

Red Atom: Russia's Nuclear Power Program from Stalin to Today

Paul R. Josephson
W. H. Freeman, New York, 1999.
352 pp. \$26.95 hc
ISBN 0-7167-3044-8

In Oscar Wilde's classic novel, *The Picture of Dorian Gray*, the title character, despite his debaucheries, vices, and villainy, remains youthful and innocent in appearance. At the same time his portrait, in his closet, becomes transformed into a hideous image, reflecting his true character. The official visage of Soviet nuclear power within what was the Soviet Union has a similar secret counterpart, and Paul Josephson reveals it in *Red Atom*. Josephson is an independent scholar of the history of science and the author of *Physics and Politics in Revolutionary Russia* (California, 1991), which Spencer Weart, director of the American Institute of Physics's Center for the History of Physics, has called "one of the standard works on the history of modern scientific institutions." This history of the development and application of nuclear physics in the Soviet Union, then, is a product of extensive scholarship by a widely recognized expert.

If socialism plus electricity equals communism, to paraphrase Lenin's famous formula, then communism plus nuclear power equals Chernobyl, the ultimate nuclear disaster (although not the one most of us have feared for the past half-century). The 1986 explosion of the unit 4 nuclear reactor at that Ukrainian site, Josephson argues in his extensive account, was the "almost inevitable" consequence of nuclear-powered communism.

Josephson uses institutional histories and biographies to carry the weight of his story of Soviet nuclear power development. The details will be of interest to readers familiar with the nuclear-power program in the US and the explicit and implicit parallels he draws between the two programs. The development of nuclear reactor technology for maritime purposes, the rivalry with fusion programs, the heavy hand of government promotion, and the neglect of safety issues that would return to haunt the technology all manifest themselves in Josephson's story. This does not always bolster his argument about the uniqueness of the Soviet experience, but it does provide grist for the

mill of historical comparisons.

Unlike most of the studies of Soviet nuclear issues, such as those made by Richard Rhodes in *Dark Sun: The Making of the Hydrogen Bomb* (Simon & Schuster, 1995) and David Holloway in *Stalin and the Bomb: The Soviet Union and Atomic Energy* (Yale, 1994), *Red Atom* assigns Soviet nuclear weapons development a supporting role, with the primary role given to nuclear power. Focusing on the peaceful uses of nuclear technology and the idealism that drove Soviet physicists (as well as their American counterparts) to beat swords into

plowshares, Josephson credits the Soviet scientists with planning, but not with implementing, nuclear power technology. Soviet engineers and industry are held accountable for much that went wrong with the effort, just as Stalin and Beria are blamed for the shortcomings and catastrophes that resulted from mismanagement of the weapons program.

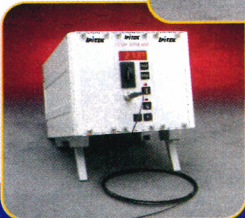
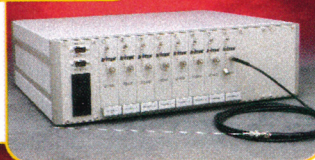
Since it is, by and large, the physicists who speak through him, it is unclear whether Josephson has considered the points of view of the engineers and political leaders. The penchant for gigantism in Soviet society,

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thus, in the eyes of the physicists, becomes the basis of a faith in large scale technology, which in turn fed technological arrogance and led to indifference to the safety standards and precautions prescribed by physicists. Yet it was those same physicists who provided overall leadership through the Academy of Sciences and the many research institutes that Josephson has singled out for criticism.

The vast scope of the Soviet nuclear enterprise was a "mistake [that] was understandable considering the genesis of Stalinist technological style,"

Josephson argues. But he parades before us examples of "technology run amok with the full endorsement of the political and scientific leadership..." The Chernobyl accident and others like it that have been hidden from sight are an important aspect of the history of Soviet science. In view of the obstacles facing detailed analyses of the hidden aspects of nuclear physics even in the United States, this volume is an impressive and pertinent accomplishment.

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CP Violation

▶ Gustavo Castelo Branco, Luís Lavoura and João Paulo Silva
Oxford U. P., New York, 1999.
511 pp. \$110.00 hc
ISBN 0-19-850399-7

CP Violation

▶ I. I. Bigi and A. I. Sanda
Cambridge U. P., New York, 2000.
382 pp. \$95.00 hc
ISBN 0-521-44349-0

We are entering a golden age in the experimental study of charge conjugation-parity (CP) symmetry. In 1999 came unambiguous confirmation of CP violation in the decays of neutral kaons (K mesons). This was 35 years after CP violation in kaon mixing was first observed by James Cronin and Val Fitch. Last year also saw the first indications, at Fermilab, of CP violation in bottom (B) meson mixing. CP violation in the B system will be probed in much more detail at dedicated electron-positron "B Factories" newly in operation at three laboratories in the United States and Japan. The upcoming Run II of the Fermilab Tevatron, to commence in 2001, will feature upgraded detectors capable of unprecedented studies of all the bottom hadrons. And the list of proposed experiments to look for more CP-violating phenomena is enough to keep the field active and exciting for years to come.

In view of these developments, two books titled *CP Violation*, one by Gustavo Branco, Luís Lavoura and João Silva, and the other by Ikaros Bigi and Ichiro Sanda, could not be more timely. All of the authors are experienced researchers in the field, well qualified to produce such texts. The books are written to provide researchers new to the field with a comprehensive introduction to the theory and phenomenology of CP violation. The authors assume that the reader is familiar with quantum field theory at the level of Feynman diagrams, but no particular sophistication with field-theoretic methods is necessary to follow the discussion. The two books cover essentially the same material, with some differences in order, emphasis and style; however, the Bigi-Sanda book is somewhat more pedagogical in tone, at times self-consciously so, and includes an excellent assortment of problems.

Both books start with a detailed discussion of the discrete parity (P) and charge conjugation (C) symmetries in quantum mechanics and quan-

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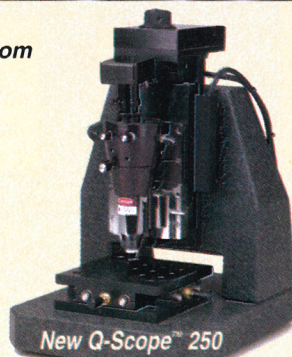
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