

# Homosexuality in Twins

## A Family Study and a Registry Study

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IN THIS PAPER, we will report briefly on a series of male twins where at least one of each pair was homosexual. One object is to report the number of concordant and discordant, monozygotic (MZ) and dizygotic (DZ) pairs observed. A second object is to examine the frequency of homosexuality in twins per se. One of the twin pairs was from a family deserving special attention. Among 14 siblings, there were three sets of male MZ twins. Two of these three sets of twins were concordant for homosexuality; in the remaining pair both twins were heterosexual. The results of our study of this family will be presented in detail.

The use of twin studies as a means of disentangling some of the interaction of nature and nurture is sufficiently well known for it to be unnecessary to give any elaborate explanation here.<sup>1,2</sup> Briefly, differences in MZ pairs provide evidence as to environmental effects. The comparison of resemblance in MZ pairs, who are genetically identical, with that in DZ or genetically dissimilar pairs can provide evidence as to the likely importance of heredity.

### Previous Twin Studies of Homosexuality

We will begin with a short though comprehensive survey of the findings as regards male homosexuality in other series of twins. The largest and best known study is that of Kallmann.<sup>3</sup> He reported 100% concordance in 37 adequately investigated MZ pairs.

Submitted for publication July 5, 1967.

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The corresponding rate of 12% in 26 DZ pairs was considerably lower. Kallmann drew attention to the difficulties of investigating homosexual behavior. Of necessity he had to rely upon the sometimes reluctant aid given by psychiatric, correctional, and charitable agencies and by contacts with the clandestine homosexual world. Such sources may have made it more difficult for him to study co-twins who were normal than those who were homosexual. Further, he tried to restrict his index cases to persons who were predominantly or exclusively homosexual and who were over the age of 30. For these reasons Kallmann later<sup>4</sup> (p259) regarded as a "statistical artifact" the 100% concordance rate in MZ twins. In 1953<sup>5</sup> he reported a pair of MZ twins in which one twin was schizophrenic and homosexual and the other neither schizophrenic nor homosexual.

Earlier, in a series of criminal twins, Lange<sup>6</sup> found two who were homosexual. In one pair both MZ twins were homosexual, in the other pair one twin only. In the latter pair the homosexual twin had been brain damaged. Sanders<sup>7</sup> reported concordance in five of six male MZ pairs. The only DZ pair was discordant. The fact that only one DZ pair was reported raises doubts as to whether the sample was representative. Habel<sup>8</sup> found concordance in three of five MZ pairs and in none of five DZ pairs. The homosexual index twins had been found in a German prison population. He drew a distinction between "genuine" homosexuality and "pseudohomosexuality."

Koch,<sup>9</sup> in the course of a good recent review of the topic, reported his own findings as regards homosexuality when he followed up, after 25 years, 495 pairs of nonpsychiatric, nondelinquent German twins. In this unselected series he found one female

MZ and one male DZ twin who was homosexual, both pairs being discordant in this respect. The two male twins in Parker's London series,<sup>10</sup> which was based on the Maudsley Hospital Twin Register, 1959-1961, form part of the wider series to be reported in the present paper.

Besides the above series of twins, single discordant pairs of male MZ twins have been selected for special investigation by Rainer et al<sup>4</sup> and Klintworth.<sup>11</sup>

Though Kallmann's study overestimated the resemblance generally found in MZ pairs, it appears from the literature that MZ twins are significantly more often alike as regards male homosexuality than are DZ pairs. There is therefore *prima facie* evidence of the relevance of genetic factors. An alternative explanation, namely that monozygotic twinning itself predisposes to homosexuality, will be discussed later.

### The Maudsley Twin Register

Since 1948, all patients admitted to the out-patient or inpatient services at the Maudsley Hospital, London, have been asked whether they are one of twins. All such twins ascertained who have twin partners of the same sex are enrolled on the Maudsley Twin Register, which is maintained by the Psychiatric Genetics Research Unit. The twin pairs are then further investigated by unit research workers. It should be emphasized that the series of twins is unselected as regards concordance and zygosity. Diagnostically, the probands appear to be representative of Maudsley patients as a whole. The Hospital Triennial Reports<sup>12</sup> and more detailed analyses made in the unit<sup>13</sup> have not shown an excess of twins or a relative excess of MZ over DZ pairs. The register has supplied material for several studies of twin pairs in various diagnostic groups<sup>10,13-15</sup> as described by Shields.<sup>16</sup>

This report covers the male homosexual twins on the register as of July 31, 1966. The proband twins were examined as psychiatric patients. They and their co-twins were further assessed at various times through personal interviews and also, latterly, by means of psychological tests of intelligence (Dominoes; Mill Hill Vocabulary Scale, Senior) and personality (mostly the Maudsley Personality Inventory [MPI]). Usually supplementary information from doctors, hospitals, family members, or other such sources was obtained. Blood samples and fingerprints were taken if needed to establish the zygosity of the twins.

One of the subjects entering this series was from the unusual family mentioned above. Before considering the series as a whole, we will present this family.

### The Family

The family had its roots in a notoriously poverty stricken area of a large city. The father and mother, both white and nominally protestant, grew up, married, and established their own home in the same area. There were no twins in the family of either. At the time of their marriage, the father was a 22-year-old dock laborer, the mother 21 and a shop girl. Over the next 20 years they had 14 children, all of whom survived. The age and sex composition of the family is presented in Table 1.

The father, a heavy drinker, worked irregularly as a casual laborer on the waterfront. The mother remained in the home. The family was poor and was usually partially dependent on the rudimentary social services of the day.

After 25 years of the marriage, the father was forced out of the home by the two oldest boys who were bolstered by social service agencies and finally the police and courts. None of the family members had further contact with him and indeed, most were not sure if he was alive or dead.

After the father left, the mother maintained the home and has remained in close contact with the children. However, the family was completely disrupted by World War II. The older children went into the armed services or war work and the younger were evacuated to foster families in rural areas in order to escape aerial bombing (as were most youngsters in the community).

After the war, the family reassembled in the same city; but by this time most of the older children had established their own homes and the younger ones were to do so within a few years. Later on, 9A moved to the London area.

### Methods

The father, mother, and 13 of the 14 sibs were interviewed by a psychiatrist (L.L.H.) for at least one hour. Each of the twins was interviewed at least twice. Sufficient rapport was established with all of these persons, except the mother, to allow questions regarding sexual activity and inclinations. Excepting 2B who refused to complete printed tests or be fingerprinted but who did cooperate in all other ways, the twins were investigated according to the standard procedure described above.

**Zygosity and Laboratory Findings.**—The zy-

Table 1.—The Family

	Age	Sex	Age at Marriage	Children	Occupation	Psychiatric Disorders
Father	77	M	22	14	Dock laborer, ret.	Alcoholic, sociopathic, severe
Mother	76	F	21	14	Housewife	Passive personality, moderate
Sibship						
1	54	F	26	1	Family business	None
2A*	52	M	24	3	Typesetter	None
2B } Twins	52	M	23	1	Machinist	None
3	49	M	27	2	Foreman, factory	None
4	46	M	23	2	Harbor pilot	None
5	44	F	24	2	Family business	Refused interview, considered normal
6	43	M	30	3	Foreman stagehand	None
7A }	40	M	—	—	Cruise director	Homosexual; depression, mild
7B } Twins	40	M	—	—	Headwaiter	Homosexual; depression, moderate
8	39	F	25	2	Housewife (husband PhD scientist)	Depression, severe
9A† }	37	M	—	—	Record librarian	Homosexual; depression, moderate
9B } Twins	37	M	—	—	Plumber, self-employed	Homosexual; depression, mild
10	35	M	25	2	Truck driver, small contractor	None
11	34	M	23	2	Route salesman	None

\* The A twin was the first born in each pair.

† Proband.

gosity of the twins was determined by inspection and by interpair resemblance in fingerprints, blood groups, and plasma proteins. There was nothing in the appearance of the twins to suggest that any of the pairs was dizygotic, and the blood chemistry determinations revealed no intrapair differences in any of the 16 established genetic polymorphisms<sup>17</sup> that were investigated in the family. At ten loci the parents and their children were identical—the genes involved did not segregate. The findings with respect to the six independent polymorphisms in which the genes did segregate are displayed in Table 2. These segregating genes, together with information from the fingerprints, allow calculation of the probability of the twins being MZ or DZ. The steps in this calculation are shown in Table 3, following the method of Smith and Penrose.<sup>18</sup> The odds assigned to likeness in the blood group<sup>19</sup> and plasma protein systems<sup>20</sup> were derived from known genetic ratios, while the relative chance of observed differences in the fingerprints was calculated by the method of Slater.<sup>21</sup> The final probability of monozygosity was: 2A and B, 0.991; 7A and B, 0.999; and 9A and B, 0.999.

A karyotype was prepared from a white blood cell (WBC) culture from 7A and was normal. It was highly unlikely that any of the children were illegitimate. There was no indication of any relationship between the investigated genetic polymorphisms and twinning, homosexuality, or enuresis.

### Interview Results

**The Father.**—This man was unanimously condemned by his wife and children. He drank heavily two or three nights per week and as often would beat the mother severely. The children were infrequently beaten but were often punished with unreasonable severity; ie, being tied to a bed for several hours. They were also threatened with even severer punishment, sometimes death. One son (No. 6), recalled father pinning him in a corner with a chair, taking out a knife and saying, "I am going to kill you—right now." Several of his children reported that they still felt fearful when talking about him, recalled hiding from him, even sleeping out all night in order to avoid him.

When interviewed, he was 77 years old, living alone in one cluttered room, and supported by a pension. He felt that he had been unjustly deserted by his family. His wife had manipulated him by threatening suicide whenever disagreements arose. Her lack of cooperation had driven him to heavy drinking and occasionally he had been forced to handle her roughly. Mention of his children evoked no evidence of feeling or interest. No evidence of significant cerebral impairment was noted. He denied homosexual experiences.

Table 2.—Segregating Genetic Polymorphisms\*

	Sex	Blood Groups				Plasma Proteins	
		ABO	MNS	Rh	Duffy	Haptoglobin	Phospho- glucomutase
Father	M	B	MsMs	R <sub>1</sub> r	a-b <sup>+</sup>	2-1	2-1
Mother	F	O	MSNs	R <sub>1</sub> r	a <sup>+</sup> b <sup>+</sup>	2-2	2-1
Children							
1	F	O	MSMs	R <sub>1</sub> r	a <sup>+</sup> b <sup>+</sup>	2-1	2
2A & 2B	M	B	MSMs	rr	a <sup>+</sup> b <sup>+</sup>	2-2†	1
3	M	O	MSNs	rr	a <sup>+</sup> b <sup>+</sup>	2-1	1
4	M	B	MSMs	R <sub>1</sub> r	a-b <sup>+</sup>	2-2	2-1
5	F	B‡	—	rr‡	—	—	—
6	M	B	MSMs	R <sub>1</sub> r	a-b <sup>+</sup>	2-1	2-1
7A & 7B	M	B	MSMs	R <sub>1</sub> r	a <sup>+</sup> b <sup>+</sup>	2-1	1
8	F	O	MSMs	R <sub>1</sub> R <sub>1</sub>	a <sup>+</sup> b <sup>+</sup>	2-2	2
9A & 9B	M	O	MSMs	R <sub>1</sub> r	a-b <sup>+</sup>	2-2	2-1
10	M	B	MSMs	R <sub>1</sub> r	a <sup>+</sup> b <sup>+</sup>	2-2	2
11	M	B	MSMs	rr	a <sup>+</sup> b <sup>+</sup>	2-1	2-1

\* Both parents and all sibs were: P<sub>1</sub>, Lu(a-), K-, Le(a<sup>+</sup>b-), Xg(a<sup>+</sup>), Do(a<sup>+</sup>), transferrin C, red blood cell acid phosphatase B, 6-phosphogluconate dehydrogenase A and adenylate kinase 1.

† 2A only. No haptoglobin was detected in 2B's sample.

‡ Stated by subject.

Antisera used: Anti-A, -A<sub>1</sub>, -B, anti-A<sup>+</sup>B, anti-M, -N, -S, -s, anti-P<sub>1</sub>, anti-C, -C<sup>W</sup>, -c, -D, -E, -e, anti-Lu<sup>a</sup>, anti-K, anti-Le<sup>a</sup>, -Le<sup>b</sup>, anti-Fy<sup>a</sup>-Fy<sup>b</sup>, anti-Xg<sup>a</sup>, anti-Do<sup>a</sup>.

Table 3.—Zygosity Probability Calculation\*

	Pair 2	Pair 7	Pair 9
1. Relative odds in favor of dizygosity (Dz:MZ)			
In twins in general			
Initial odds (70:30)	2.3333	2.3333	2.3333
Like-sexed twins (0.5:1)	0.5	0.5	0.5
In twins with observed resemblance in fingerprints (from Slater <sup>21</sup> , 1963)	—	0.0173	0.0322
In this family, given twin A of pair:			
Twins alike in ABO blood groups	0.5	0.5	0.5
Twins alike in MNS blood groups	0.5	0.5	0.5
Twins alike in Rh blood groups	0.25	0.5	0.5
Twins alike in Duffy blood groups	0.5	0.5	0.5
Twins alike in Haptoglobin	—	0.5	0.5
Twins alike in Phosphoglucomutase	0.25	0.5	0.5
Product of independent odds (total relative chance, pD, in Smith-Penrose terminology)	0.00912	0.000158	0.000685
2. Probabilities (total chance, in Smith-Penrose terminology):			
That twins are dizygotic pD/(1 + pD)	0.00904	0.000158	0.000587
That twins are monozygotic 1/(1 + pD)	0.991	0.999	0.999

\* Based on the method of Smith and Penrose.<sup>18</sup>

**The Mother.**—This woman was 76 years old when interviewed. She was highly regarded by her children, although, several suspected that she had exaggerated the injuries she received from her husband and a succession of minor medical ailments. When interviewed, she appeared ill at ease and gave "yes-no" answers to most questions. She had remained with her husband because of her fear—"he could always find me"—and only took a firm stand when her oldest sons were able to protect her. She

had often felt like committing suicide and threatened her husband with this. She felt that she had insufficient time to spend with her children because there were so many. However, she loved them all from the time they were born, had no particular favorite, and none were especially troublesome. All the children were dressed and reared in accordance with their biologic sex. She controlled the children by exhortations: she could not bring herself to spank them. Her children feel that she was a warm loving

woman who had some minor failings, but who did her best in the most difficult circumstances.

**The Heterosexual Children.**—All of these persons described themselves as being unhappy as children, citing the father's cruelty and the family's poverty. Several (No. 3, 4, 8, and 10) were enuretic until early adolescence. As the family grew, considerable responsibility for the younger children was assumed by those who were older. One of the older twins (2A) had been deliberately assuming the role of father to the seven youngest children during the last year the father was in the home. He is still affectionately referred to as "Pa." His twin carried out more feminine chores in the home, such as shopping and child care. Both 2A and his twin have been exclusively heterosexual and there was no evidence of significant psychiatric disorder.

One woman (No. 5) refused the interview, pleading lack of time. (This was probably realistic.) She was married and working successfully. Some information was obtained through telephone contact. She was regarded as psychiatrically normal.

Another woman (No. 8) had suffered intermittent depressions. After her last pregnancy (seven years past), she felt depressed with prominent hypochondriacal symptoms and seriously considered suicide. When interviewed, she felt dissatisfied with her role as housewife in which she was "vegetating."

**Homosexual Twin Pair 7A and 7B.**—These twins were 40 when interviewed. Both held junior executive positions in entertainment and recreation business.

Following a normal gestation period, these twins developed normally in relation to the usual landmarks. The eldest, 7A (by 20 minutes) and the heaviest (5¾ lb, one quarter pound heavier) was the more active and aggressive. From an early age, the twins preferred to play separately and were seldom in each other's company. However, A added that they stuck together in any adverse circumstance. Like their siblings, they remember their early years as unhappy, because of poverty and fear of their father. Both describe their mother as "wonderful," but B felt she did not have enough time for them. Neither felt they were overprotected or specially treated in any way. Both were

enuretic for many years, A to age 10, B to age 12. From ages 8 to 10, they were in separate homes. B remained with the mother, while A lived with a neighboring family, who had taken a liking to him. A remembers these two years as being especially happy. During this period, B began secretly donning female clothing and applying mascara and lipstick. This practice gave him a "thrill" and continued for about a year. During a six-month period, starting at about 12 years, B began to have vivid dreams of himself in the mother-wife role in a family. His husband was a powerful, unrecognizable man, who periodically "enveloped" him. His twin denied corresponding experiences.

By age 14, when they left school, both realized that they were unlike other boys. They disliked rough games, were effeminate in speech and gesture, felt neutral toward females, and positively attracted toward males. B, still slightly smaller and now the more effeminate, began working as a waiter in a night club. Shortly afterward, he began a series of casual homosexual encounters. He was rejected for military service because he acknowledged his homosexuality. His twin had no overt sexual activity until he entered the navy at age 17. After a few brief homosexual affairs and two unsuccessful attempts at heterosexual relations, A developed an intense attachment for a fellow sailor, who has lived with him as his homosexual partner for 20 years. He felt that this prolonged affair was exactly analogous to heterosexual marriage. A acknowledged episodes of moderate depression attributed to fear of being exposed as a homosexual and regret that he would never have a family and children. Otherwise, he felt quite content with his life.

B also had only one homosexual partner, whom he met during the period when his twin was in the navy, and with whom he has lived ever since. However, B sometimes finds pickup partners at homosexual parties. Like his twin, B has been subject to depressions and he cited the same reasons. However, B has been more severely affected. At age 35, he sought psychiatric treatment and attended a few group meetings. He was regarded as suffering from an anxiety state with secondary autonomic accompaniment: he did not reveal his homosexu-

ality. Although he has never felt as if he might commit suicide, he would welcome some fatal calamity.

The strikingly similar pattern of homosexual behavior developed in these twins entirely independently. During the time period when they found their separate partners, A was in the navy. He did not return home during this period and he and his twin did not exchange a single letter. Each was ignorant of his twin's homosexuality until about ten years after A's Navy service when they confided in each other.

The interviews with these twins elicited no evidence of psychiatric disorder other than homosexuality although both had histories of depression. Both had learned to disguise their feminine mannerisms through strenuous effort, A more successfully than B. Both denied sexual contact or feeling toward their co-twin. They were of high normal intelligence with A slightly the brighter. A, with a score of 24 was considerably less neurotic than B, who scored 36 on the MPI.

**Homosexual Twin Pair 9A and 9B.**—These younger twins were 37 when interviewed. Their birth and early developmental history was unremarkable. Although their exact birth weights were unknown, their mother thought they were about 6 lb and nearly equal in weight. Through their early years, they came to avoid each other's company because, according to A, "We were shown off together, were expected to be together, and we resented this."

The twins lived in the family home until age 10, when they were evacuated to different foster homes at the start of World War II. Up to this time, and for another year, both twins were enuretic.

During the period in the foster family, A was befriended by a 35-year-old man, who lived in the home. This man was "kind" and "gentle," and was "the only father I had ever known." His benefactor seduced A and the two began a homosexual affair which continued for six months. During the same period, his twin was living in a nearby home with several other boys. He was forced into homosexual acts by some of the older boys.

After four years in foster homes, the twins returned to their mother and discontinued all sexual practices except masturba-

tion. Neither knew of the other's homosexuality and, although both were suspicious, they were not certain at the time of this investigation.

At age 17, both went into military service and were posted to different overseas stations. Both resumed homosexual practices and both had sporadic heterosexual affairs, which neither found satisfactory. Of the pair, B was the more active heterosexually and at age 33 was engaged to marry. He felt he could tolerate marriage and wanted children; however, he could not explain his periodic lack of sexual interest to his fiancée, nor his being so often out at night with men and he broke the engagement. He felt that he could not in good faith marry a normal woman, although he had not ruled out the possibility entirely. His twin's heterosexual activity had been almost entirely with prostitutes "to see if I could enjoy it." He derived little satisfaction from this and had stopped all contacts several years before.

This pair of twins had frequent homosexual relations with several partners. Both acted as fellators. A associated with casual pickups, many of whom he paid, while B had several men, "old friends," whom he "dated." Most of the latter men were married. Neither would consider living with a man as 7A and 7B did and both preferred nonhomosexual sex partners. Like their older twin brothers, this pair denied any sexual contact or feeling for each other and reported the idea as distasteful.

Both twins felt mildly depressed and anxious most of the time with occasional exacerbations. They separately ascribed these feelings to fear of exposure as a homosexual, and their inability to found a family. A was much the stronger in his expressions of depressed feelings and added that he often felt shame and disgust after a homosexual act. A sought psychiatric treatment for his homosexuality. At 36, after coming to London, he had a few psychotherapeutic interviews privately, then was referred to the Maudsley. He rejected the offer of aversion therapy. When seen for the present investigation six months later, there was no evidence of psychiatric disorder in either twin other than homosexuality with secondary depression. A had slightly more effeminate mannerisms than B, although neither was

striking in this respect. However, when A was more obviously depressed and was seen at the Maudsley, he was described as very effeminate. Psychological tests show the twins to be in the bright normal range with B slightly more intelligent.

A, who had changed jobs several times, felt less successful vocationally than B. B found considerable satisfaction in his work.

### Comments on the Family

The salient feature of this family's history is the concordance in sexual behavior of the three sets of MZ twins and especially the concordance of the two sets of homosexual twins. It is also notable that, in agreement with Slater's findings,<sup>22</sup> the latter twins came late in the birth order and that the mother's age (35 for the first set) was relatively advanced. This evidence suggests a genetic vulnerability to homosexuality, possibly operating through fresh gene mutations or chromosomal errors. However, the findings can be interpreted otherwise and, taken alone, add little substantial knowledge. The following consideration of similarities and difference within and between the homosexual twins and their siblings is an attempt to slip between the horns of the sterile nature-nurture dilemma.

**Homosexuals vs Other Sibs.**—The environment in which the children were reared must be regarded as severely disruptive. Clearly the father was a heavy drinker, who brutalized the mother and inspired great fear in the children. Fear of their father characterizes a high proportion of homosexual men.<sup>23,24</sup> There were 14 children and the nurture available from the mother was spread thinly. The family was poverty stricken, lived in a slum area, and the younger children were displaced because of war.

These major features of the environment did not change during the period when the children were growing up. All of the 14 sibs were at risk. If such an environment were predictable in producing adverse effects, it would be reasonable to postulate that the behavior of all the children would exhibit some evidence of psychological scarring. A continuum of behavioral disorder should be apparent. But the disability was, instead,

discontinuous. Most of the children became successful adults. The homosexuality of the twins and thread of depression running through the histories of these same twins and their sister (No. 8) contrasts sharply with the social effectiveness and apparent psychological health of the other nine siblings.

Two major postulates can be formed to account for the homosexuality of the twins: (1) There must have been some special vulnerability, genetic or constitutional, in the affected persons which predisposed them to homosexuality. If such a vulnerability is admitted, the unfavorable environment may well have contributed to the final result. (2) The environment alone determined the homosexuality. This proposition cannot be proved on the basis of the evidence and cannot be disproved in principle. However, it is beset with difficulties. The same or closely related environmental factors would have to select out four persons—the two sets of homosexual twins—and leave the other children, including a third set of twins, untouched. Obvious environmental features, such as the fear-inspiring father, which common sense would depict as highly deleterious, would have to be relegated to non-contributory or at most accessory etiologic roles because all of the children were exposed. Of course, it is possible that there existed in the family environment factors, which were so (apparently) trivial as to escape notice or leave ready memories with any of the informants, yet which were so selective, specific, and profound in effect as to determine homosexuality in only the affected persons. But this seems most unlikely.

**Between Homosexual Twin Pairs.**—There were major sociopsychological differences between the twin pairs. The pair 7A and 7B lived with permanent partners for whom they expressed strong affectional ties. They described their relationship as analogous to heterosexual marriage and were highly critical of "promiscuous" homosexuals. Their younger twin brothers had more heterosexual experience and had conducted their homosexual activities with temporary partners. They would not consider living with a man.

Since these twin pairs are brothers, it is likely that the same basic etiologic factor(s)

produced the major deviation, ie, homosexuality. If this is true, then the differences in life styles between the pairs, although striking, are attributable to modifying genes or life experiences, which are incidental to homosexuality per se. This gives support to the concept that the several types of homosexual behavior do not necessarily entail several primary etiologies.

**Within Homosexual Twin Pairs.**—These twins were not only concordant for homosexuality, but the members of each pair had developed modes of sexual behavior strikingly similar to each other. Furthermore, they did this while ignorant of their co-twin's homosexuality and, for 7A and 7B, while widely separated geographically. This finding echoes the report of Kallmann.<sup>3</sup> But there were also major differences within the twin pairs and these could not be produced by environmental differences. 7B, always smaller, less robust, and less aggressive than his twin, was also the more effeminate and practiced transvestism briefly. He was more liable to depressions. Within the younger pair, 9A was more homosexual in orientation; yet less accepting of himself as a homosexual and more liable to depressions. He was also vocationally less successful than his twin.

The differences between 7A and 7B were lifelong and are reasonably well explained by the size and weight differences. Such differences and other related ones appear to be of major importance in normal MZ twins<sup>25,26</sup> and possibly in twins that are discordant for schizophrenia.<sup>27</sup> The differences between 9A and 9B became apparent later in life and have increased. The seduction of 9A by an older man, who had treated him kindly and assumed a fatherly role when 9A's life was disrupted, is an experience considered of critical etiologic importance by East<sup>28</sup> and many others.<sup>29,30</sup> It is also from this point in time that the differences between this pair began to emerge. The seduction is most unlikely to have determined 9A's homosexuality because 9B, also homosexual, had no such experience. But it could well account for much of the intrapair difference and this is clearly of great importance. 9B had nearly married and had had considerable heterosexual experience, which he found mildly pleasurable.

It is not unreasonable to suppose that he would have made a heterosexual adjustment of sorts given favorable circumstances. His twin exhibited no evidence of such a capability.

In summary, the evidence presented by this family, will not support either genetic or environmental determinism as an explanation of the homosexuality of the twin pairs. An etiology based on the interaction of these factors is required.

### The Registry Study

We shall now report briefly on the other homosexual twin pairs on the register. Conclusions will be limited by smallness of numbers and by the fact that homosexuals referred to a psychiatric clinic cannot be assumed to be representative of all homosexuals. Similar objections can be raised to most clinical studies of homosexuality.

We have set out in Table 4 the salient facts relating to all 12 male twins on the register who had a primary or secondary hospital diagnosis of homosexuality and whose MZ or male DZ twins had passed the age of 15 when last heard of. A 13th case, from overseas, had to be omitted for lack of information. The zygosity of the listed pairs is reasonably secure and is supported by blood groups in all MZ and in four DZ pairs. The remaining three DZ pairs differ clearly in appearance, including hair color.

**Intrapair Resemblance as to Homosexuality.**—In two of five MZ pairs (MZ 3 and 4) both twins were clearly homosexual. In a third pair (MZ 1) the co-twin had what may have been a related sexual deviation (delusion of sex change, exposed himself). Both these latter twins were schizophrenic, and in each the sexual deviation only became manifest after onset of the psychosis. For a number of years the picture in MZ 1 was similar to that of the case described by Kallmann and referred to above.<sup>5</sup> The concordance rate, if one wishes to calculate it on such small numbers, is between 40% and 60% depending on how one deals with MZ 1.

Two MZ co-twins were heterosexual. In one of these (MZ 2, case A of Parker<sup>10</sup>), the difference in sexual behavior was consistent with differences in the attitude of the mother. This case shows that discordance is not restricted to the less confirmed type of

Table 4.—Homosexuals on Psychiatric Clinic Twin Register

No.	Age, Last Info MA* Place in Sibshipt	Proband		
		Sexual History	Notable Background Features: Other Abnormality	Co-Twin
MZ Pairs				
1	Age, 40 MA, 45 Twins, 5/5	At 10, priest interfered with his private parts. Homosexual practices by 24. At 30 inpatient (IP), anxiety state, homosexuality. Single.	Onset of <i>schizophrenia</i> at 14. First hospitalization at 17. In state of good remission when hospitalized for homo problems. Later some deterioration.	Single. No homo practices. Onset of <i>schizophrenia</i> at 29. <i>Delusion of sex change</i> at 30. <i>Indecent exposure</i> at 34. Longer hospitalization than proband.
2‡	Age, 29 MA, 39 Twins, 2/2	Regular homo activity from adolescence. Outpatient (OP) at 26. Single.	Though not dressed as a girl or given a feminine name, proband (but not co-twin) was thought to have been treated by mother, who wanted a girl, in some ways as if he were one. No other abnormality.	Married, 2 children. Normal
3	Age, 43 MA, 35 Twins, 3/4	Homo inclinations from early age & intermittent practice. IP at 43, illness precipitated by being teased on account of effeminacy. Single.	Overconscientious, liable to attacks of anxiety & depression. <i>Depressive episode with delusions</i> at 43, diagnosed reactive depression, homo.	Single. <i>Practicing homo</i> from early age. Personality as proband. At 33 IP, depression with psychotic symptoms, good recovery.
4§	Age, 37 MA, 39 Twins, 9/11	Homo. Single. OP at 36.	Depression secondary to homo.	Single. Homo. Mild, untreated secondary depression.
5	Age, 22 MA, 31 Twins, 1/1	Homo from adolescence. OP at 22. Single.	Mother died when twins 4; brought up by grandmother, got on indifferently with father. No psychiatric abnormality.	Single. Heterosexual activity. Normal. No evidence latent homo.
DZ Pairs				
1	Age, 33 MA, 31 Twins, 2/2	First aware of homo inclinations at 21. OP at 26 with worry over homo, diagnosed. Inadequate psychopath with homo tendencies. Later, confirmed homo practices. Single.	Brought up in poor working-class district. Unhappy home: much quarreling between parents, father drinker, mother shrill-voiced, overpowering in manner, elder sister epileptic, getting divorce. At 21, OP, anxiety attacks, feelings of impending death, somatic symptoms of anxiety, depressed following change of job.	Single. Dress designer. At 26 engaged to dominant girl, homo fears. Later breaks off engagement, mixes in homo circles, regards himself as homo. No psych illness.
2	Age, 45 MA, 32 Twins, 3/3	Regular homo practices since 20. OP at 37. Single.	None	Married, 1 child. Normal.
3	Age, 39 MA, 23 Twins, 4/5	Homo feelings from 9; practices from 14. At 28 court charge. At 31 OP. Single.	None	Single. In religious order requiring celibacy. No overt homo. ? Mild reactive depression at 21 when studying.
4	Age, 22/26 MA, 25 Twins, 1/1	Homo practices from 14. In "care & protection" for this at 16. IP at 17, diag homo, immature personality. Continued homo activities. Single.	Unstable background: neglected by mother, parents divorced. <i>Unstable personality</i> : frequently on probation for larceny; many changes of job; at least 11 suicidal attempts, 4 of them serious, and eventually committed <i>suicide</i> (overdose) at 22.	Age 26. Married, does not want responsibility of children. As adolescent, much casual hetero activity. Since 18, OP for aggressive behavior, secondary anxiety ? malingering. Usually regarded as psychopath.

Table 4.—Homosexuals on Psychiatric Clinic Twin Register (Continued)

No.	Age, Last Info	MA* Place in Sibship†	Proband		
			Sexual History	Notable Background Features: Other Abnormality	Co-Twin
5	Age, 20 MA, 29 Twins, 1/1		Homo practices from 12, also some transvestism. In court at 16, then OP, diag homo. Later gets girl friend (?).	Father rejecting; mother has disseminated sclerosis. At OP secondary diag of psychopath made (larceny, absenteeism, unrealistic attitudes, bad relations with father). On follow-up behavior said to be improved.	Single. No homo inclinations. Normal.
6	Age, 38 MA, 34 Twins, 1/3		Fetishism from 13; masochism; first of 3 homo arrests at 26. Psychoanalysis at 29. OP at 34, sexual perversion. Forced marriage to fellow patient, 1 child.	Father eccentric, paranoid. Highly intelligent. Many personality & occupational problems resulting in lowering of occupational status (sociopathic).	Married at 35. Successful. No homo or psychiat illness.
7	Age, 21 MA, 35 Twins, 4/4		Homo from 14. OP at 20. Single.	Overpossessive mother (case referred for social work). No psychiatric abnormality.	Single. No homo inclinations. Normal.

\* Mother's age at birth of twins.

† In terms of mother's effective pregnancies.

‡ Previously reported by Parker<sup>10</sup> (case A).

§ The proband for the large family reported above.

|| Previously reported by Parker<sup>10</sup> (case B).

Table 5.—Co-twins of Homosexuals on Psychiatric Twin Register

Zygoty	Homosexual	Other		Total
		Sexual Deviation	No Sexual Abnormality	
MZ	2	1	2	5
DZ	1	0	6	7
Total	3	1	8	12

homosexuality. In the other discordant pair (MZ 5) we were unable to discover any reason for the apparently spontaneous development at adolescence of homosexual interests and behavior in one twin only. Though the proband had for some time been on poorer terms with his father than was his co-twin, this could as easily have been the consequence of his effeminacy as a critical environmental factor accounting for the differences between the twins.

Turning to the 7 DZ pairs, one (DZ 1) is probably concordant for homosexuality, though there is no direct evidence of physical relations in the case of the co-twin. Diagnosing the histories of pair DZ 1 independently of one another and in ignorance of zygosity, Dr. Eliot Slater in an earlier study<sup>31</sup> classified both twins as homosexuals. This would give a concordance rate of 14%. Of the six nonhomosexual DZ co-twins, three are married. The ages of those

who have so far never married are 20, 21, and 39. In the last case (DZ 3) one might speculate about a latent homosexuality.

The tendency shown in the present sample, as in cases from the literature, is thus for concordance and discordance to occur about equally frequently in MZ pairs, given that one of them is homosexual, while concordance is less frequent in DZ pairs.

Homosexuality among the sibs, as opposed to the twins, of the 12 probands was found only in case MZ 4. Holemon and Winokur<sup>32</sup> reported that out of 40 homosexuals, 2 had a homosexual sib.

**Other Psychiatric Conditions.**—Since this is a series of twins where one was seen at a psychiatric hospital, cases of major psychiatric disorder may be mentioned. Besides the schizophrenic twins of pair MZ 1, there was a second MZ pair (MZ 3) where the proband had a severe depression requiring hospitalization. Here both twins seem to have had a tendency to affective disorder independent of homosexuality. In general, the presence or absence of other diagnosed psychiatric conditions in the MZ probands does not appear to account for the resemblance in homosexuality.

Four DZ probands had, in varying degrees, unstable or inadequate personalities

which contributed to their referral to the Maudsley Hospital; one of them (DZ 4), from a disturbed home background, had a co-twin who was also psychiatrically abnormal but was heterosexual.

### Frequency of Homosexuality in Twins per se

It has been argued that the tendency for MZ twins to be more alike than DZ twins in homosexuality is related not so much to genetic factors as to problems of sexual identification connected with being a monozygotic twin, which in turn predispose towards homosexuality.<sup>33,34</sup> It could indeed be pointed out (though not, we think, with justification) that in the sibship reported in the first part of our paper four out of six males who were twins were also homosexual, while this was so in none of the five males who were singly born. We may therefore ask: Does the Maudsley Register reveal a relative excess of homosexuality in MZ as compared with DZ twins? The 5 MZ homosexuals come from 82 MZ or probably MZ adult male twins on the Register (6.1%) and the 7 DZ homosexuals from 97 (7.2%). These findings do not support the hypothesis which associates monozygosity with homosexuality.

It is harder to say precisely whether the incidence of homosexuality in members of same-sexed male twins is greater than in the parent Maudsley population, since there are features about the way in which the hospital statistics are compiled which make comparison with our twin series difficult. However, a count of diagnostic punched cards (one card for each discharge) for the period 1952-1957 was previously made by one of us (J. S.); and this showed that a primary diagnosis of 320.6 (sexual deviation) was made in the case of patients who were twins of *any* kind in a proportion very close to that made in all patients (3.2% and 3.1% respectively). As already noted the ratio of twins to non-twins is about the same in the Maudsley as in the general population.

A follow-up of 27 pairs of normal London male twins (ie, 54 individuals) at an age between 22 and 25 revealed none that were homosexual (Harrison and Shields, unpublished data). The findings are similar to

those of the much larger prospective study of normal German twins by Koch,<sup>9</sup> which discovered only one male homosexual twin.

There therefore appears to be no good evidence from the present material or from other work for supposing that twins have a high risk of being homosexual.

### Summary

An unusual family with a sibship of 14 has been investigated clinically and in respect of 16 genetic polymorphisms (blood groups and plasma proteins). Among the sibs were three pairs of male monozygotic twins, in two of which both twins were homosexual and in the third both heterosexual. No environmental factors could be detected which differentiated the homosexual from the heterosexual sibs. All grew up in what must be regarded as a severely disruptive environment, yet most of the children were successful adults. Clinical differences between the two homosexual pairs and differences within each of them have been discussed. An etiology based on the interaction of genetic and environmental factors is required to explain the findings.

The above family came to notice through the study of a consecutive series of twins. To date, 12 pairs of male twins in which one or both is homosexual have been recorded on a register of all twins attending a psychiatric clinic. These pairs have been described briefly and the literature reviewed. There is no evidence that monozygotic twins per se are particularly prone to homosexuality. The tendency is for concordance to be incomplete in series of MZ twins but to be higher than in corresponding DZ pairs, a finding which once again points to the importance of both genetic and environmental causes.

Dr. Heston is a former Guest Worker, Psychiatric Genetics Research Unit, supported by Special Fellowship 1-F3-MH-28, 474-01(MTLH) National Institute of Mental Health. Dr. Ruth Sanger, MRC Blood Group Research Unit, Lister Institute, London, performed the blood grouping and Dr. Elizabeth B. Robson, MRC Human Biochemical Genetics Research Unit, the Galton Laboratory, London, did the starch gel electrophoresis. Dr. F. Kräupl Taylor called our attention to the family studied. Dr. J. Kahn, Psychiatric Genetics Research Unit prepared and read the karyotype.

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