Discrimination Cases

Academics in Court. The Consequences of Faculty Discrimination Litigation. GEORGE R. LANOUE and BARBARA A. LEE. University of Michigan Press, Ann Arbor, 1987. x, 285 pp. Paper, $16.95.

More than 20 years ago, the eminent legal historian Lawrence Friedman wrote that "it is easy to forget that each [law case] embodies the skeletal remains of a unique human situation: even at its most matter-of-fact and businesslike, the legal system rests on human raw material." Friedman was drawing on the 20th-century tradition of legal realism, and he presaged the recent scholarly fascination with the place of the "human voice" in the law, the impact of litigation and legal decisions on real people. Similarly, students of the implementation process, scholars of distinction such as Milbrey McLaughlin, Richard Elmore, and Eugene Bardach, have called our attention to the sometimes serendipitous process of implementing court decisions and statutes. In *Academics in Court*, LaNoue and Lee write in this same modern tradition.

Academics in Court is concerned with employment discrimination litigation in higher education, focusing on Title VII of the Civil Rights Act and the Equal Pay Act. These acts were amended in 1972 to extend to university employers, and they basically forbid discrimination in employment and compensation by sex or race. LaNoue and Lee are not primarily concerned with legal doctrine; rather they seek to examine the impact of the litigation process and judicial decisions on "the lives of the participants and their environment" (p. 7). They assert that their "study examines the consequences of the academic discrimination process and [that they do] not attempt to determine which party 'deserved' to prevail" (p. 22). In this effort they have produced a fascinating and readable book, but one that only partially succeeds in achieving its articulated aims.

The core of the book consists of a series of case studies, really stories, about sex and race discrimination suits at the University of Connecticut, Muhlenberg College, the University of Delaware, Montana State University, and the University of Minnesota. The authors claim to draw on the judicial-systems model developed by others, and they set up a method of analysis that separates litigation into stages: triggering incident, perception of alleged discrimination, settlement or litigation decision, pretrial impacts, trial impacts, decision impact, post-trial impacts, and so forth (p. 15). But with all due deference, their model is not so much one of social science methods as it is one of providing useful subheadings for sophisticated case descriptions, based on court papers, interviews, and other data. As the authors themselves admit more than 200 pages later, social scientists have not succeeded in developing coherent theories to order information about the impact of litigation (p. 240). Indeed, the authors make no effort to ensure the representativeness of their sample or to compare employment discrimination experiences at universities not subjected to the litigation process.

The stories they relate are good stories and highly informative, though frequently the authors do not analyze in detail the common themes that emerge. One common theme is that many discrimination suits arise in the context of departments or universities that are endeavoring to raise standards for hiring, promotion, and tenure. From the university's perspective it is applying the new standards, for example a substantial publication requirement, in an evenhanded manner. Litigants, however, see many other colleagues in the same department who were tenured, in the past, with records very similar to their own. They see discrimination, not changing institutional conditions. Another theme is that the litigants tend to associate the discriminatory acts and hurtful words of individuals in the academic community with an overall atmosphere of racism or sexism, including employment decisions, whereas the universities tend to see them as isolated events having no bearing on institutional policies. Finally, many universities are able to amass evidence of special recruitment efforts for minorities and women, but the litigants in class action suits are more interested in results than processes. Hence it is not surprising that the parties draw markedly different inferences from the underrepresentation of minorities and women on faculties.

The authors ably relate the impact of discrimination litigation on the participants: the luck of the draw in determining whether one finds oneself before a sympathetic or a hostile judge, the feelings of powerlessness and the absolute preoccupation of litigants with their cases, the alienation from lawyers and judges who do not treat the case with the same intensity as the litigants, the feeling that the "real" story never came out, the hostility of academics who view themselves as liberals when they are charged with racism and sexism, and the horrendous human problems in using the sanctions of law to compel an academic community to accept someone whom it has previously rejected.

If there is a major flaw in the book, apart from the unwarranted assumption of scientific methods, it lies in the authors' assertion of objectively examining consequences without caring who wins or loses. Perhaps it is inevitable that the storyteller will take sides in relating emotionally and ideologically charged stories, but, in any event, the authors do hold strong pro-plaintiff views. A ruling against the plaintiff is characterized as a "great disappointment" to women and a "setback" (p. 85); a university's "extraordinary efforts" to recruit blacks are placed in quotation marks (p. 130), whereas frequently the plaintiff's claims are not so treated (p. 119); an adverse decision "has not created the legal precedent faculty women needed to challenge the fundamental arrangements in American higher education" (pp. 173–174); the documentation of the plaintiff's alleged shortcomings is viewed as a use of the university's "formidable political clout" (p. 186); and a "conservative" view of affirmative action is viewed as unpromising (p. 146). It is not so much that one agrees or disagrees with the authors' views, but rather that *Academics in Court* is infused with judgments on the merits that are not defended with analysis and that stand outside of the authors' stated objectives for their study.

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Roots of a Discipline

From Mineralogy to Geology. The Foundations of a Science, 1650–1830. RACHEL LAUDAN. University of Chicago Press, Chicago, 1987. xii, 278 pp., illus. $27.50. Science and Its Conceptual Foundations.

The transformation of geology over the past two decades demonstrates just how dramatically a science can change its shape and scope. Geologists have allied themselves with physicists, chemists, and mathematicians; field and museum workers are on the defensive; even the name "geology" has been challenged as a label for the discipline, so that many departments are now engaged in "earth science." Geology, once a self-evidently natural way of perceiving the earth, can no longer be taken for granted.

These developments should sharpen awareness that human beings, not nature,

decide how the disciplinary map of science will be drawn. As geology merges into earth science on the one hand and splinters into geochemistry, geophysics, and other specialties on the other, it is appropriate to investigate how the discipline came into being in the first place. This has been the subject of some of the best recent work in the history of science, and Rachel Laudan's *From Mineralogy to Geology* makes an important contribution to what promises to be a lively debate.

The late 18th and early 19th centuries saw unprecedented changes in the ways scientists subdivided nature. Old subjects like "natural philosophy" were broken up, and new subjects were created. One of the most exciting and popular new sciences was geology. Aspects of nature that had been studied from points of view as diverse as Biblical chronology and mineral chemistry were drawn together in a single new field concerned with the study of the earth. Laudan provides a challenging and cosmopolitan account of how this happened.

The main aim of her book is to recover the "conceptual foundations" of geology: the theories and methods upon which the classical discipline is built. In these terms, the book is strikingly successful. In a subject where almost all the laurels have been awarded to the British, Laudan establishes the centrality of Continental work, particularly in chemistry and mineralogy.

The story begins with late-17th-century mineral cosmologists, men like J. J. Becher and G. Stahl, whose work provided the basis for chemical studies of the earth's formation. These authors were widely read in the mining schools and academies of Germany, France, and Sweden during the 18th century. This period was one of great debate over the methods of classification that could be used to subdivide the mineral kingdom. Attempts were made, by Linnaeus and others, to apply techniques that had proved successful for animals and plants to the mineral kingdom. But these failed. Instead, Abraham Gottlob Werner at the mining academy of Freiberg constructed a new kind of theory, one in which mineral strata were identified primarily by the period of their formation.

The work of Werner and his followers transformed the practice of geology. At a conceptual level, the union between the causally and historically oriented approaches to the earth that had characterized the work of the mineral cosmologists began to fall apart. In the writings of a Wernerian like Leopold von Buch, the two enterprises were pursued as distinct activities. More fundamentally, though, the Wernerian approach gave geologists something to do. As Laudan shows, the theory of Werner was open to creative modification and transformation. It could be extended to new types of phenomena, or ones (such as volcanoes and mountain chains) for which new evidence showed Werner's explanations to be inadequate. Most important, perhaps, was its emphasis on the mapping of concrete formations in space. By the time Werner died in 1830, most of Europe and much of Asia and eastern America had been mapped by his enthusiastic followers. Laudan's superb discussion of this "Wernerian radiation," based partly on work by Alexander Ospovat and Martin Guntau, fills a major gap in the English-language literature in the history of science.

After reading this book, it is difficult to doubt that the concepts that underlie classical geology were forged on the Continent at the end of the 18th century. The thrust of innovation through the second decade of the 19th century remained in the mining schools and academies of the Continent, particularly of Germany and France.

Why, then, has the great majority of work on the history of the earth sciences during this very period concentrated on England and Scotland? In part, as Laudan points out, this is simply a matter of the history of geology basking in the glow of the Darwinian revolution. The traditional line of influence traced from James Hutton through Charles Lyell and finally to Darwin has given a distorted focus to the literature. The so-called "background to evolution" has become confused with the origins of geological science. Rather strangely, Laudan does not entirely escape from this tradition herself; the last chapter of the book is about Lyell, when it would have more effectively been about the French theorist Léonce Elie de Beaumont and the reception of his work. What Laudan says about Lyell is important, but concluding with a discussion of his work rather reduces the impact of her main argument.

The dismantling of the traditional pantheon of geology is a welcome feature of Laudan's book. At another level, though, some of her criticisms of other historians tend to miss the mark. In many ways the literature on British geology has not aimed at an account of the intellectual origins of the science but reflects an alternative conception of what the history of science should be about. Laudan's is primarily an intellectual history, and the central object of her analysis is the "intellectual tradition." By contrast, much of the work on British geology—for example Charles Gillispie's classic *Genesis and Geology*—is concerned with how the study of nature has been part of wider historical developments.

One of the most convincing advocates of this alternative approach is Roy Porter, whose *The Making of Geology: Earth Science in Britain, 1660–1815* (Cambridge University Press, 1977) covers some of the same territory as Laudan's book does. In dealing with one country, Porter naturally gives a fuller picture of the institutional, intellectual, and economic conditions that made possible various kinds of interest in the earth that developed there. But as Laudan makes clear, the failure to give due attention to the importation of Wernerian geology at the beginning of the 19th century is a major hole in Porter's story. Even on its own terms, Porter's account badly needs to be supplemented by Laudan's account of the "Wernerian radiation."

Ultimately, though, Laudan and Porter are concerned with different questions. Porter asks why geology was studied in the first place. What material, social, and intellectual constraints shaped the way 18th-century people interpreted the natural world? These issues are touched on in Laudan's account, but they are not fundamental to it. Similarly, her brilliant dissection of Lyell's "geological logic" only begins to address the reasons behind his advocacy of uniformitarianism. Laudan devotes many pages to analyzing a succession of concepts; Porter analyzes the conditions that made such concepts possible.

Laudan's view that social history must play "second fiddle" to intellectual history in the study of the development of a science sets up a false dichotomy. As much of her own book demonstrates, the two approaches can best be pursued together. For example, Laudan's discussion of Werner's work is particularly effective because it is located in the specific social setting of the German mining schools. Attention to the differences between these schools—and also the English and French contexts where their work was taken up—might shed light on the reasons why Wernerian geology developed in the ways it did, however. Without an understanding of the different styles of science pursued in different locations one is left with an overly individualized model of scientific change.

On any terms, though, *From Mineralogy to Geology* makes a signal contribution to the analysis of geology and its origins. The hitherto separate histories of chemistry, classification, and geology are brought closer together. At long last the Wernerians are restored to their pivotal role in the development of the science. And if Enlightenment mineralogy does not always make for gripping reading, the book's clear argument and general surveys will be valuable for teaching. Most important, Laudan's study should fos-

ter fresh debate on the formation of disciplines and the sometimes surprising ways in which scientists have chosen to carve up the empire of nature.

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Explorations of the Cosmos

Observational Cosmology. ADELAIDE HEWITT, GEOFFREY BURBIDGE, and LI ZHI FANG, Eds. Reidel, Dordrecht, 1987 (U.S. distributor, Kluwer, Norwell, MA). xxvi, 854 pp., illus. $149. International Astronomical Union Symposium no. 124 (Beijing, China, Aug. 1986).

Symposiums on topics related to observational aspects of cosmology were held in Crete in 1983, in Tallinn in 1977, and in Cracow in 1973. Another took place in Balatonfüred, Hungary, in 1987, subsequent to the 1986 symposium in Beijing on which this book is based. The setting of the 1986 meeting was significant, not only because of ancient China's many contributions to astronomy and cosmology, but more particularly as an example of modern China's current eagerness to develop its scientific capabilities through international contacts and exchanges. This opening up is part of a renewal of university life that can be felt as a strong undercurrent of optimism (and often of impatience) among Chinese students and academics. Cosmology has played a significant indirect role in this movement, since Li Zhi Fang, China's best known cosmologist and an editor of the book under review, is known throughout his country as an outspoken supporter of intellectual liberalization in universities.

A comparison of *Observational Cosmology* with the proceedings of the earlier symposiums shows a continuity of concerns and goals as well as some substantial progress. Looking to the future in his summary remarks at the 1973 symposium, Martin Rees hoped soon to see the detection of fluctuations in the microwave background radiation, measurements of its deviation from a blackbody spectrum at millimeter wavelengths, the discovery of quasars and x-ray-emitting galaxy clusters at high redshift, and (with a perhaps ironical "of course") continuing progress on the "classical" problem of determining the size and density of the universe. In addition, he expected substantial progress on fundamental problems related to the physics of the early universe. There has indeed been an explosion of new ideas in this last area since about 1980, but the organizers of the Beijing symposium decided to exclude such topics from their meeting in order to keep a better focus on *observational* cosmology. Most of Rees's other hopes still remain hopes today. The reflex of the motion of our Galaxy has been detected as a dipole anisotropy in the microwave background, but there is still no unambiguous detection of small-scale anisotropies from which we might decipher the origin of galaxies. A significant excess background at submillimeter wavelengths was discovered in 1987, after the Beijing symposium, apparently a result of energetic activity in the pregalactic universe, but we are only now beginning to find quasars and galaxy clusters at redshifts significantly higher than those known in 1973. The traditional tests for size and geometry of the universe remain inconclusive and controversial.

On the other hand, these tests have provided the stimulus for one of the most striking areas of recent progress. In the late 1970s it became clear that the geometry of the universe could not be derived without a detailed understanding of the evolution of the galaxies used to trace its structure. Recent observational advances have made it possible to study the stellar and gas content of galaxies at such large distances that we see them as they were when the universe was less than half its present age. As a result we can now study galactic evolution directly, and the observations are gradually revealing a complex and fascinating story: we may be beginning to see galaxies in the process of formation. Several papers in *Observational Cosmology* give good reviews of this topic, but the reader should note that there have been significant advances since the Beijing symposium.

A second area of substantial progress has been the elucidation of the structure of the universe on large scales. The ability to measure redshifts, and thus rough distances, for large samples of galaxies has made it possible to map the structure of their distribution in three dimensions. The observational advance in this area is easily appreciated by comparing the maps in *Observational Cosmology* with those of earlier volumes. As new data have accumulated the structure has been characterized successively as cell-like, filamentary, frothy, bubble-like, and spongy. It seems clear that our ability to characterize the galaxy distribution and draw physically meaningful conclusions from its structure has not advanced as fast as the observations. However, this is currently a very active area of theoretical research.

Other areas in which our observational understanding is advancing rapidly include the intergalactic medium, dark matter in the universe, and gravitational lenses. A strong point of *Observational Cosmology* is the almost uniformly high quality of the review papers covering these forefront topics. There are also a number of very good papers reviewing less rapidly developing areas of study where it is easier to be complete and the discussion is slower to be outdated. Although the standard of the contributed papers in the volume is more uneven, they give a fair cross section of current observational research and of theoretical efforts to interpret the data. The book opens with a particularly fine historical survey by Sandage and closes with a highly readable summary by Longair. All in all it provides a good introduction to the present state of the farthest frontier of observational astronomy.

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Biotic Changes

Global Bio-Events. A Critical Approach. OTTO H. WALLISER, Ed. Springer-Verlag, New York, 1986. x, 442 pp., illus. Paper, $38.50. Lecture Notes in Earth Sciences, 8. From a meeting, Göttingen, F.R.G., May 1986.

"Global bio-events" are profound, relatively rapid, worldwide changes in fossil biotas. Their recognition is not a new phenomenon—fossils have long been used to demarcate the stratigraphic record. What is new is an increased appreciation of the importance of sudden change in the history of the earth and life. Hypotheses of punctuated equilibrium, asteroid impact, and periodic extinctions have made current interpretations of earth history and the tempo of evolution more in the spirit of Cuvier and less in the spirit of Lyell. Instances of rapid change in the stratigraphic and fossil record, rather than seen as evidence of an imperfect record, are now likely to be taken seriously.

This volume, the proceedings of the Fifth Alfred Wegener Conference (the first international meeting of International Geological Correlation Program Project 216), consists of six general papers that provide the theoretical rationale and methodological framework for the study of global bio-events and 35 short descriptions of work on particular time intervals.

In his introductory chapter, Walliser notes that bio-events may be originations, rapid diversifications, dispersals, or extinctions; that they may have a complex of terrestrial and extraterrestrial causes; and