

using batch processing may be drawing to a close. The increasing use of conversational terminal-oriented systems shows great advantages for both teaching and practical problem solving. The development of powerful new languages, such as APL, make the formulation of physical problems using scalars, vectors, and arrays of data much easier than with FORTRAN. The concepts of self-describing data, block-structured programs, general-file access methods, and other such inventions of computer science are steadily finding their way into common use. Perhaps we can look forward in three or four years to a second edition of Ehrlich's *Physics and Computers* using such methods.

HARWOOD G. KOLSKY
IBM Scientific Center
Palo Alto, California

Men of Physics: J. R. Mayer, Prophet of Energy

R. B. Lindsay
238 pp., Pergamon, New York,
1973. \$8.25

A distinguished elder statesman of physics has written the first full-fledged biography of Robert Mayer to appear in English. The volume is part of the publisher's series of "Selected Readings in Physics," and the purpose of these books is, according to the jacket copy, to counteract the much-debated tendency for undergraduates to learn their physics from textbooks rather than from original sources.

R. Bruce Lindsay divides his work into three parts: A biographical sketch (14 pages); a commentary on Mayer's contributions to science, including a bibliography of manageable size (35 pages in all); and a final section (173 pages) consisting of Mayer's five articles on the energy concept. The translations of these papers were competently provided by the author, and together with his brief commentaries, they form the bulk of the volume. This arrangement of the material proves to be highly effective.

Like James Joule, Mayer was one of those gifted amateurs of science. His training was in biology and medicine and included only one semester of physics at Tübingen, yet he became one of the founders of thermodynamics and biophysics and even anticipated the cybernetics of the living organism. He was the first scientist to calculate the numerical value of J , the heat-work equivalent.

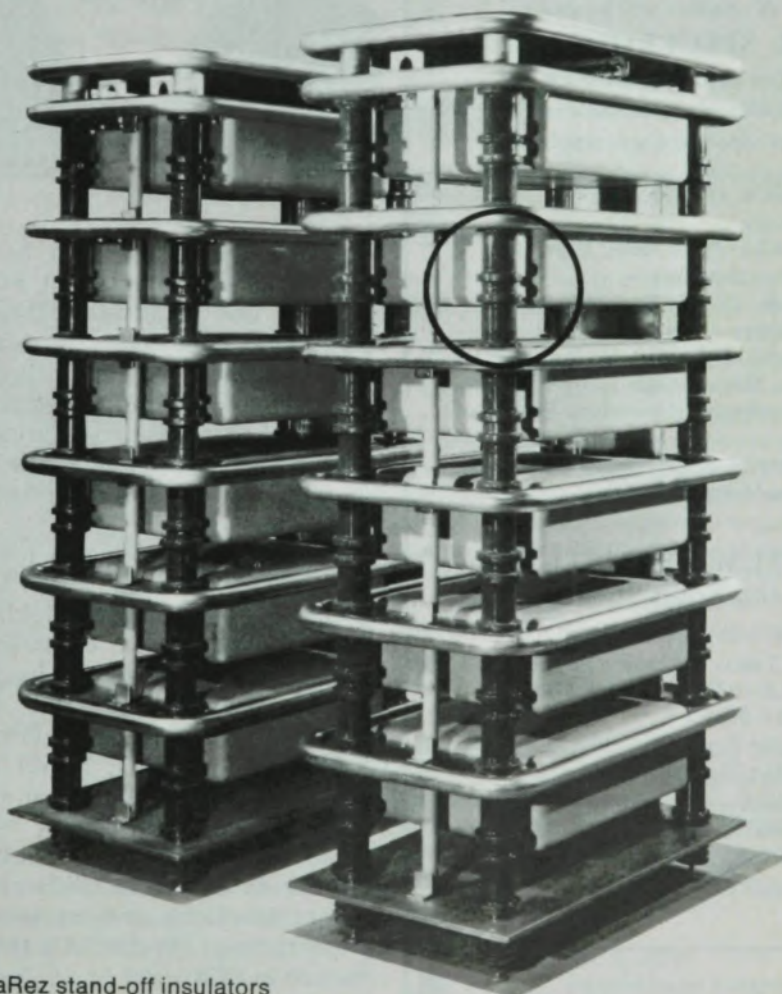
The story of the physiological observations in Surabaya that led him to formulate the energy principle is well

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known: "The blood, a slowly-burning fluid, is the oil in the flame of life." His famous paper setting forth the generalization of the energy concept was written on his return to his native Heilbronn in 1841 to take up the practice of medicine.

Mayer suffered from the circumstance that he did not know enough physics to present his ideas cogently and in a way acceptable to physicists. His first manuscript was rejected by the editor of *Poggendorff's Annalen*. However, just as Einstein had his Marcel Grossmann, so Mayer found in

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MAYER

his friend Carl Baur (later to become professor of mathematics at Stuttgart) a helpful and dependable mentor. A short paper describing the calculation of *J* was subsequently published, but it appeared in a pharmacological journal and failed to come to the attention of such people as Joule and Ludwig Colding who were working along similar lines.

Eventually the work was noticed by Joule, who mentioned Mayer's contribution in one of his publications. There resulted a great controversy, involving such scientists as Joule, John Tyndall, Peter Tait and William Thomson. Although some formal recognition came to him, Mayer was annoyed at being considered an amateur. His brooding concern over scientific priorities and a series of family tragedies led to emotional difficulties, an attempt at suicide and confinement in an institution. He died of a tubercular infection in 1878.

With regard to priorities in the advancement of science, Lindsay remarks that "This overlooking or disregard of the scientific achievements of one's scientific contemporaries is one of the basic problems in the sociology of science; it has been the theme of

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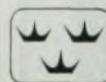
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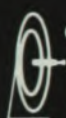
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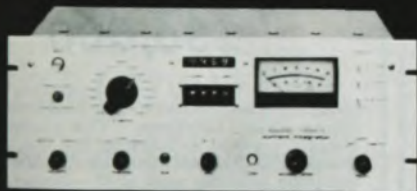
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countless commentators, who have done their best to provide reasons for the curious behavior of eminent scientists, without in general too much success. The larger problem of priority in scientific discovery though ideally soluble in an abstract sense in terms of publication date, remains in its essence hopeless. The history of science rests ultimately on arbitrary decisions."

Lindsay's book should go far toward rounding out and correcting the fragments of information that make up, for many students as well as teachers, their acquaintance with the history of the development of the energy concept.

IRA M. FREEMAN
*Rutgers University
New Brunswick, New Jersey*

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