The Domain of Childbirth

Brought to Bed. Childbearing in America, 1750 to 1950. JUDITH WALZER LEAVITT. Oxford University Press, New York, 1986. xii, 284 pp. illus. $21.95.

In the historical literature, the birthing experience emerges as either a morality tale of the great march of medical enlightenment or a horror story of iatrogenic perfidiousness. Historian Judith Walzer Leavitt has provided a more complex understanding of this most enduring biological, yet culturally shaped, event. In this finely crafted and elegantly argued study, Leavitt has restored historical agency to women and provided a sympathetic accounting of the physician's difficulties.

The approach is both narrative and analytic. The chronology is familiar: the Colonial era of women-controlled home births is slowly changed by the introduction of physicians into the birthing chamber until, in the 1920s and 1930s, physician-controlled hospital births come to predominate. But Leavitt adds a sophisticated analysis that reveals the dilemmas faced by both the parturient and her birth attendants that made changing birthing customs possible.

The author argues that safety and control over birthing were crucial concerns to physicians and women alike. In her analysis, women's gratefulness to their physicians is balanced against their anger at loss of control over certain aspects of birth. In turn, the doctors' desire to "do something" is examined in relationship to the state of medical knowledge, the political and economic position of obstetrics as a specialty, and women's demands. Leavitt is sensitive to the pressures women put on physicians and to the medical "panic" that often occurred in difficult birthing situations. Never assuming there was only one kind of physician or group of women, she is also careful to note regional and educational differences among doctors and race and class differences among women.

Leavitt begins by suggesting that the realistic fear of death or serious injury overshadowing the birthing bed made it possible for some upper-class women, in the late 18th century, to begin to look for the safety that physician-attended births seemed to offer. Various chapters on forceps, asepsis, and pain relief examine these women's hopes and assay the effectiveness and promise of medical care. Because Leavitt sees birthing as a continually negotiated event, she is arguing that the physician's entree into the birthing chamber did not mean automatic loss of control by the parturient woman or her other attendants. Unlike some feminist historians, Leavitt is thus suggesting that it was the context (home versus hospital), not the mere presence of physicians, that affected the control women had over the birth process. And unlike some medical historians, she is concerned with both the patient's role in shaping medical decisions and the difference between the promise of medicine and its realities.

With safety and control as her underlying themes, Leavitt is alert to the seeming ironies in the history: for example, it was women, not physicians, who argued for control over birth by wanting the use of scopolamine and morphine, or "twilight sleep." She sees in the 1910s debate over twilight sleep the beginning of the redefinition of birthing as an "illness" requiring hospitalization and the basis for physicians' growing sense of power. It was the increasing abstruseness of medical science, the desire of women for "modern" and safe births, and doctors' quest for the removal of "lay" interference from the birthing process, she argues, that finally made the transition to hospital births possible. Using medical debates, biographies, popular literature, diaries, and the letters of women who answered her author's inquiry in the *New York Times*, Leavitt paints a balanced portrait of the problems with hospital births.

Leavitt ends her book in 1950 at the beginning of yet another change in birthing history: the rise of the natural childbirth movement. Her keen insights into this important era are needed, and the book should have had another chapter. In a note, Leavitt calls for an analysis of role of nursing in transition from home-based to hospital-based births. But such an examination should not have been left out of a medical history and would have helped to explain women's hopes from and disappointments with hospital births.

Leavitt has provided us with an excellent history of childbearing. But even more, the book serves as a model of scholarship on change in medical practice, the ideological function of science, and the place of childbearing in women's lives and culture. No other book to date has so successfully negotiated these politically mined historical waters with such sophistication and skill.

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The Biology of Plants

Plant Ecology. MICHAEL J. CRAWLEY, Ed. Blackwell Scientific, Palo Alto, CA, 1986. xiv, 496 pp., illus. $55; paper, $29.95.

Plant ecology and the related disciplines of plant biology have undergone rapid development during the last 15 years. As plant population biology has expanded, the boundaries between the traditional botanical disciplines have become blurred. For example, anatomical and morphological models are now used to predict the dynamics of clonal plant populations. Similarly, physiological ecologists determine how variation in environmental factors such as water, temperature, and light control the growth, survival, and reproduction of individuals making up populations. In this new book 7 of the 12 chapters are specifically devoted to population ecology or population genetics. Of the remaining five, three focus on community ecology and two on physiological ecology, but all are strongly oriented toward population ecology.

The book should be viewed as a state-of-the-art treatise for scientists and advanced graduate students, summarizing critical ideas and research on plant population biology and citing over 1200 references in the process. Most of the chapters give a balanced overview of a major topic in plant ecology, such as Watkinson's on population dynamics and Crawley's on life history and environment. (In this the book may be contrasted with *Perspectives on Plant Population Ecology* [1984], edited by Dirzo and Sarukhán, which emphasized research results.) The chapters are written by acknowledged experts at an advanced level. Considerable background material is summarized quite briefly. The book does not cover basic aspects of plant ecology that are covered in textbooks, such as vegetation sampling, the major vegetation types of the world, how transpiration and photosynthetic rates are measured, and how to conduct transplant experiments. More illustrative material would have helped create excitement about the natural history aspects of the subject for the beginning researcher. Illustrations would have been particularly useful in

Howe and Westley's chapter on the ecology of pollination and seed dispersal, to show the types of flowers and fruit associated with each syndrome.

The chapters on physiological ecology by Mooney, Fitter, and Crawley set out clear definitions and mechanisms for many central ideas of plant population biology, such as allocation patterns, life history strategies, and reproductive effort. The physiological basis of plant growth patterns is described in relation to limiting resources. The common technique of measuring reproductive effort as the percentage of total plant weight accounted for by reproductive tissue is seen as providing only a crude approximation, in part because the green parts of reproductive tissue contribute a substantial portion to their own carbon budget.

The chapter by Levin on breeding systems and genetic variation is a good summary of a rapidly developing branch of population biology, in which Levin himself has been influential. In the last 20 years electrophoretic analyses have shown that outcrossing species generally have greater genetic variation than selfing species in terms of the percentage of loci that are polymorphic, the number of alleles per polymorphic locus, and the percentage of polymorphic loci that are heterozygous. Further, selfing species have a greater proportion of their genetic variation distributed among populations than do outcrossing species.

The chapter by Waller demonstrates the renewed importance of classical plant morphology and anatomy in explaining the constraints on plant development. Plants are typically constructed out of modular units, such as leaves, shoots, and roots, with the placement of these structures as well as of dormant buds governed by morphological rules. Computer models using these rules can predict how plants would grow to maximize photosynthesis in the absence of competitors and how they would grow to maximize survival in the presence of intense competition. These models are proving to be extremely useful in predicting the ecological consequences of the branching patterns found in early land plants as well as the adaptations of herbaceous plants in different environments.

Other chapters are more narrowly focused. For example, Hubbell and Foster primarily describe their own studies of long-term changes in tropical tree populations. These studies have shown that, though only a few of the species have specialized requirements for regeneration, most can establish new recruits equally well in the range of canopy and gap environments occurring in the forest.

The chapter by Gill presents arguments for a controversial theory. Gill believes that somatic mutations may allow long-lived plants, such as trees and rhizomatous perennial herbs, to generate the genetic variability needed to respond to herbivore attack and other aspects of a changing environment. His evidence comes primarily from the literature of agriculture and horticulture in which somatic mutants spontaneously appear and are preserved if economically useful. Also he describes the variability among the branches of naturally occurring woody plants in fruit production and herbivore damage as examples of possible somatic mutation. The proof of this thought-provoking theory will come after careful, controlled experiments have been conducted using isozyme, chromosome, and quantitative genetic studies.

As with any compilation, some topics are covered only superficially or omitted in this one—for example vegetation analysis, herbivory, and biochemical ecology. The book is of excellent quality, however, and is recommended for anyone wanting a current overview of plant population biology.

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Palynological Patterns

Pollen and Spores. Form and Function. S. BLACKMORE and I. K. FERGUSON, Eds. Academic Press, Orlando, FL, 1986. xvi, 443 pp., illus. $92.50. Linnean Society Symposium Series, no. 12. From a symposium, London, March 1985.

Research on modern and fossil pollen and spores has contributed greatly to ideas about the evolution and relationships of plant groups. The study of functional factors underlying the intricate and bewilderingly diverse variations in pollen form and exine structure has lagged behind, however, despite its potential for raising pollen morphology above the descriptive level and for elucidating the biology of ancient plants through inferences from the fossil pollen record. The present volume consists of papers presented at a symposium that was intended to improve this situation.

The success of the symposium was limited by the fact that very few people have specialized in the functional morphology of pollen, so most of the contributors are experts on other subjects. Some deal with this problem by writing on other topics (sometimes with important results, such as the conclusion of Walker and Walker that the initial Cretaceous radiation of monocots was centered in Laurasia rather than in northern Gondwana, as has been inferred for dicots). Many who do consider function tend to ignore recent critiques of the "adaptionist program," particularly of its tendency to accept the first plausible explanation for a feature without considering how it might be tested against alternative hypotheses, including explanations based not on function but rather on phylogenetic, developmental, or geometric constraints. These latter issues are addressed most explicitly by Blackmore and Barnes, who argue that mechanisms for harmomegathy (which allow pollen to accommodate changes in volume during release and germination) are generally exaptations that arose by co-optation of features that originated as adaptations for protection or germination, and by Kress, who maintains that since the "exineless" condition in Zingiberales is primitive in the order as a whole, studies of function in modern members may not reveal why it originated in the first place. The several papers on development are most valuable in summarizing the great strides being made toward recognition of common mechanisms behind seemingly unrelated patterns of exine development, but they are also significant in pointing out the role of structures as routes for exchange of materials or foci of exine deposition during development and suggesting that some structures may have little to do with survival value at the stage when pollen is actually functioning.

One of the papers of broadest interest is Crane's review of pollen morphology in relation to wind pollination, which covers the wide range of factors (physiological, mechanical, aerodynamic) involved at all stages in the process. However, it skirts some major questions, such as the reason for the shift to granular exine structure in Amentiferae and whether the sacs in conifer pollen function primarily for buoyancy during transport or flotation in the pollen chamber. In general, the best-understood aspect of pollen function, elegantly illustrated by the paper by Blackmore and Barnes, seems to be harmomegathy, which is easiest to investigate experimentally. There has been less progress toward explaining variations in exine structure in functional terms, perhaps because exine biomechanics is less amenable to experimental or mathematical analysis. Several papers relate exine characters to climate or pollinators, but these tend to be based more on correlation arguments than on analysis of causal factors, raising the possibility of spurious secondary correlations. The most successful of these studies is that of Grayum, who correlates evolution of secondarily smooth and spinose exines in Araceae with specialization for beetle and fly pollination.

If one is looking for a definitive synthesis