growth spurt. The pattern suggests—especially because parental provisioning could allow very rapid attainment of adult stature if doing so would maximize biological fitness—that rather than being a critical constraint, the growth rate itself is molded by natural selection in relation to other features of the human life history. It does not appear to be coincidental that abstract logical reasoning, adult stature, and body fat storage are all timed to develop during late adolescence so that in most foraging societies reproduction is initiated at age 18 or 19. The learning-intensive foraging strategy practiced by hunter-gatherers and, perhaps, learning-intensive parenting strategies require many years of cumulative knowledge. Maybe it simply does not pay to grow to adult stature until the brain is ready for successful parenting and for the acquisition of energy to support reproduction. Viewing these behavioral, physiological, and anatomical characteristics as co-evolved components of a unique brain-based life history pattern helps explain the specialized features of human gestation and birth so elegantly described in the book; otherwise, the brain itself is an unexplained determinant.

A novel synthesis of a fast-growing field, *On Fertile Ground* will interest specialists and nonspecialists alike and can be used as an undergraduate text as well. It is an excellent read that significantly advances our understanding of human reproduction.

References

1. H. S. Kaplan, J. B. Lancaster, K. R. Hill, A. M. Hurtado, *Evol. Anthropol.* **9**, 156 (2000).
2. J. Bongaarts, R. G. Porter, *Fertility, Biology and Behavior: An Analysis of Proximate Determinants* (Academic Press, New York, 1983).
3. J. W. Wood, *Dynamics of Human Reproduction: Biology, Biometry and Demography* (Aldine de Gruyter, New York, 1994).

BOOKS: GENETICS

Writing About the Unseen

Andrew Berry

Jennifer Ackerman's previous book, *Notes from the Shore*, was about horseshoe crabs, whales, and seagulls. Her new one, *Chance in the House of Fate*, is about transposons, apoptosis, and hox genes. Ackerman has in effect undertaken a grand literary experiment: She has tried to export her nature-writing skills from the visible, tangible world of natural history to the unseen, microscopic world of the cell.

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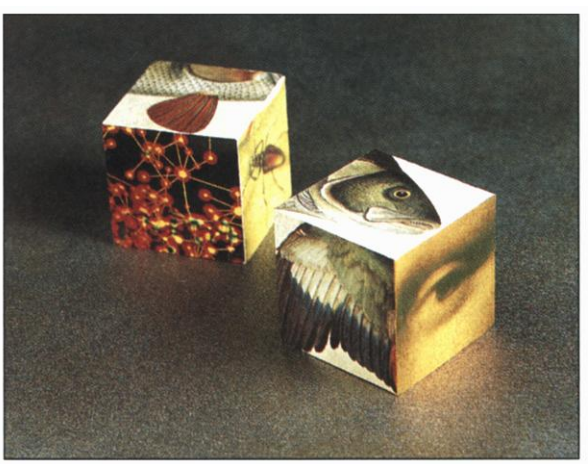
Chance in the House of Fate
A Natural History of Heredity
by Jennifer Ackerman
Houghton Mifflin, New York, 2001. 268 pp. $25. ISBN 0-618-08287-5.

To do this, she weaves together three narrative strands. Along with the science, we get plenty of history of science (Galen, Cuvier, and Redi are all there) plus a good dose of Ackerman's personal story. Not only do we follow her mother and grandmother as they fall prey to cancer and Alzheimer's, but we also learn that Ackerman keeps seashells on a windowsill in her study and has a dog called Lucy. This is certainly not standard science-writing fare. Even the structure of the book departs from convention. There seems to be no particular theme binding together its 18 chapters or four sections; the book is best viewed as a collection of essays or—because the chapters generally lack the formal argument that characterizes an essay—meditations on molecular biology and genetics.

The book's strengths are its lightness of touch and breadth of coverage. *Chance in the House of Fate* contains a great deal of biology (circadian rhythms, the tumor suppressor protein p53 and cancer, the molecular components of the eye, imprinting, and plenty more). Much of it is deftly presented, and Ackerman can be a thoughtful commentator: "The conservation of genes across species was revealed not as Darwin's discoveries were—by seeing what others had seen and thinking what no one had thought—but through a kit of new technological tools." But ultimately her efforts are not satisfying: She fails to elicit any new or deep appreciation of what she refers to as "the gnomic workings of the living order, nature's inventive jack-in-the-box surprises that shift our view of life like the sudden twist of a kaleidoscope."



Ackerman likes to enshrine diversity in a list. In her earlier book, she describes the noises that fish make. They "thump, cluck, croak, bark, rasp, hiss, growl, swish, spit, scratch, and quack. Eels bubble and thud. Herrings signal in soft chirps. Sea robins squawk, toadfish grunt, and striped bass utter an 'unk.'" Molecular biology also provides the author with lists: "The motifs [of proteins] carry such names as kringle (for the Danish pastry it resembles), apple, kunitz, link, zipper, zinc finger, forkhead, sushi domain, and homeodomain." This is, I admit, an unfair comparison—the onomatopoeia of fish utterances is inevitably lyrical while the names devised for newly discovered protein motifs over pizza and cheap beer at lab get-togethers are just as inevitably prosaic—but the comparison nevertheless crystallizes Ackerman's problem. Nature writing is best applied to nature. Writing that is evocative and poetical in one context is merely whimsical and obtuse in another. Lucy the dog is our introduction to a discussion of the molecular basis of smell: "She has caught an aromatic vapor from unseen origins, and she lingers for a moment, savoring, then snuffles forward to seek other faint effluvia."

Although I do not think that Ackerman's nature-writing-meets-molecules approach succeeds, I applaud her for trying. The world within the cell is, after all, every bit as wondrous, and even as beautiful, as the world of a tropical forest; so why not apply the same language to describing them both? I think the answer lies in the extent to which each world is tangible. A description of a stroll through a forest in which each encounter—the call of a bird, the rustle of a fleeing lizard, the flash of a butterfly's wings in a sunspot—is described only fleetingly can successfully convey a concrete sense of that forest. This, I suspect, is because we all have some experience of forests. But we have no equivalent experience of the subcellular world. Fleetingly described encounters with mitochondria ("these prominent little generators"), ribosomes (those "splendid little structures"), and DNA ("a serpentine coil of atoms with an odd stringent beauty, long and skinny, like its name, deoxyribonucleic acid") fail to yield a concrete sense of the inside of a cell. Sadly, my imagination remains firmly aground on the didactic schematics in introductory biology textbooks. I conclude from Ackerman's experiment that it is mighty difficult to write evocatively about worlds that lie beyond our normal sensory universe.

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