serious books written mostly by participants in the events described, each from its own point of view. *The Second Creation* is a little different. The authors are not participants—one is an experienced scientific editor and the other was a graduate student in philosophy at Columbia. They did an enormous amount of work, interviewing more than a hundred physicists, looking at the files and the correspondence of some of them and descending 2300 meters into the Kolar gold mine in India to see the proton-decay experiment there. Their book begins and ends in the salt mines under Lake Erie. There is every sign that during their five years of work the authors had a very good time.

What is their focus? It is the physics of fundamental particles and fields, both experimental and theoretical. Like some of the participants they obviously think that this is the central concern of physics and that the rest is a working out of details. (I hope someone will write an equally good piece of reportage on the high-temperature superconductivity explosion.) But the real focus is on people. They are portrayed as individuals, not just as exponents of this or that idea, and once we have met them, strolled with them through the places where they work and eaten with them in the cafeteria, the story of particle physics can be presented as an account of what they have done, the physics being given as needed. The authors explain just about all that can be explained without mathematics. They talk about theories and describe crucial experiments such as the search for neutral currents, giving attention both to experimental techniques and to the exhaustive consideration of data and of possible alternative explanations before anything is announced.

For whom are they writing? Not just that model layman, I'm sure, for they hold a mirror up to the profession and some of its leading members. There is more here for physicists to read than just physics.

What do the authors know? They do not pretend to be physicists. Their narrative is vivid and personal, and it will read very differently for someone who knows what $SU(3)\times SU(2)\times U(1)$ means and for someone who knows groups only by the authors' example of the integers, making no mention of the group operation. Perhaps some little errors, such as the use of "Bo" to represent boron, were allowed to pass by the dozens of people who seem to have read various chapters—these mistakes serve, without hurting anything, to tell us about the authors, as the authors tell us about the physicists.

How is the book written? Well, but with occasional lapses. There is a nice description of Victor Hess landing after an early cosmic ray flight: The photograph shows "Hess peering out through the ropes of the balloon, smiling against the sun, a wave of farmers lapping against the side of the basket." On the other hand it would be a relief if once, just once, a writer described the fast pace of something as other than "feverish."

This lively and entertaining book ends with an account of the reasoning by which the first seconds of the cosmological model universe are being reconstructed using insights from particle physics—the "second Creation" of the book's title.

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The Quantum Hall Effect

Edited by Richard E. Prange and Steven M. Girvin
Springer-Verlag, New York, 1987. 419 pp. $27.50 hc ISBN 0-387-96286-7

The discoveries of the quantum Hall effect in 1980 and of the fractional quantum Hall effect in 1982 initially took the physics community by surprise. By now we have reached a rather thorough, though by no means complete, understanding of the basic phenomena. It is now widely accepted that the quantization of the Hall resistance of a two-dimensional electron gas in a strong magnetic field in units of h/e^2 (or a simple rational fraction thereof) is due to general principles of gauge invariance and charge quantization. The exactness of this relationship has already made an impact on metrology, and the quantum Hall effect is well established as a resistance standard. For the fractional quantum Hall effect, Robert Laughlin's picture of an incompressible fluid due to electron correlation has also gained broad acceptance.

Now the field has reached a certain level of maturity, so a book summarizing the current status would be most welcome. This need is well fulfilled by the volume of review articles edited by Richard Prange and Steven Girvin. The book contains both experimental and theoretical reviews, written by leading contributors to the field. Marvin Cage covers both the experimental situation and the metrological application of the integer effect; Albert Chang has provided thorough coverage of the fractional case. The theoretical situation receives a very complete coverage in eight chapters.

Rather than producing a collection of technical articles intended for specialists, the authors have all made special efforts to introduce their subject in a pedagogical but informal way. Prange has supplied a very readable introduction to the subject, while Girvin has supplied a summary chapter, which is refreshing in that it places its emphasis on what is not known and reports on original research that points to future directions. The choice of topics is generally excellent, even though one wishes that less orthodox ideas such as cooperative ring exchange could have been represented.

On the whole the book achieves the stated goal of reviewing the subject in depth and yet at a level accessible to graduate students in physics. It serves as a valuable guidepost in this still rapidly developing field and should be a standard reference for years to come.

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Electron Energy-Loss Spectroscopy in the Electron Microscope

Ray F. Egerton
Plenum, New York, 1986. 410 pp. $59.50 hc
ISBN 0-306-42158-5

The last decade has witnessed the remarkable development of the analytical electron microscope, a hybrid instrument that combines the imaging and diffraction capabilities of the transmission electron microscope, scanning transmission electron microscope and scanning electron microscope with analytical spectroscopies. The AEM provides elemental characterization of thin, solid matter with a lateral spatial resolution of tens of nanometers while displaying morphological structure to a fraction of a nanometer. While most current applications of the AEM for elemental analysis make use of energy-dispersive x-ray spectrometry because of its inherent simplicity, the complementary but more complex technique of electron energy-loss spectroscopy offers the greatest promise for future improvements, particularly for improving the spatial resolution of analysis to a scale of 1 nanometer. What has been hindering a greater acceptance of EELS among the general electron microscopy community has