BIBLIOGRAPHY. A. Elfin Moses and Robert G. Hawkins, *Counseling Lesbian Women and Gay Men: A Life-Issues Approach*, St. Louis: C. V. Mosby, 1982; Robert Schoenberg, Richard S. Goldberg, and David A. Shore, eds., *With Compassion Toward Some*, New York: Harrington Press, 1985; Natalie Jane Woodman and Harry R. Lenna, *Counseling with Gay Men and Women: A Guide for Facilitating Positive Life-Styles*, San Francisco: Jossey-Bass, 1980.

Wayne R. Dynes

SOCIOBIOLOGY

Sociobiology is the study of behavior (in human beings and animals) from the point of view of its evolution by natural selection. The term was popularized in 1975 (the field is sometimes also called "behavioral ecology"). Narrowly, sociobiology has come to mean the study of the "why" questions of behavior: why does a particular species of fish have males that act like females do just before they lay their eggs? Broadly, it can also take in the "how" questions: how do the fish's central nervous system and hormones collaborate to produce this behavior?

Nature and Nurture. There are, of course, other approaches that have been called "biological." To the lay mind, if a trait "is" biological then it cannot be changed; if the trait "is" environmental then it can be. This is a false dichotomy, and is self-contradictory. For example, an "environmental" event like a car accident can have very fixed and unchangeable consequences (such as permanent injury), while a "biological" trait such as the growing of a beard can be routinely overridden by a cultural mandate (shaving). Establishing the steps leading up to a trait helps one to understand the trait and perhaps to change it, regardless of whether the causation turns out to "be" biological, environmental, or some combination. The sizes, shapes, and spatial distributions of footprints are all socially determined within certain limits set by the biology of walking. But if the footprints are in sand, they are easily changed; if they are in wet concrete, they are unchangeable (short of jackhammering) after just a few hours.

Unfortunately, this naive nature–nurture dichotomy has been widely taken up in the social sciences. The most common view is to say that biology has an influence in the womb and very early in life, but that soon after birth the family and society socialize the infant and make the influence of biology negligible. A variation of this view maintains that biology sets the limits but socialization sets the precise outcome. A few social scientists, including a few in sexology, believe so strongly in the power of socialization that they claim that students of behavior should not bother with biology at all.

This point of view is rapidly crumbling, even within the narrow confines of sexology itself. The massive Kinsey Institute study of male and female homosexuality in blacks and whites (Bell, Weinberg, and Hammersmith, 1981) attempted to correlate hundreds of environmental factors (number and age of siblings, childhood rearing practices, social class, and the like) with adult homosexual outcome and came up with almost nothing. They very nearly found that the only powerful predictor of adult homosexuality is childhood gender nonconformity, a finding that has been replicated often, both retrospectively and prospectively. This predictor is so strong that the authors of the study considered it evidence that such nonconformity is closely linked to homosexuality developmentally—i.e., that the commonest type of adult homosexuality is just the adult expression of the childhood nonconforming trait. That is a reasonable conclusion, though one cannot thereby assume that biology has been shown to be the likely cause of sexual **orientation** differences.

Yet sexual orientation does run in families, according to a study conducted by Richard Pillard and James D. Weinrich. If the results are extendible to the population at large, then about 20 to 25 percent of the brothers of gay men are also gay, and 20

to 25 percent of the sisters of lesbian women are lesbian or bisexual. These findings per se do not show the reasons for the trait running in families. But it is interesting that in recent history, social scientists have not conducted studies like this one, even though they would quite properly point out that they would use socialization theory to explain the results.

When homosexuality and biology have been discussed together before the advent of sociobiology, results have been mixed. Alfred **Kinsey** approached homosexuality and biology just as he approached heterosexuality and biology: by considering the natural evolutionary heritage of our species. Heterosexually, he noted that a sense of smell is extremely important in the courtship rituals of many mammalian species, and so he thought it not surprising that some human beings would be sexually excited by particular smells. Likewise, he found sexual activities between members of the same sex to be common enough in other mammals to conclude that homosexuality, too, was within the evolutionary heritage of the human mammal. However, he resisted finer distinctions (might something be natural for mountain sheep but unnatural for human beings?) and seemed to be uninterested in the Why questions, even though he was a well-enough regarded expert in evolutionary biology to write a textbook about it.

Genetic Basis for Homosexuality? The Kinsey group's surveys did, however, find an incidence of homosexuality among men and women that was very high, evolutionarily speaking. This significance of Kinsey's statistics was picked out by the pathbreaking evolutionary biologist G. Evelyn Hutchinson, who read the Kinsey statistic that roughly 10 percent of American males had only or mainly homosexual experience for 3 or more years of reproductive life, and argued that there might be a genetic predisposition to such behavior. This number is evolutionarily extremely large if one assumes that homosexuality is merely an evolutionary "mistake." Had the actual incidence of homosexuality turned out to have been what biologists consider the normal range for evolutionary mistakes—very rare, say one in 10,000—Hutchinson would not have taken note of it, because (rightly or wrongly) he could have assumed that if there were a genetic mechanism promoting homosexuality it was no commoner than any of several genetically transmitted diseases. But 10 percent is at least 100 times as high a level as 1 in 10,000 is, and so Hutchinson had to ask why natural selection would have "allowed" the evolution of a species that had sexual learning patterns in which 10 percent of its male members reproduce at a level significantly lower than they otherwise seemed able to—not because of some incurable defect but because they are not attracted to women. After all, attraction to the opposite sex is one of the first things one might expect evolution to arrange. So if there were any genetic predisposition to even a portion of male homosexuality, then Kinsey's statistics pose a puzzle: how could a genetic mistake come to be so common? Even if one takes an estimate as low as 4 percent, this is still 40 times higher than the highest mutation rates.

Hutchinson's answer was to find the sense in which homosexuality is not an evolutionary mistake, and in following this radical (for 1959) line of thought he showed a preference that was also shared by the earliest sociobiological investigators of homosexuality. When sociobiologists see variation in a trait in nature, they tend to look not for what went wrong, but rather for what went right. In Hutchinson's day, the way to see something "right" in a trait that lowered reproductive success was heterozygote advantage. This was the first in a number of theories developed in an attempt to explain the evolutionary value of homosexuality.

Heterozygote Advantage. This is commonly illustrated in textbooks by the example of sickle-cell anemia, but there is

no reason why the principle has to be illustrated with a disease. The essential point is that sometimes an organism can need two different genes to maximize its reproductive success. Owing to genetic recombination, a parent usually passes only one of these two genes on to any particular offspring, and so only some of that organism's children will get one of each kind of gene (i.e., be heterozygous like the parent), even if both parents have both genes (i.e., are are heterozygous themselves). Some children will get two copies of one and others will get two copies of the other (i.e., they will be homozygous). Natural selection will be unable to eliminate either of the two kinds of homozygote, even if one of them (as in sickle-cell anemia) is extremely deleterious to the carrier's reproductive success, because there is natural selection for heterozygosity.

Hutchinson's idea could be loosely applied to homosexuality as follows. If there were a gene which predisposed its carriers to be heterosexual, and another one at the same locus that predisposed them to be homosexual, and if those who got one of each gene on average raised more children than those who got two of either kind, then there could well be a number of nonreproductive, homozygous individuals who got two copies of the homosexuality-predisposing gene—a number much higher than the levels of 1 in 10,000 or so discussed above, and quite possibly in the 4–10 percent range. So Hutchinson viewed homosexuality not as an out-and-out mistake but perhaps as the inevitable result of selection for heterozygosity in sexual preference.

It was evolutionary biologists John Kirsch and James Rodman who put flesh onto this idea in 1982 by proposing that people with one copy each of the hypothetical homosexuality- and heterosexuality-predisposing genes might be bisexuals with a higher average reproductive success than either the average "pure" homosexual or the average "pure" heterosexual. There are, for example, many societies in which everyone is expected to marry but in which male members are expected to engage in extensive homosexual relationships before marriage (or throughout life). These relationships can be of profound benefit throughout the men's lives. A "pure" heterosexual might have more difficulty forming such bonds, and a "pure" homosexual might have trouble forming a marital bond, and thus both groups might not fare as well reproductively as the man with bisexual potential. How this might apply to societies in which extramarital homosexuality was disadvantageous was not explained in detail.

An entirely different model of homosexuality in sociobiological thought concerns certain so-called "cross-gendered" individuals such as the **berdache** among American Indians, the **mukhannath** (or *khanith*) among the Arabs of Oman, and the hijra in **India**. In certain societies (with endless variation in detail), boys (and sometimes girls) with marked childhood **gender** nonconformity are channeled into specialized adult roles. In the case of berdaches, these specialized positions often combine the roles of drag queen, healer, psychotherapist, and teacher. The theory proposed to account for such people is called kin selection, and in its previous application to insect societies it constitutes one of sociobiology's theoretical triumphs.

Kin selection theory points out that Darwin was wrong when he proposed that, as a result of natural selection, individual animals will act so as to maximize their reproductive success (or RS: the number of offspring one has which survive to reproductive adulthood). Instead, says kin selection, natural selection acts to maximize individuals' inclusive fitness (IF), which is the number of surviving offspring plus the number of relatives' surviving offspring, with each such offspring being devalued by a fraction that reflects the percentage of genes shared

with the individual by direct descent. One's own children are valued at 1, a full sibling's children at 1/2, one's half-sibling's children at 1/4, and so on. Accordingly, some people might maximize their IF even if they have an RS of zero—which means that one can no longer automatically assume that an animal without offspring is acting contrary to how evolution has selected it to act. Accordingly, the homophobes' most smug argument—that homosexual acts are unnatural because they cannot produce children—collapses at its foundation.

In 1976 Weinrich pointed out that this model might be applicable to the cross-gendered berdaches (following suggestions made by Robert Trivers, Herman Spieth, and Edward O. Wilson). For kin selection to take hold and allow the evolution of such reproductively altruistic traits, a certain mathematical relationship must hold between the cost to the individual of not reproducing (the cost measured in terms of lost RS) and the benefit to that individual's kin of having a nonreproducing relative (the benefit likewise measured in RS units). Under some conditions, an individual might reproductively be considered "damaged goods," and thus have a lower than average cost of not reproducing. Under others, an individual might just happen to be particularly gifted in a given society's nonreproductive role, and might thus maximize her or his IF by taking up the role—even if taking up the role would require one to forego personal reproduction.

The damaged goods argument often meets with acceptance, perhaps because it does not challenge the cultural assumption that homosexuality should turn out to be below heterosexuality in some sense. But the special-talent explanation often meets with the following question: if the people supposedly covered by it are so talented, why do they not apply their talents to reproduction?

Berdaches. A good answer to this legitimate (even if unfortunately-phrased) question had to wait until 1987. Recent anthropological research suggests that people like the berdaches are not so much cross-gendered as they are mixed-gendered, and that they serve(d) important roles in their societies as arbitrators in the battle between the sexes. Here, once again, the unique sociobiological perspective (or obsession) of reproductive success steps in with a surprising theoretical argument. If mixed-gender individuals are valuable because they can arbitrate different points of view on gender issues, why is it to the advantage of each side to take the berdaches' advice? Why would they be considered less biased than others in the tribe? If a society is willing to reward them (and their families) for settling gender disputes, arranging marriages, and the like, because they are not particularly biased for or against (say) men who abandon their wives and 20 children or women who cuckold their husbands, it would behoove them not to be men who had abandoned their wives and 20 children themselves or women who had cuckolded their husbands themselves.

Sociobiological theory suggests that these people would in fact be less likely to be biased only if they renounced their sex's point of view, which sociobiologically is seen to result from the different actions each sex is selected to use in its reproductive strategy. If they pursue a nonreproductive strategy, then sexual dimorphism suddenly loses its point, and (according to kin selection) their side in the battle of the sexes would depend not upon their own sex but upon the sex of their relatives. But on average (and certainly on average over time!) one's relatives are about equally divided between males and females. So by renouncing individual reproduction, such people make it possible for their advice in fact to be less biased. This in turn makes their advice more likely to be taken (even if, as is the fate of arbitrators, it is taken grudgingly).

Marriage and Homosexual Behavior. With both the kin selection and

heterozygote-advantage theories in mind, in 1987 Weinrich proposed a new theory that put forth a better evolutionary raison d'être for homosexuality in societies in which everyone is expected to marry. In such societies, sexual attraction is often not high on the list of reasons to marry; pure lust is expected to be gratified in extramarital liaisons or not at all. Ancient **Greece**, modern urban **Mexico**, medieval **Japan**, and the **United States** in several of the past few centuries may well constitute such societies. "Being homosexual" in such a society, as opposed to "being heterosexual," means being inclined to having homosexual relations outside of marriage instead of heterosexual ones outside of marriage. Obviously, this kind of homosexuality can be considered a form of **bisexuality**, and interestingly such a bisexual or homosexual person has two reproductive advantages over a pure heterosexual when viewed in sociobiological terms: he or she would be less likely to have children out of wedlock, and she or he would be less likely to protest a marriage arranged by the parents (i.e., one would be less likely to be already in love with a member of the opposite sex to whom one might have wished to become married). Both of these traits had previously been proposed by sociobiologists as reproductively altruistic acts (in work published before this theory was circulated).

Conclusion. Of course, any sociobiological theory worth its salt must be highly aware of social and environmental influences on the traits being considered, because natural selection is extremely sensitive to the social forces at work in the society which sets the rules. If your society offers no berdache **role**, you can try to improvise one (as modern "drag queens" seem sometimes to do) but it is unlikely that your IF will thereby increase. Sociobiological theories help to explain why imprinting of sexual object choices could have evolved in some species to be fixed (like footprints in concrete) and in others to be easily changeable (like footprints in sand). Indeed, it is even conceivable that "fixed" types may have begun evolving in some societies and "changeable" types in other societies.

BIBLIOGRAPHY. Alan C. Bell, Martin S. Weinberg, and Sue Kiefer Hammersmith, *Sexual Preference: Its Development in Men and Women*, Bloomington: Indiana University Press, 1981; G. G. Gallup, Jr., and S. D. Suarez, "Homosexuality as a By-product of Selection for Optimal Heterosexual Strategies," *Perspectives in Biology and Medicine*, 26 (1983), 315–22; G. Evelyn Hutchinson, "A Speculative Consideration of Certain Possible Forms of Sexual Selection in Man," *American Naturalist*, 93 (1959), 81–91; John A. W. Kirsch and James Eric Rodman, "Selection and Sexuality: The Darwinian View of Homosexuality," in *Homosexuality: Social, Psychological, and Biological Issues*, W. Paul, J. D. Weinrich, J. C. Gonsiorek, and M. E. Hotvedt, eds., Beverly Hills, CA: SAGE Publications, 1982, pp. 183–95; Richard C. Pillard and James D. Weinrich, "Evidence of Familial Nature of Male Homosexuality," *Archives of General Psychiatry*, 43 (1986), 808–12; Michael Ruse, "Are There Gay Genes? Sociobiology and Homosexuality," *Journal of Homosexuality*, 6:4 (1981) 5–34; James D. Weinrich, *Human Reproductive Strategy: The Importance of Income Unpredictability, and the Evolution of Non-Reproduction*, Ph.D. thesis, Harvard University Department of Biology, 1976; idem, "Is Homosexuality Biologically Natural?" in W. Paul, et al., op cit., pp. 197–211; idem, "A New Sociobiological Theory of Homosexuality Applicable to Societies with Universal Marriage," *Ethology and Sociobiology*, 8 (1987), 37–47; idem, *Sexual Landscapes: Why We Are What We Are, Why We Love Whom We Love*, New York: Charles Scribner's Sons, 1987.

James D. Weinrich

SOCIOLOGY

The term sociology was coined by Auguste Comte in 1836. Since his time sociology has developed into a major discipline, with particular resonance in English-speaking countries.

Yet academic sociology is in some respects a codification of knowledge that