

BOOKS

A Personal Odyssey: From a Boy's Dream to the Far Side of the Great Attractor

Voyage to the Great Attractor: Exploring Intergalactic Space

Alan Dressler
Alfred Knopf, New York, 1994.
355 pp. \$25.00 hc
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Reviewed by George Lake

Alan Dressler has woven together a marvelous tale of a boy's journey toward a career in science and the charting of the largest structures in the universe. Scientific memoirs are rather rare; this one is unusually well done.

In Dressler's account a group of seven astronomers with diverse backgrounds and interests (Dressler, Sandra Faber, Donald Lynden-Bell, Roberto Terlevich, Roger Davies, Gary Wegner and David Burstein)—who eventually become known to their colleagues as the seven samurai—set out to study a large selection of elliptical galaxies for clues to their formation and stellar content. Elliptical galaxies are found in different environments: groups, poor clusters and rich clusters. They show some signs of strong differences in their content. Some are bright in the ultraviolet, some are not, for example. In the samurai sample, they span a range in luminosity of nearly a hundred. Yet there are remarkably strong correlations among their internal properties: diameter, velocity dispersion and metallicity. There are yet other parameters, such as internal flattening, that one might hope to correlate with the deviations in these relations.

Dressler takes seriously his charge to create a scientific memoir, and we see all the warts—scientific and personal—that characterize a collaboration that spans several years. We see the stumbling data exchanges, the trials of computer bugs and the repeated near-discovery and denial of something truly new and different. Most of the samurai are my personal

friends, and I recall some of their troubles during those years. Dressler has taken care not to reopen old wounds, but he still gives the reader a good look at the difficulties that arise when strong individuals begin to struggle with the need for large group efforts. In the end the samurai pull through and propose that a structure larger than any heretofore known—the so-called great attractor—is pulling us toward it at a breathtaking 500 km/s.

Dressler is also frank about the current debate over their conclusion. In the famous COBE ovals, which have appeared on the cover of nearly every scientific magazine including PHYSICS TODAY, one oval shows a whopping dipole that probably owes to our motion with respect to the microwave background; the next shows the interference from the Milky Way; the final one is the barely resolved fluctuations that are the precursors of even larger structures than the great attractor (COBE project director George Smoot's "face of God"). The origin of the strong dipole signal has been mysterious, leading some to conclude that it is an intrinsic feature of the universe.

The samurai's discovery was that, as one looks toward the dipolar "hot spot," the peculiar velocity of galaxies increases—a sure sign of a mass concentration. To clinch the case one would like to see backside infall, the motion of galaxies toward us on the other side of the great attractor. Dressler and fellow samurai Sandra Faber have reported seeing the backside infall. Other groups have denied its existence. Dressler, Faber and their younger colleagues Stefan Courteau and Jeff Willick have found evidence for an even greater attractor beyond the range of their observations (another way of saying that the backside infall isn't strong enough for all the motion to be accounted for by a single structure like the great attractor).

This is a marvelous book for its engaging description of observational cosmology, its story of the author's scientific career and its insight into the difficult dynamics of group efforts in astronomy. The exploration of flows

in the universe is not over; dramatic changes may lie ahead. If the notion of a great attractor doesn't stand the test of time, that will only increase the value of this book as a glimpse into the process of scientific discovery.

Science Has No National Borders: Harry C. Kelly and the Reconstruction of Science and Technology in Postwar Japan

Hideo Yoshikawa
and Joanne Kauffman
MIT P, Cambridge, Mass., 1994.
137 pp. \$22.50 hc
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On 14 August 1945 the Japanese government signaled its acceptance of the Allied terms for unconditional surrender ending World War II. Immediately thereafter, at the direction of Manhattan Project chief Leslie R. Groves, some scientists, who had been on Tinian in the Mariana Islands to prepare the atomic bombs destined for Hiroshima and Nagasaki, were dispatched to those cities to assess the blast and radiation effects of the two bombs. One aspect of the trip that made a great impression on the scientists was the welcome they received from their Japanese counterparts as well as from the general population. Although the Manhattan Project scientists had no armed escort of any sort, they were greeted calmly and, if not warmly, respectfully, without any obvious rancor.

In later written and oral reminiscences, the American scientists said they found this reception both noteworthy and surprising. They could not imagine a comparable situation had it been the Japanese who had come to inspect the destruction of American cities after a Japanese victory. It made immediately obvious the great gulf that existed between normative behavior in American and

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