

Current Comments®

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Is Homosexuality Biologically Determined?

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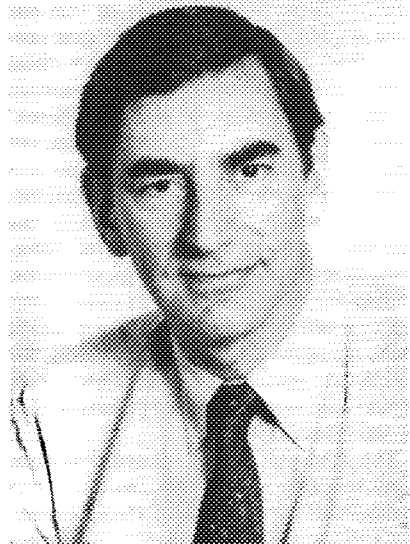
May 25, 1992

An article in *The Philadelphia Inquirer*¹ about the book *Being Homosexual*,² by Richard A. Isay, a New York psychiatrist and psychoanalyst, led to my reading this short volume. It is a remarkable review of the subject by a physician specializing in treating homosexual men and should be read by anyone with an interest in the subject.

Several years ago, a geneticist colleague expressed the belief that sexuality is "biologically determined" and suggested I write an essay on this topic. I've been working on it since then, but Simon LeVay's recent report in *Science*³ has catapulted the idea into greater public awareness. John Maddox, in his inimitable fashion, asked in *Nature* "Is homosexuality hard-wired?"⁴ Earlier work by D. F. Swaab in Amsterdam, in *Brain Research*,⁵ showed that the suprachiasmatic nucleus of the hypothalamus is larger in heterosexual men than in homosexual men.

We reprint below an interview⁶ with Rockefeller University scientist Bruce McEwen whose research with laboratory animals points to a link between the effects of sex hormones on the brain and sexual motivation. As McEwen notes, knowledge about sexual differences can be important in the diagnosis and treatment of various diseases.

The phrase "biologically determined" can be interpreted in many ways. Homosexuality may be the result of some alteration in the chromosomes that determine sex. Or, there may be a shift in the fetal endocrine balance as a result of environmental stress in the pregnant mother. But, whatever the reason, most male homosexuals appear to be "constitutionally" gay, and they become



Richard A. Isay

aware of their "differences" at a very early age.

Traditionally, twin studies are used to establish a genetic basis for any trait. However, there are only a few reports of monozygotic twins who were raised separately being gay. These studies cannot be considered conclusive. It will require more data from larger studies to support these preliminary findings. A recently published paper by J. Michael Bailey (Northwestern University) and Richard C. Pillard (Boston University)⁷ lends support to a genetic cause. They conducted a two-year study of 56 homosexual identical and 54 fraternal twin brothers, as well as 57 adoptive brothers. Fifty-two percent of the identical

twin brothers of gay men also were gay, as against 22 percent of nonidentical twins and 11 percent of the adoptive, genetically unrelated brothers. They summarized their study in *The New York Times* Op-Ed section for December 17, 1991,⁸ followed by a letter to the editor by Bailey on February 1, 1992.⁹

Lack of Studies

During the years I've followed this topic, I have been disturbed by the lack of explicit studies designed to expand our knowledge on these matters. With all that has been written on sexuality in the past century, from Freud to Kinsey, why is there still so much unknown about the question of biological origins of sexual patterns? Incidentally, it was Freud who pointed out that many great historical figures were homosexuals, such as Plato, Michelangelo, and Leonardo da Vinci. Oddly enough, the gay community has not been all that interested in the question of biological origins. Perhaps it is thought that the "constitutional" theory could mark gays as "diseased" rather than normal but different. Alternatively, the community may be understandably preoccupied with more immediate problems, such as the spread of AIDS.

The dominant psychoanalytical view of homosexuality in the 1960s and 1970s was symbolized by the work of Irving Bieber. His 1962 book, *Homosexuality: A Psychoanalytic Study of Male Homosexuals*,¹⁰ summarizes the more than 50-year-old psychoanalytic view of homosexuality. Indeed, until 15 years ago, the American Psychiatric Association classified homosexuality as a disease.

From 1 to 5 percent of the world male population is estimated to be "constitutionally" gay. And, another 10 percent is thought to be bisexual in practice if not by biological "inclination." The term "inclination" is important because an individual's social and cultural environment presumably influences how or even whether sexual orientation is expressed, regardless of genetic variation or prenatal influences. If one accepts the premise that homosexuality is predetermined, then it is understandable why efforts to suppress its occurrence—repress-

sive laws, religious proscriptions, and psychotherapy—have failed. According to Isay, the taboos and suppression of homosexuality cause some gay men to express their anger in antisocial or defiant behavior.

Parental Angst

The prevalent mythology has it that the behavior of one or both parents may be the primary cause of homosexuality. As a close friend once asked me: "What did I do to 'make' my son gay?" Thousands of loving, caring, parents must painfully reexamine their behavior in the wake of theories that homosexuality may be linked to domineering, neglectful, or abusive parental behavior in early childhood. As Isay points out, most fathers prefer their other children to an unconventional male child, withdrawing from the relationship. Or, they feel threatened by the child's desire for closeness and withdraw for this reason. And, he adds, in the case of a typical male homosexual child, the "competition" for the affection of the father may add painful stress to the mother/child relationship.

Isay provides dozens of case histories that dramatize the need for a new way of thinking about homosexuality. It is imperative that we find methods for identifying gay inclinations at an early age and sensitizing parents to what this means. Perhaps these children can be spared the alienating burden of making the discovery alone by counseling parents not to be rejecting but to be affirming and supportive. How this information will be used in each individual case needs to be the subject of ethical discussion, in private and in society.

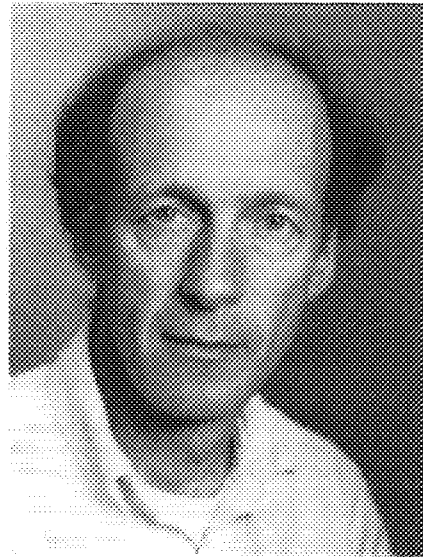
Although centuries-old hostility against homosexuals has been reduced in many religious groups, it is evidently still difficult to obtain recognition of the need for early identification and acceptance. Early identification might encourage some to engage in homosexual sex earlier. But the pressures to remain heterosexual in this society are still so strong that making the voluntary choice of homosexuality is unlikely to occur even with bisexuals, most of whom choose "conventional" heterosexual lives. In communities where homosexuality is acceptable behavior and the individuals in-

volved are not stigmatized for their choice, the problem may be moot. But even in San Francisco, the symbol of large and open homosexual communities, there are still tensions between gay and "straight" groups. In the short term, the majority view of homosexuality as an unacceptable life-style will discourage the implementation of such identification and counseling programs. However, I believe public opinion will change about homosexuality, and programs will be widely adopted.

Biological Inclinations: What We Know

On Tuesday, August 27, 1991, Irving Bieber died at the age of 80.¹¹ Ironically, two days later, on the front page of *The New York Times*, Natalie Angier reported the work of Simon LeVay et al.,¹² mentioned at the outset. LeVay is a self-acquainted homosexual and world-class scientist associated with the Salk Institute in California. His study reports a link between the size of nuclei in one part of the hypothalamus and homosexuality. The publicity of this report reflects, I believe, the widespread desire for better understanding of these phenomena. LeVay and others have been interviewed on numerous television programs, including the Phil Donahue show. Incidentally, Donahue, I thought, demonstrated considerable understanding of the issues and called for more research.¹³

Nevertheless, the evidence concerning genetic or prenatal determinants to sexuality is still inconclusive. Current informed opinion sees no conflict between the "nature" and "nurture" theories of behavioral development—that we are born with various dispositions which are conditioned by experience. However, biomedical research on sexual orientation, for all intents and purposes, has been taboo until recently. Louis Sullivan's recent cancellation of the survey of sexual attitudes, under pressure from the White House, was a travesty. Let us hope the unspent funds (\$17 million) will be used to expand basic studies on the origins of sexual preferences. Of course, informed and reasonable people do not need biological data to be tolerant of alternate life-styles or cultures.



Simon LeVay

The work of LeVay, Bailey and Pillard, D.F. Swaab in Amsterdam, and others, gives us hope that the National Institutes of Health and other research agencies will be more disposed to support research on all aspects of this question. These initial indications that homosexuality may, in fact, be determined, either before birth or in early pregnancy by a combination of influences, indicates the need for widespread discussion. The implications of early recognition of many genetic variations, including sexuality, are important areas for discussion.

My concern is not only for the difficult choices and social conflicts endured by the minority with genetic or other biosexual determinants. It also embraces the pain of their parents who, for generations, have been the inadvertent victims of "classical" but misguided psychoanalytic dogma, illustrated by Bieber's theories. Isay's recent review of the problem provides a more reasonable approach.

One can only welcome the salutary remark of a gay person reported by Angier—that scientific evidence, like that of LeVay, and of Bailey and Pillard, is wanted by the gay community. This is quite contrary to what many, including myself, had assumed.

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Sex and the Single Brain

(An interview with Bruce McEwen on differences
in our most complicated organ)

By Susan Blum

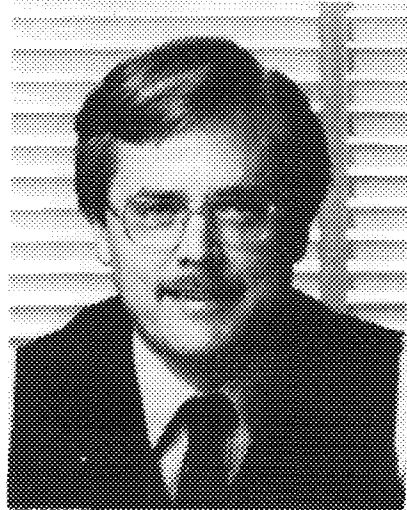
Is anatomy destiny?

Freud thought so. Determined by the most basic physical differences between men and women, the destiny posited by the Viennese psychiatrist reflected (and helped reinforce) repressive societal notions of "proper" roles for the two different sexes.

After holding sway for almost a century, Freud's theories gradually fell into disrepute, replaced by the idea that destiny is determined by social rather than biological factors. Now the theoretical pendulum is swinging again—though this time not so widely.

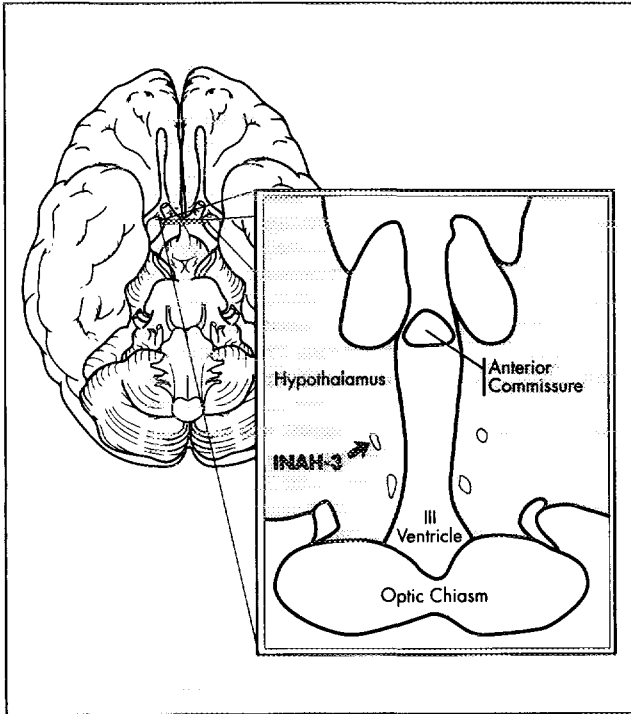
Recent studies have reopened the question of biology's influence on behavior. But rather than emphasizing differences in the sex organs per se, as did Freud, these modern-day studies focus on the brain, an organ that is turning out to differ according to sex—and, perhaps, even to sexual preference.

Still controversial, and ringed with caveats, the current studies exploring possible links between brain and behavior are conducted with a much more sophisticated understanding of the molecular underpinnings of anatomy, and a much greater awareness of the social, environmental, and idiosyncratic factors that also affect behavior.



Bruce McEwen

Within this subtler context, the new studies hold the potential to liberate rather than repress. A case in point is the research of Simon LeVay, a neurobiologist at the Salk Institute who found that an area of the brain is different in homosexual and heterosexual men.



The hypothalamus, located deep within the brain, is a region involved in controlling sexual behavior. A recent study reported that a nucleus in the hypothalamus, the interstitial nucleus of the anterior hypothalamus-3 (INAH-3), is larger in heterosexual men than in homosexuals.

LeVay's report appeared in the journal *Science* last fall. According to Bruce McEwen, a Rockefeller scientist who studies the effect of hormones on the brain, "the immediate significance of the report was more political than anything else. It let people in the gay community say, 'look, this is a biological feature of who we are.' When there is a possible biological substrate, it makes a difference in people's attitudes."

Though the political implications of the study may be clear, the scientific ramifications are not. As the author of the report himself points out, the findings raise many more questions than they answer. For instance, are the differences in the brain region a cause or a consequence of homosexuality? What might account for the anatomical differences? And how might these differences actually be affecting behavior?

There are many intriguing hints, but no solid answers. The area under consideration is a region known as the interstitial nucleus of the anterior hypothalamus-3, or INAH-3. In LeVay's studies, autopsies showed

that the INAH-3 was more than twice as large in heterosexual as in homosexual men. Previous studies had already shown this area to be more than twice as large in heterosexual men as in women.

What might be influencing the size of the INAH-3? McEwen reports that a similar area, or nucleus, in the rat hypothalamus is affected by sex hormones. "By analogy to the rat, we can say it is possible that hormones are at work in this part of the human brain, but we just don't know yet," he says. Should hormones be shown to be involved in the human brain, he adds, there will still be many more questions than answers. "Numerous studies have shown that the blood levels of hormones are the same in heterosexuals and homosexuals. So what would account for the different hormonal effects in the brain? They would have to be very localized, and, perhaps, limited to a very short time period during prenatal development or in childhood."

Questions of fundamental causation aside, how might the INAH-3 be affecting behavior? McEwen explains that in animals

such as monkeys, levels of sex hormones are important in sexual motivation—that is, in deciding and then demonstrating who is an appealing mate. “We call this aspect of behavior ‘proceptivity,’ ” McEwen explains. “In animals, it is related to behaviors that lead members of the opposite sex to become interested in one another.”

In rats, the region similar to the INAH-3 is normally larger in males than in females and is one of the nuclei in the hypothalamus known to regulate typically “male” and “female” sexual behaviors. McEwen speculates that the INAH-3 may play a similar role in humans. He cautions, however, that the region—no bigger than a grain of salt—is probably not solely responsible for sexual motivation. “If you make a lesion in the equivalent area of a rat’s brain, there is no change in the rat’s sexual behavior. Only when the lesion is much larger do you start to see disruptions. This has been a problem in rat studies, and it’s a problem when you start to think about humans, too. Of course, no one makes experimental lesions in human brains, so we may never know exactly what the INAH-3 does.”

Sexual motivation is just one of the complex behaviors that might be mediated by sexually determined differences in brain structure, known as sexual dimorphisms. Learning abilities, verbal and spatial skills, and propensities for particular mental and neurological disorders may all reflect hormonally influenced anatomical differences that develop prenatally or early in life.

In humans, the most commonly studied dimorphic structure is the corpus callosum, a bundle of nerve fibers connecting the right and left cerebral hemispheres. Studies have shown that regions of this structure are different sizes in men and women. Scientists speculate that these differences may relate to differences within the cerebral cortex, the brain region responsible for integrating information, and may help account for the fact that, on average, women are more skilled at verbal tasks, while men do better at spatial ones.

Other studies have pointed to hormonal fluctuations that can influence adult brains. For instance, research in McEwen’s lab has

shown that during the rat’s estrous cycle there are changes in nerve cell interconnections in the hypothalamus and in the hippocampus, a brain region involved in learning and memory. And researchers elsewhere have found that performance on tests of spatial ability varies with hormonal fluctuations. Men tend to do better on the tests in the spring, when their testosterone levels are lower, than they do in the fall when their testosterone levels peak. Women’s test performance fluctuates more frequently, peaking each month during the part of the menstrual cycle when estrogen levels are lowest. Women also produce testosterone—though not as much as men—and those with the highest testosterone levels do best on the tests.

McEwen points out that knowledge about sexual differences can be important in the diagnosis and treatment of disease. Males, for example, have a fourfold higher incidence of dyslexia and learning disorders, and recover more slowly from some kinds of strokes than do women. Understanding how their brains differ from those of females may improve treatment prospects for these conditions. On the other hand, estrogen makes women more susceptible to the effects of certain neuroleptic drugs, such as those used to treat schizophrenia. A greater focus on this difference might lead to better therapeutic regimens for women, who suffer more severe side effects from the drugs than do men.

Though discoveries about sexual dimorphism in the brain must not be dismissed, they must never be used to legislate, McEwen asserts. “It would be absurd to say, ‘Let’s only let men be map readers for the military because they’re good at spatial relationships, and let’s only let women give speeches because they’re better verbally.’ You have to look at individual capabilities, which vary over a wide range,” he insists. Moreover, he adds, inherent differences may well be overcome by training, encouragement, and experience.

“Anatomy is not destiny,” McEwen sums up. “It may sometimes bias, but it never determines.”