

Thinking About Food

Plants, Power, and Profit. Social, Economic, and Ethical Consequences of the New Biotechnologies. LAWRENCE BUSCH, WILLIAM B. LACY, JEFFREY BURKHARDT, and LAURA R. LACY. Blackwell, Cambridge, MA, 1991. xii, 275 pp., illus. \$39.95.

This book asks us to ponder a simple question: What is the future of food? One possible future for food might consist in the following: a breakfast of bioengineered toast, petroleum-based protein capsules, and genetically enhanced eggs. Such a repast might not be particularly appealing. Equally unappealing might be the prospect that the biotechnology behind the bread put thousands of small farmers out of business; that the protein pills were manufactured by an oil company; and that, even though the eggs are marvels of science and highly profitable for the conglomerate that hatched them, no one knows for sure how healthy they might be in the long run.

The principal message of *Plants, Power, and Profit* is that now is the time to contemplate and debate the future of food and the economic and social systems through which it will be produced. Developments in biotechnology, the authors argue, have expanded the array of possibilities—in food, as well as in food production—but neither biotechnologists nor policymakers are adequately equipped to make choices about which is the preferable future. Scientists may be concerned about the broader consequences of their research, but the scientific community is not routinely expected to think through the social, political, and economic implications of the experiments it runs. Likewise, policymakers and social scientists may be concerned about the ramifications of scientific activity, but they tend to be ill-equipped to understand the choices scientists make, much less to engage researchers in meaningful discussion of those choices.

Informed choice and effective policy, Busch and his colleagues suggest, require three essential ingredients. First, each side must have a better understanding of the other: its motivations, its ways of thinking, its stake in the future of food. To that end, the authors provide an overview of developments in the fields of plant breeding, genetics, and biotechnology with an eye toward

explaining to the nonscientist not only what are the current “hot topics” (that is, problems that are attracting both research and research dollars) but also what are the issues that scientists themselves find controversial (such as whether plants should be thought of as microbes). Conversely, they challenge scientists to reflect on the social organization and the intellectual underpinnings of their own activity. For example, they contrast positivistic, reductionist, and dialectical approaches in an effort to bring to the surface deeply held assumptions about the physical world and make them part of policy debate.

Second, Busch *et al.* argue that all sides must have a common language that will enable them to debate food futures. While implicitly rejecting the idea that language can be stripped of interests, they provide the next best thing: a detailed but very readable introduction to the histories of the “old” biotechnology (that is, plant breeding as practiced by farmers and extension agents and rooted in Mendelian theory) and the “new” biotechnology (grounded in molecular biology and biogenetics). To this they add a pair of empirical chapters—on the wheat and tomato industries—that analyze the accomplishments of both biotechnologies historically and consider their impacts on the political economy of those crops.

Third, Busch *et al.* argue that it is essential to have an analytical framework robust enough to engage scientists, industrialists, economists and sociologists, and policymakers and to encourage them to think beyond their immediate material and intellectual interests. To that end, they stress the importance of identifying and then thinking across levels of analysis. For example, in an early chapter readers are treated to three different ways of thinking about new biotechnologies: as scientific and technological facts and procedures; as political and economic forces on a world scale; and as contenders for a direct role in the restructuring of national and global society. Subsequent chapters detail the potential impacts of biotechnology on the molecular structure of plants, the physical and social organization of agriculture, and the ordering of the global economy. To their credit, the authors are modest in their effort to present an analytical framework: they seek to be comprehensive, but

they also take great pains to avoid the suggestion that theirs is the “proper” approach to assessing the potential impacts of biotechnology or that one can be derived from a purely technological, economic, or political perspective. Indeed, it is the tendency toward reductionism in science (as well as in economics) that has stifled adequate consideration of food futures. The authors have provided a serious and, in many ways, sobering treatment of a topic deserving of wide attention.

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Delayed Cures

A Simple Matter of Salt. An Ethnography of Nutritional Deficiency in Spain. RENATE LELLEP FERNANDEZ. University of California Press, Berkeley, 1991. xiv, 252 pp., illus. \$34.95. Comparative Studies Of Health Systems and Medical Care.

Iodine deficiency is associated with major mental deficits, goiter, and other, potentially fatal disorders. Treatment of goiter with iodine-bearing substances began in antiquity, as has been documented among Egyptians, Chinese, and the Inca. In the 1920s, iodized salt was introduced as a cheap, reliable way to prevent goiter. In Spain, however, its use did not gain official backing until 60 years later. Renate Lellep Fernan-



“Daughter and goitrous mother, from a nineteenth century glass plate.” [From *A Simple Matter of Salt*; courtesy Joaquín López]



"Man with bilobular goiter. Artists rarely portray goitrous women." [From *A Simple Matter of Salt*; copy out of J. Brown, Jusupe de Ribera, *Prints and Drawings*, 1973]

dez begins her volume by posing this strange historical fact as a problem regarding iodine-deficiency disorders that have been endemic in the Cantabrian Mountain villages of Asturias.

Fernandez found that in the 1920s a highly influential Spanish physician, Gregorio Mara $\acute{n$ on, had deliberated over goiter prevention through the use of iodized salt but preferred the more ambitious approach of improving economic conditions of the poor nationwide. If implemented, his approach would have eliminated many specific nutritional deficiencies and other health problems, and Fernandez's findings about differences in the incidence of goiter according to socioeconomic level imply that it too would have been reduced. Neither strategy was adopted, however, and ensuing political developments prevented reconsideration until recently. In the Franco period, health administrators defined the problem of goiter as genetic (the result of inbreeding) and therefore not subject to public health measures, despite some opposition within the Spanish medical profession. Fernandez carefully documents the weakness of the genetic hypothesis with her own data and provides convincing evidence of the role of diet in the mountain communities. She points out, moreover, that shipments to the region of expensive medical technology from the United States to diagnose iodine-deficiency disorders were not accompanied by information on less costly preventive measures. The villagers themselves were concerned about the disorders but were unaware that

such measures existed, despite good access to medical care throughout the century. Finally, after Franco's death, the problem was officially addressed by regional prophylaxis in 1984.

Incorporating both policy analysis and reflective ethnography, *A Simple Matter of Salt* complements work by a number of other anthropologists concerned with health issues, especially L. S. Greene's analysis of endemic goiter in Ecuador (in *Malnutrition, Behavior, and Social Organization*, Academic Press, 1977). As have Latin American anthropologists, Fernandez emphasizes history as crucial on many levels, and she analyzes genealogies spanning seven generations to explore kinship, marriage, genetics, and land tenure. She also explores the cultural ramifications of the disease, contrasting an Asturian saying that one without goiter is not beautiful with the derogatory terms used to characterize those so afflicted and the concern on the part of the inhabitants of the afflicted villages with the disrepute in which they are held by outsiders.

Malnutrition is a phenomenon that has absorbed a great deal of attention, time, and money in recent decades, yet it continues to exist. The analysis by Fernandez is crucial to understanding why. The iodine-deficiency disorders that have been endemic in this part of northern Spain cannot be ascribed simply to underdevelopment, for the region is advanced in education, access to medical care, and connections to outside markets. Instead, these disorders can be characterized as diseases of political miscarriage and maldistribution of medical knowledge, as well as of regional prejudice and poverty. This work represents a new standard in studies of nutritional deficiencies on the community level and will receive wide attention.

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Evolutionary Disentanglement

The Comparative Method in Evolutionary Biology. PAUL H. HARVEY and MARK D. PAGEL. Oxford University Press, New York, 1991. vii, 239 pp., illus. \$70; paper, \$24.95. Oxford Series in Ecology and Evolution, 1.

The natural world displays a bewildering variety of organisms that appear uniquely adapted to a myriad of environmental conditions. In seeking to disentangle the basis for this diversity, evolutionary biologists commonly draw comparisons among taxa to formulate or test hypotheses. Yet the conclusions generated from comparative analy-

ses have often been weakened by their dependence on mere correlation and by the implicit assumption that phenotypic traits are molded and optimized by extrinsic selective forces arising within an environment. Two species exhibiting striking similarity in phenotype and occurring in matching environments would be interpreted to represent an equivalent response to a common selection factor, and few studies tested for the effects of other factors that could explain variation in the phenotype. Beginning in the late 1970s, Paul Harvey and associates published several widely cited papers that demonstrated the importance of history in explaining patterns of variation in several phenotypic traits among cross-taxa comparisons. These and other papers led evolutionary biologists to recognize the necessity of incorporating phylogenetic information in comparative studies. This reawakening to the importance of history has generated a confounding array of statistical and methodological procedures, and ecologists and evolutionary biologists now face analytical and methodological options that were not always dealt with in their training.

The Comparative Method in Evolutionary Biology, in offering a broad review of the field that places the various procedures into a evolutionary and statistical context, is thus timely. Largely an expanded version of several recent review articles by the authors, it presents a clear and concise account of the major advances forming the "new comparative method."

Harvey and Pagel begin with an overview of the comparative approach and espouse the need for a phylogenetic perspective in the study of adaptation. Appropriate comparisons may demonstrate previously unknown relationships among sets of traits and, when properly conducted, test hypotheses regarding their adaptive significance. Several classic examples are discussed to reinforce these points. Most comparative studies perform contrasts across a wide range of taxa that differ to some degree in a phenotypic trait (generation time, for example). Significant covariation between the trait and an environmental feature should indicate adaptive evolution. Herein, argue Harvey and Pagel, lies the weakness of the comparative method, which is part statistical and part conceptual. The varying degrees of relatedness preclude the use of species as independent data points and therefore inflate the true number of degrees of freedom; other assumptions of many common statistical procedures are also violated. The evolutionary biologist also faces a problem involving the appropriate method for disentangling the extent to which an observed association is a manifestation of