

of the first computer company; the company eventually failed, but not before their new computer, the UNIVAC (the Universal Automatic Computer, the new name of the EDVAC), scored an outstanding success. Its calculations led to an early prediction of Eisenhower's landslide win in the 1952 presidential election, forecasting 438 electoral votes, compared to his actual 442 votes. Unfortunately, the media didn't believe such a lopsided vote was likely and fudged the prediction.

4) The patent fight in the Honeywell-Sperry suit over the invention of the ENIAC: The suit was based largely on the early work of John Atanasoff, who in 1941 built a special-purpose, digital, partly-vacuum-tube computer that was never fully operational. The 1964 ENIAC patent was ruled invalid, however, because Eckert and Mauchly had not filed their patent in a timely fashion, and Atanasoff became the de facto inventor of the electronic digital computer. McCartney seems to believe that the judge's ruling in this case was more a move to open the computer industry than a strict legal ruling.

Although the author erroneously credits ENIAC with subroutine capability not present on any computer until the EDSAC, in 1949, we found very few errors in the book. It is well worth reading, both because of the intrinsic interest of the story told and because of the importance of the little-known background and facts it describes.

J. ROSS MACDONALD
University of North Carolina,
Chapel Hill

HARVEY G. CRAGON
University of Texas, Austin

Polymers at Surfaces and Interfaces

Richard A. L. Jones and
Randal W. Richards
Cambridge U. P., New York, 1999.
377 pp. \$90.00 hc (\$39.95 pb)
ISBN 0-521-47440-X hc
(0-521-47965-7 pb)

A collection of tangled, long-polymer molecules exhibits very diverse phenomena that allow, for example, solid-like properties on short time scales and liquid-like properties at longer times. (The range of time scales depends on the chemical composition of the polymer and its contour length.) How does such an entangled mass of polymer molecules shape up to make its own surface? What are the fundamental relations between their molecular dynamics and macroscopic assembly? What are the differences

between polymer molecules near and far from interfaces in terms of size, shape, and dynamics of individual chains? How do such differences determine the macroscopic density profiles? More important: How can we measure these microscopic and macroscopic properties of polymeric systems near interfaces?

Researchers worldwide have been extremely active over the past three decades in answering those questions. Research in polymer-bearing interfaces has been fueled by the availability of very sensitive experimental tools and by strong industrial interest in nanotechnology and cybernetics. Two of the leading researchers in this very active and significant research area of polymers at interfaces, Richard Jones of the University of Sheffield and Randal Richards of the University of Durham, have summarized the current status of the field in their excellent book, *Polymers at Surfaces and Interfaces*.

Starting with an adequate description of thermodynamics of polymer mixtures, the authors present basic concepts of equilibrium and kinetics of spontaneously forming interfaces. They do a good job of describing the effects of molecular weight, composition of the mixture, and temperature on interfacial profiles and their evolution. In separate, self-contained chapters, the authors deal with adsorption and permanent tethering of polymer chains to fixed surfaces and how such forces affect phase separation in the bulk. They devote a very brief chapter to adhesion and mechanical properties. Given the recent advances and the importance of an understanding of failure modes of polymeric interfaces, more space could have been allotted to this topic. Various experimental techniques (in particular, reflectivity measurements) and calculational methodologies (in particular, self-consistent field calculation) are explained very well.

The exciting aspect of this book for me was its clear summary of key experimental tools and theoretical concepts and its excellent analyses of measured data in different situations involving surfaces and interfaces. As an instructor of graduate level courses in polymer physics, I find that this book fills a long-standing void in the area of polymers at interfaces. I recommend this book for graduate students and researchers who would like to learn the fundamentals of macromolecular concepts in the exciting area of polymers at interfaces.

MURUGAPPAN MUTHUKUMAR
University of Massachusetts, Amherst

Their Day in the Sun: Women of the Manhattan Project

Ruth H. Howes and
Caroline L. Herzenberg
Foreword by Ellen C. Weaver
Temple U. P., Philadelphia, 1999.
264 pp. \$34.50 hc
ISBN 1-56639-719-7

In *Their Day in the Sun*, physicists Ruth H. Howes and Caroline L. Herzenberg bring to light the many scientific and technical contributions that women made to the Manhattan Project, the United States's gargantuan World War II effort to create the first atomic bombs. The book is based primarily on the results of questionnaires, interviews, and correspondence with more than 90 individuals. It departs from previous accounts, which emphasized women's roles as wives, mothers, and administrative and support personnel; it focuses instead on women's work in the laboratories, in the production facilities, and on the test sites. Most histories of the Manhattan Project convey the impression that science and technology were exclusively male activities. Howes and Herzenberg demonstrate that, with the exception of the final assembly of the bomb on Tinian Island, women worked on every aspect of the effort. The work that women performed as physicists, chemists, mathematicians, life scientists, and technicians, the authors argue, was critical to the project's success.

Howes and Herzenberg describe the story they tell as important for two disparate audiences. First, they point out that women's contributions have been largely ignored and deserve recognition; they conclude the book with the hope that others, presumably historians, will extend their research. Second, women and girls considering careers in physics and engineering should realize that women participated in the astonishing achievements of those disciplines a half-century ago.

As a work of empowerment, then, *Their Day in the Sun* succeeds in proving what stands out as the authors' main point. As a work of history, however, *Their Day in the Sun* is much less successful, leaving important questions unanswered. For example, the authors fail to engage a larger question that is significant to historians of science: Why were women's scientific contributions generally ignored in other accounts of the Manhattan Project? Because the histori-

ans were male, as Howes and Herzenberg suggest? Or because women's contributions, while critical, were not singular? In other words, would women's scientific and technical contributions have been worthy of inclusion in histories of the science and technology of the Manhattan Project if they had been men's contributions? The authors' own chronology, included as an appendix, shows no substantial impact on the basic story of the development of the atomic bomb. In this respect, although they cite it, Howes and Herzenberg have failed to follow historian Stephen G. Brush's admonition to avoid "glorifying 'the first woman [or women] to do X, where X would be unremarkable if done by a man.'" (*The Physics Teacher* 23, p. 11 [1985]) Such a failure, however, would not necessarily preclude the book's value as a contribution to the history of women's experiences during World War II.

In line with the historiography of the war's effect on women's roles, Howes and Herzenberg argue that "[w]artime personnel shortages opened scientific and technical opportunities that were not available to women in peacetime, and women took them," and that "[t]he attitude that glorified Rosie the Riveter also infused the scientific community." However, as the authors observe, pragmatism and patriotism did not fully clear the way for equality of opportunity. With few exceptions, for example, gender-based discrimination denied women access to leadership roles in the Manhattan Project.

But unlike their compatriots who entered the general labor force, many of the women whom the authors describe were particularly positioned to take advantage of wartime scientific and technical labor shortages. Many already possessed some level of training, professional experience, or formal degrees in math, science, or engineering. The question of how these women acquired such expertise in the first place, along with how they came to be involved in the Manhattan Project, begs further investigation and analysis. Too often, the authors of *Their Day in the Sun* resort to passive construction at critical junctures in their narrative: so-and-so was hired, was recruited, was persuaded. The very existence of a significant number—Howes and Herzenberg have discovered more than 300—of scientifically and technically trained women, and, more important, their association with the key figures and research centers that became part of the atomic bomb project, suggests a much more

nuanced portrait of gender discrimination in science before and during World War II than the authors have provided.

Finally, students wishing to pursue the lines of inquiry charted by Howes and Herzenberg might find the task somewhat challenging, owing to the authors' methodology. While the numerous interviews and questionnaires might well constitute a rich source for historical inquiry, the citation style is not complete enough to allow adequate judging of the merits of the sources.

BENJAMIN C. ZULUETA
University of California,
Santa Barbara

NEW BOOKS

Astronomy and Astrophysics

Astrophysical Formulae, Vol. I: Radiation, Gas Processes and High Energy Astrophysics; Vol. II: Space, Time, Matter and Cosmology. *Astronomy and Astrophysics Library*. 3rd edition. K. R. Lang. Springer-Verlag, New York, 1999 [1978]. 1050 pp. (set) \$139.00 (set) hc ISBN 0-387-91585-0 (set)

The Formation of Galactic Bulges. *Cambridge Contemporary Astrophysics*. C. M. Carollo, H. C. Ferguson, R. F. G. Wyse, eds. Cambridge U. P., New York, 1999. 207 pp. \$69.95 hc ISBN 0-521-66334-2

The Hy-Redshift Universe: Galaxy Formation and Evolution at High Redshift. *Astronomical Society of the Pacific Conference Series* 193. Proc. Conf., Berkeley, Calif., Jun. 1999. A. J. Bunker, W. J. M. van Breugel, eds. Astronomical Society of the Pacific, San Francisco, 1999. 680 pp. \$52.00 hc ISBN 1-58381-019-6

Observing the Caldwell Objects. D. Ratledge. Springer-Verlag, New York, 2000. 242 pp. \$34.95 pb ISBN 1-85233-628-5

Photometric Redshifts and High Redshift Galaxies. *Astronomical Society of the Pacific Conference Series* 191. Proc. Wksp., Pasadena, Calif., Apr. 1999. R. J. Weymann, L. J. Storrie-Lombardi, M. Sawicki, R. J. Brunner, eds. Astronomical Society of the Pacific, San Francisco, 1999. 376 pp. \$52.00 hc ISBN 1-58381-017-X

Spectrophotometric Dating of Stars and Galaxies. *Astronomical Society of the Pacific Conference Series* 192. Proc. Wksp., Annapolis, Md., Apr. 1999. I. Hubeny, S. R. Heap, R. H. Cornett, eds. Astronomical Society of the Pacific, San Francisco, 1999. 335 pp. \$52.00 hc ISBN 1-58381-018-8

Stellar Magnetism. *International Series of Monographs on Physics* 99. L. Mestel. Oxford U. P., New York, 1999. 636 pp. \$145.00 hc ISBN 0-19-851761-0

Working on the Fringe: Optical and IR Interferometry From Ground and Space. *Astronomical Society of the Pacific Society Conference Series* 194. Proc. Conf.,

Dana Point, Calif., May 1999. S. Unwin, R. Stachnik, eds. Astronomical Society of the Pacific, San Francisco, 1999. 485 pp. \$52.00 hc ISBN 1-58381-020-X

Atomic and Molecular Physics

Bose-Einstein Condensation of Excitons and Biexcitons and Coherent Nonlinear Optics with Excitons. S. A. Moskalenko, D. W. Snoke. Cambridge U. P., New York, 2000. 415 pp. \$85.00 hc ISBN 0-521-58099-4

Multiphoton Processes in Atoms. *Springer Series on Atoms and Plasmas*. 2nd edition. N. B. Delone, V. P. Krainov. Springer-Verlag, New York, 2000 [1994]. 314 pp. \$118.00 hc ISBN 3-540-64615-9

The Physics of Electronic and Atomic Collisions. *AIP Conference Proceedings* 500. Proc. Conf., Sendai, Japan, Jul. 1999. Y. Itikawa, K. Okuno, H. Tanaka, A. Yagishita, M. Matsuzawa, eds. AIP, Melville, N.Y., 2000. 728 pp. \$140.00 hc ISBN 1-56396-777-4

Trends in Atomic and Molecular Physics. K. K. Sud, U. N. Upadhyaya, eds. Kluwer Academic/Plenum, New York, 1999. 427 pp. \$155.00 hc ISBN 0-306-46301-6

X-Ray and Inner-Shell Processes. *AIP Conference Proceedings* 506. Proc. Conf., Chicago, Ill., Aug. 1999. R. W. Dunford, D. S. Gemmell, E. P. Kanter, B. Krässig, S. H. Southworth, L. Young, eds. AIP, Melville, N.Y., 2000. 694 pp. \$135.00 hc ISBN 1-56396-713-8

Biophysics and Medical Physics

Optics and Lasers in Biomedicine and Culture. *Series of the International Society on Optics Within Life Sciences* V. Proc. Conf., Aghia Pelagia, Crete, Greece, Oct. 1998. C. Fotakis, T. G. Papazoglou, C. Kalpouzos, eds. Springer-Verlag, New York, 2000. 356 pp. \$119.00 hc ISBN 3-540-66648-6

Chemical Physics

Fullerene Polymers and Fullerene Polymer Composites. *Springer Series in Materials Science* 38. P. C. Eklund, A. M. Rao, eds., Springer-Verlag, New York, 2000. 394 pp. \$99.00 hc ISBN 3-540-64894-1

Methods of X-Ray and Neutron Scattering in Polymer Science. R.-J. Roe. Oxford U. P., New York, 2000. 331 pp. \$80.00 hc ISBN 0-19-511321-7

Semiconducting Polymers: Applications, Properties, and Synthesis. *ACS Symposium Series* 735. Proc. Symp., Dallas, Tex., Mar. 1998. B. R. Hsieh, Y. Wei, eds. American Chemical Society, Washington, DC, 1999. 464 pp. \$130.00 hc ISBN 0-8412-3612-7

Condensed Matter Physics

Condensed Matter Physics. M. P. Marder. Wiley, New York, 2000. 895 pp. \$94.95 hc ISBN 0-471-17779-2

Contact, Adhesion and Rupture of