics; likewise the remnants from Tycho's and Kepler's supernovae and the progenitor for our recent supernova, not to mention comets, most of which are spotted by diligent amateur astronomers.

In an introductory 25-page monograph essay in *Uranometria 2000.0*, a book of modern star charts, George Lovi tells the story of mapping the heavens—uranography—from star atlases, starting in the ancient world and going through the Renaissance to the present. Johann Bayer's *Uranometria* (1603) used Tycho's naked-eye star catalog as its base; just a few years later Galileo started using a telescope to make his epochal astronomical observations. *Uranometria 2000.0*, with its 259 charts in volume 1 covering the Northern Celestial Hemisphere, is a worthy successor to Bayer's atlas in its scope and care in execution. Volume 2, covering the Southern Hemisphere to $+6°$, should be available by mid-1988. An accompanying three-volume star catalog is scheduled for publication later in the year. The database includes 332 556 stars to about magnitude 9.5 (nearly 40 times fainter than naked-eye visibility). Some 10 000 deep-sky objects are included: quasars, radio sources, x-ray sources, dark nebulae and the nonstellar objects (both Galactic and extra-Galactic) listed in the *Revised New General Catalogue*.

Barry Rappaport's computer graphics skills developed the plotting accuracy for the chosen computerized database at the Centre de Données Stellaires of the Observatoire de Strasbourg, France, whose foundation is the 19th-century *Bonner Durchmusterung* with its southern extensions. Wil Tirion, whose much admired hand-drawn *Sky Atlas 2000.0* to magnitude 8.0 was published in 1981, has transformed Rappaport's computer plots into charts. The new convenient book-format atlas sets

standards for comprehensiveness, positional accuracy and graphic quality: Here observational astronomers have a fine resource.

—PER H. ANDERSEN

The Particle Explosion

Frank Close, Michael Marten and Christine Sutton
Oxford U. P., New York, 1987. 239 pp. $35.00 hc
ISBN 0-19-851965-6

Coffee-table books are not usually taken seriously by those who consider themselves serious about their chosen subject. But *The Particle Explosion*, with its stunningly evocative photos of the world of the infinitely small together with its disarmingly lucid text, may be just the antidote to that all-too-hasty dismissal.

The book shows us the tools that physicists have used, both now and in past decades, to discover the essence of particle physics. And the history goes down easily. It is a book to give to a close relative to tell why some of us think doing physics is better than hanging out at the local shopping mall.

—PER H. ANDERSEN

NEW BOOKS

Acoustics

The Musician's Guide to Acoustics. M. Campbell, C. Greated. Schirmer (Macmillan), New York, 1987. 613 pp. $20.00 *hc* ISBN 0-02-870161-5. *Monograph text*

Prospects in Modern Acoustics—Education and Development. Proc. Conf., Gdańsk, May 1987. A. Sliwinski, G. K. E. Budzynski. World Scientific, Singapore (Teaneck, N. J.), 1987. 464 pp. $68.00 *hc* ISBN 9971-50-379-4

Ultrasonics International 87. Proc. Conf., London, July 1987. Butterworths, Stoneham, Mass., 1987. 959 pp. $195.00 *pb* ISBN 0-408023-48-1

Biophysics

Biophysics and Synchrotron Radiation. *Springer Series in Biophysics 2.* Proc. Conf., Frascati, Italy, July 1986. A. Bianconi, A. C. Castellano, eds. Springer-Verlag, New York, 1987. 333 pp. $75.00 *hc* ISBN 0-387-16948-2

Coordination Compounds: Synthesis and Medical Application. *Structure and Bonding 67.* R. A. Bulman, A. M. J. Fichtinger-Schepman, R. Krause, J. Reedijk, A. T. van Oosterom, P. van de Putte. Springer-Verlag, New York, 1987. 150 pp. $60.00 *hc* ISBN 0-387-17881-3

Microwave Cookbook of Pathology: The Art of Microscopic Visualization. M. E.