

BOOK REVIEWS

On Fertile Ground: A Natural History of Human Reproduction. *Peter T. Ellison.* Cambridge, Mass.: Harvard University Press, 2001, 358 pp. \$27.95, cloth.

This splendid book is so clearly written and yet so rigorously detailed that it can be recommended to teenage daughters and sons as well as to specialists in reproductive ecology and life history theory. The book covers everything about the female reproductive system in intricate detail, from conception and early fetal development through childhood, the onset of sexual maturation, female ovulatory cycling, pregnancy, birth and lactation, and finally menopause and the postreproductive lifespan. It also includes a fascinating chapter on male reproductive physiology that clearly explains how the sexes are similar and how and why males are different.

The most important contribution of this book, however, is the consistent application of evolutionary logic concerning function while presenting the intricate details of reproductive physiology. These details about hormonal production, feedback loops, and effects on target cells, etc., should concern all scientists interested in human life history traits because they provide important clues as to why reproductive function is designed the way it is. But Ellison shows, just as importantly, that having a basic understanding of how the system was designed (by natural selection) and what its primary purpose is (to convert limited resources into gene copies at the highest possible rate in a competitive environment) is a basic requirement for those who wish to “understand” rather than just describe human fertility patterns. By wedding the knowledge of details with a deep understanding of the theory about their function, Peter Ellison has been an outstanding leader of the field of reproductive ecology for more than twenty years. This book is the distillation of his ideas over that time period and a sparkingly transparent presentation of what sometimes seems to be a muddy pond of complicated details.

The lack of an evolutionary understanding about human reproduction has hindered fertility research in the social sciences for half a century. As Ellison illustrates, demographers first assumed that fertility did not vary with ecological conditions and then later proposed that observed variation could all be explained by a social/cultural variable—the pattern of nursing. They explicitly denied that food intake and workload differences could explain human fertility variation across natural fertility populations (something suggested by sociobiologists and physiologists). Instead they produced twenty-five years of inappropriate studies (comparing bottle-fed and breast-fed populations) and misinterpretations of data (allowing the statistical effects of artificial nursing regimes to account for most variance in the birth interval when such nursing patterns are not found in most

human natural history) to deny the food-fertility link in natural human populations.

This denial was part of the larger debate in the late twentieth century about the relevance of biology and natural selection to human issues in the social sciences. It was motivated by a refusal to recognize human fertility as a "biological" trait and the concerns about what demographers believed to be the political implications of recognizing the food-fertility link (Bongaarts stated in a 1980 *Science* article that demographers are relieved to be able to "demonstrate" no food-fertility link because such a link might lead developed nations to stop food aid to developing nations with high birth rates). Demographers held fast to their insistence that nursing patterns alone determined fertility variation in humans, despite the fact that food intake could be shown to affect fertility in virtually all other mammals where the relationship was investigated and the commonsense knowledge obtained from any farmer, animal breeder, zookeeper, or lab animal manager that feeding patterns have profound effects on reproductive function in mammals ranging from mice to elephants (including our closest relatives, the chimpanzees, who show earlier sexual maturity and higher fertility in captivity than in the wild). Evolutionary theorists had pointed out for decades that because multiple juvenile offspring are simultaneously dependent on human mothers for much of their lives, signals from a currently nursing infant alone would be a poor way for natural selection to adapt female fertility to the ability to engage in further reproduction. Such logic never phased the hard-core "nursing-hypothesis" advocates. Most importantly, demographers sidestepped the fact that modern hunter-gatherers show a twofold range in completed fertility (from about four to eight live births) in populations who all nurse their infants on demand and at frequent intervals (several times an hour), but who have widely different patterns of caloric intake and workload.

Ellison leads us back to the path of common sense and solid evolutionary logic (female organisms must evolve the ability to adjust their reproductive output according to the resources they have available for reproduction) and then provides the reader with examples of rigorous experimental research that clearly show the nursing hypothesis to be incomplete. He then provides an obvious and coherent alternative, the "metabolic load" hypothesis, which proposes that milk production required by nursing along with food intake, work output, disease load, etc., all interact to signal a woman's body when reproduction is likely to be successful again.

Although Ellison is a leader among reproductive ecologists in using life history theory, some aspects of this book illustrate how underdeveloped the theory still remains for fully explaining all human developmental traits. A good example is the human juvenile period. We have no well-developed hypothesis at present for the extremely low growth rates of human juveniles relative to other mammals and primates or the existence and timing of the adolescent growth spurt (which shows that they could grow faster if it were advantageous). The hypothesis presented in the book for the timing of sexual maturation illustrates how this weakness ultimately undermines our ability to "explain" the age of sexual maturation. Although Ellison favors the hypothesis that achieving required pelvic size is the key determinant of the length of the juvenile "growing" period and the age at sexual

maturation, it seems more likely that pelvic development is simply an early marker of the integrated process of sexual maturation whose timing we are trying to explain. Girls grow through childhood, and then when it is time for them to mature sexually, they undergo a rapid growth spurt that includes widening and reshaping of the pelvis, epiphyseal closure of bones and cessation of growth, development of reproductive organs, and the onset of ovulation. The mechanistic link between epiphyseal closure and development of the reproductive organs results in deterministic growth (all energy is diverted from growth to reproduction at sexual maturity). The attainment of required pelvic diameter for live birth of a human infant cannot be the "explanatory" variable for the age at sexual maturation unless it is impossible to attain the required pelvic size at an earlier age.

But there are at least two ways that the required pelvic size could be attained at a younger age. First, the adolescent growth spurt could take place at an earlier age (since this is the event that produces the required pelvic width). Second, the pelvis could widen even when females were not as large as modern humans. We have no good explanation for the timing of the growth spurt, so the first possibility is left wide open. To counter the second possibility (wider pelvis at a smaller body size), Ellison suggests that bipedal locomotion would be inefficient if the appropriate pelvic size were coupled with a smaller than modern adult body size. This seems unlikely, however, since some human populations (such as African Pygmies) do attain required pelvic size when overall stature is no larger than that of a nine-year-old American girl. This situation suggests that growing up in body size is about more than just producing a large enough pelvis for birth. Sufficient pelvic diameter can be achieved with very poor nutrition that does not produce the (optimal) body size attained with good nutrition. There must be important gains from body size independent of pelvic diameter. Thus, the observations about the timing of pelvic growth prior to sexual maturity seem to be part of what we need to explain, not part of the explanation. Only life history theories that specify how the gains from longer juvenile periods are weighed against the losses from constant mortality and a longer generation time can truly be considered "explanatory" theories for the age of sexual maturation.

Regardless of the few rough spots where theory is not completely developed, this book is full of great ideas, important insights, and clear descriptions of physiological mechanisms. It will undoubtedly be on the forefront of a new era in human reproductive studies, helping to lead those who study human reproductive patterns down a pathway where questions and hypotheses about functional design are central and are firmly grounded in the realization that the whole system evolved by natural selection.

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Wake the Town and Tell the People: Dancehall Culture in Jamaica. Norman C. Stolzoff. Durham, N.C.: Duke University Press, 2000, 298 pp. \$59.95, cloth; \$19.95, paper.

Wake the Town and Tell the People is a welcome addition to the scholarship on music and culture in the Caribbean. The subtitle of the book, "Dancehall Culture in Jamaica," is constructively misleading. Rather than being strictly about the well-known genre of Jamaican-derived music commonly known as "dancehall," the book's scope is actually much broader. Stolzoff documents the spatial, temporal, and cultural roots of the contemporary genre in a way that gives the reader a greater understanding and respect for the current forms that Jamaican dancehall music takes.

But this book is not simply a history of Jamaican dancehall music; it also treats music as a lens for looking at other issues in Jamaican society. Stolzoff argues that the music has been a context in which differences of race, class, age, and gender have been played out. In the process, he represents the voices of individuals who have been intimately involved with creating music for dancehalls. For the historical sections of the book, this involves interviews with figures who were involved in developing some of the first sound systems. For the ethnographic sections of the book, Stolzoff's analysis is centered on the "White Hall Crew," a group of young DJs whom Stolzoff describes as "allies" of the Dub Store, a recording studio, and the Kilimanjaro sound system. As such, his ethnography emphasizes a single group of people and is multisited at the same time, encompassing their efforts to build reputations and get work around the Dub Store and in their neighborhoods, as well as their involvement in performances and sound system clashes at dances around Jamaica where Kilimanjaro was present. He complements this emphasis with interviews of many prominent performers such as Beenie Man, Luciano, and Papa San.

This approach allowed him access to DJs at all stages of their careers, ranging from novices with no reputations to well-known artists. Indeed, the strongest ethnographic sections of the book are where he examines the cultural ideas about DJs' career trajectories and where he analyzes sound system clashes between Kilimanjaro and Stone Love. Consequently, Stolzoff's approach importantly steers the reader away from the one-dimensional understanding one gets of the music through listening to commercial recordings. Indeed, Stolzoff rightly criticizes looking at dancehall music through commercial recordings, because they do not completely capture a musical tradition that is closely identified with neighborhoods, individuals, and groups. In meeting this goal, the book is extremely successful.

The book does not entirely meet the standards Stolzoff sets, however. In the introduction, he argues against focusing on successful artists, yet most of the lengthy quotes come from interviews with producers and performers that are at least locally successful and well established. Furthermore, the members of the audience remain faceless and nameless; they are represented either as "the crowd" or as categories such as "young urban male," rather than having their discourse find