The brain and sexual behavior


What do Calvin Coolidge, sexually active chickens, and the evolution of sexuality have in common? According to both Simon LeVay and Meredith Small, a great deal. Fascinatingly, both use the same story about the Coolidges' visit to a farmyard to make almost opposite points about animal (and, by implication, human) sexuality. And therein lies a tale (or is it tail?). According to lore, Coolidge learned that after mating, roosters return more rapidly to vigorous sexual pursuits if they are presented with a different female, and he asked the farmer to be sure to tell his wife this fact. Traditionally, evolutionary biologists have attributed the belief that males seek sexual novelty to the idea that they have evolved to fertilize as many females as possible. In The Sexual Brain, Simon LeVay signs on to the view that males are more sexually active and aggressive than females. But not so Meredith Small. She argues for what she calls the Ms. Coolidge effect. “Females, she writes, want novel males as much as novel males want [the females]” (p. 180).

The Sexual Brain and Female Choices have similarities and differences. Each is engagingly and clearly written, potentially appropriate for classroom use. Both strongly espouse the view that contemporary human behavior has been deeply and perhaps unalterably influenced by the species' evolutionary history. As LeVay puts it, “In my view, the scientific evidence presently available points to a strong influence of nature, and only a modest influence of nurture” (p. 1). Despite their beliefs in the predominating forces of nature over nurture, however, Small's and LeVay's views about sexuality could hardly differ more. LeVay recites a standard litany: women are less aggressive, less sexually driven, poorer at visuospatial skills, better at language skills, and possibly “in touch with their feelings” than men (p. 103). This latter trait, he thinks, might plausibly be associated with possible differences in brain structure.

In contrast, Small wishes to reclaim the biological literature for feminist purposes. The female she describes often dominates group behavior, actively seeks sexual pleasure, and controls mating interactions. Small argues, for example, that the large penis size of human males may have evolved because a larger organ does a better job of clitoral stimulation. Females drove the evolution of male genitals by choosing to mate with males who gave greater sexual pleasure. In her view, human females can use knowledge of female primates as "strategizing female creatures." She says that humans can perhaps follow "the example of our bonobo [pygmy chimpanzee] sisters, who have parlayed their sexual natures into equality with bonobo males" (p. 218). The evolutionary history Small presents can be used to liberate. In contrast, LeVay suggests that "our range of individual development is defined and limited by what we are born with. Like water lilies, we swing to and fro with the currents of life, yet our roots moor us each to our own spot on the river's floor" (p. 138).

The Sexual Brain focuses on reproductive physiology and the brain. In introductory chapters, LeVay skims over theories of the evolution of sex, reviews the biology of sexual development, and focuses on general principles of brain organization. Perhaps not surprisingly, he is most complex and even-handed when writing
about neurobiology, the area he knows best. His accounts become progressively weaker as he strays further from this familiar territory.

LeVay's story of the embryonic development of gonads and genitalia, for example, is extremely unsophisticated. Parroting the widely held beliefs that female development is passive and preprogrammed (whatever that means), and male development active, requiring intervention from what he calls a master gene, he nowhere cites critiques of this viewpoint or of the idea of a master gene that controls male development (Eicher and Washburn 1986, Fausto-Sterling 1989, Mittwoch 1992). Yet, saying that female development is something that just happens is hardly explanatory. Nor does the evidence for a male master gene really fit the hypothesis so neatly. And there are the little inaccuracies—such as the claim that the fetal ovary does not produce significant amounts of hormones when in fact it begins synthesizing estrogen quite early in development (Wilson and Griffin 1981).

LeVay brings a wider range of evidence to bear in examining the interactions among hormones, the brain, and behavior. For example, he cites the often-ignored work of Celia Moore of the University of Massachusetts at Boston, who showed that hormones can affect behavior without necessarily affecting the central nervous system. But his bent toward nature still inclines him to give the nurture side of the evidence short shrift. While preparing to write this review, I happened to be reading an issue of *The American Zoologist* that carries reports from a symposium on neural aspects of reproductive endocrinology (vol. 33 no. 2), and I kept running across material I wish LeVay had integrated into his story.

Although I do not criticize LeVay for failing to cite a publication that came out after he finished his writing, an extensive literature predating his book focuses on environment-neuro-endocrinological interactions, often in animals studied in social groups rather than in the isolated lab studies of the sort LeVay primarily cites. There were, for example, earlier studies showing that a female dove exposed to a courting male is more likely to increase her hormone levels if the male directs his response to her than to another bird (Ball 1993). There have also been studies (Matt 1993) examining photoperiod-induced testicular growth and regression in Siberian hamsters. The medial basal hypothalamus and the preoptic area both process light-period information. But social interactions can override changes in the medial basal hypothalamus, whereas diet can affect activity in the preoptic area.

LeVay's leanings toward nature rather than nurture lead him also to an uncritical use of certain scientific studies. For example, he cites work by Melissa Hines of the University of California at Los Angeles on the play patterns of girls born with cortical adrenal hyperplasia. This metabolic disorder often masculinizes the external genitalia during fetal development. Common medical practice is to manage the metabolic difficulties with cortisone and during infancy alter the masculinized genitalia, often with extensive vaginal and clitoral surgery. Hines reported that such girls played more frequently with boys', rather than with girls', toys. She suggests (and LeVay cottons to the claim) that early hormone exposure masculinized the girl's play behavior. But the controls and data evaluation in such studies are more than a little problematic. Is it possible, for example, that these girls are more active (and thus choose toys permitting greater activity) because they take cortisone, which is known to affect behavior? Or because of early, and often multiple, surgeries? Hines' controls do not permit an evaluation of this interpretation. Furthermore, Hines' attempts to rule out influences from parents, aware that their girl was born looking like a boy, focus only on conscious, remembered behavior, even though it is well known that people are not always aware of how they interact with others (Berenbaum and Hines 1992). LeVay presents these and other studies (for example, the claim of a sex difference in corpus callosum anatomy) as if they represented widely accepted science rather than belonging to a heavily disputed set of claims (Byne and Parsons 1993, Fausto-Sterling 1992).
The biology of homosexuality is very much in the news these days, and both LeVay and Small directly address this question. LeVay's courage in declaring his own gay identity has understandably made him a hero among many in the gay community. In his chapter on sexual orientation, he considers his own publication on the hypothalamus of gay and straight men in the context of other evidence read in support of a biological origin for homosexuality. By and large, I found his treatment of the matter appropriately cautious, arguing mainly that finding neural and/or genetic components of the origins of homosexuality will make it "easier to study how environmental processes can interact with them to modify the final outcome" (p. 130).

The bulk of work on homos­

sexuality focuses on men, and once again Small provides a refreshing reminder that there are females out there and they have sex, too. She reviews the evidence from a surprising number of primate species that nonhuman female homosexuality is common. She writes, "Females sometimes get their pleasure from other females, and like all physical interactions among social primates, these contacts are often, but not always, meaningful in a social context. Homos­

sexuality among female nonhuman primates, may, in fact, be just part of a larger portrait of a highly sexual, even promiscuous, and not particularly choosy animal" (p. 147). All of which—if, as Small does, you believe in the influences of our evolutionary history—puts human female homos­

sexuality in a new light.

Both The Sexual Brain and Fe­

male Choices represent an important genre—the documented but popularly written science book. If the newspaper and magazine headlines, the topics on the talk shows and on "Nightline" are any measure, our culture is in the midst of redefining and renegotiating sexuality in its many guises—from gender roles and sexual orientation to family structure. LeVay, a neurobiologist turned gay activist, and Small, a primatolo­

gist and anthropologist, have both contributed to this national debate. To place their work and that of other biologists and sociologists who follow in context, we will need also to add to the cauldron the writings of historians of sexuality, psychologists, and even the census takers, who tell us just what actual humans do in their daily lives.

The rest of the decade will cer­

tainly prove to be fascinating, and before it is out I am certain we will hear further from both these authors. However much I may disagree with them (or others who for my taste focus too heavily on biology), I look forward to hearing more. The na­

tional renegotiation of sex, gender, and the family is too important to close out a particular viewpoint. So, in the spirit of an earlier revolution from the other side of the world and in celebration of human difference, let a thousand flowers bloom.

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ECOLOGY

ENCOUNTERS CULTURE


The authors set out with the goal of their book stated as discussing the "interfaces of the different aspects of 'ecology'" (p. ix). It is unclear to whom this discussion is geared: bi­

ologists (ecologists in particular?), historians or philosophers of science, or environmentalists. In some ways, the authors seem to attempt to teach some basic concepts and ideas for each of these areas. In others ways, however, they seem to expect the reader to have a good knowledge of the terminology and concepts commonly used in each area. I was glad to have had, along with ecological courses, some coursework in the his­

torical, philosophical, and social discussions. Historians and philoso­

phers, even those with a scientific background, might have problems understanding much of the more scientific discussions (especially those of ecology in Chapters 2 and 3 and health in Chapter 4).

Although both authors call themselves ecologists, they seem to con­

tinually blur the boundaries between what is generally considered ecology and what is considered environ­

mentalism. This seems especially appar­

ent in their discussion in Chapter 1, "What program can ecology set for society?" Much of the discussion centers on what would, especially by ecologists, be considered environ­

mentalism, not ecological science.

The authors provide a com­

prehensive, albeit somewhat disjointed, review of the development of the field from a historical, philosophical, and to some extent scientific perspective. This review should be of interest to ecologists, as well as others interested in the development of...