huge figure of approximately 650 per annum. In addition to local graduates, some 585 doctors from Great Britain and Ireland and from foreign countries have emigrated to Australia between 1948 and 1952. There can be little doubt, therefore, that Australia is rapidly becoming over-doctored.

TABLE IV.—*British Dominions: Increase in Number of Medical Students Graduating in Selected Years Compared with Increase of Population (data obtained from the "Year Book of the Universities of the Commonwealth")*

Country	Year	Approximate Population in Millions		Approximate % Increase		No. of Students Graduating Annually	% Increase
		European	Non-European	European	Non-European		
South Africa	1938	2·05	8·0	29	25	134	224
	1951	2·65	10·0			435	
New Zealand	1936	1·65		24		39	187
	1951	2·05				112	
Canada	1938	11·5		22		492	62
	1951	14·0				791	
Australia	1934	6·6		33		175	263
	1952	8·8				635	

Conclusion

Sufficient has been said to make it clear that opportunities for medical practice in the Dominions and Colonies for British graduates wishing to emigrate overseas are much fewer to-day than they were 40 years ago. Owing to the overcrowding of the profession and the preference given to local graduates, it is my opinion that it would be unwise for a British graduate in medicine to proceed overseas without first having obtained a salaried appointment in a commercial firm, in a university, in a research institute, or in H.M. Oversea Service, or without having obtained a legal contract safeguarding an offer of an assistantship or partnership in private practice. It is also clear that in Great Britain at the present time the chance of becoming a consultant in hospital practice or a principal or partner in general practice is too difficult and too uncertain. In short, there seems to be an over-production of doctors both in Great Britain and in the Dominions.

Unless reasonable opportunities for employment are going to be made available to potential graduates, not only will the numbers entering medical schools fall, according to the laws of supply and demand, but so will the quality of the entrants. The Government Committee appointed to study this important problem will have to consider whether it is better to allow the laws of supply and demand to operate or whether restriction of entry to medical schools should be enforced. That the former mechanism is already operating would appear to be the case, since the number of students starting medicine in Great Britain and Ireland has declined from 2,725 in 1949–50 to 2,280 in 1953–4 (*Lancet*, 1955). On the other hand, it may be felt that the second course is preferable, as it is obviously a wasteful and expensive business to produce more doctors than are required. The question will then arise whether medical schools should be ordered to reduce their annual intake of medical students by a certain quota or whether they should merely be recommended to do so. In this connexion the problem of the excessive production of doctors by the Irish medical schools will require particular attention. Lastly, it will be necessary to decide whether any proposed reduction in intake should be proportionally the same for every medical school in Great Britain or whether medical centres with a long-established international reputation for medical education should receive special consideration.

My thanks are due to Mr. Jolley, Librarian of the Royal College of Physicians, Edinburgh, for the help he has given me in collecting the data for Tables III and IV.

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DIVERSITIES OF SEX*

BY

C. N. ARMSTRONG, M.D., F.R.C.P., D.P.H.

Physician, Royal Victoria Infirmary, Newcastle-upon-Tyne, and Queen Elizabeth and Bensham General Hospitals, Gateshead

Diversities of sex can be divided into: (1) hermaphroditism, in which the gonads are of both sexes and the external sexual appearances may be male or female or a mixture of both; (2) pseudohermaphroditism, in which the external sexual characteristics are more or less characteristic of the sex opposite to that of the gonads; and (3) homosexuality, a state of affairs in which the libido and sexual urge is directed towards the same anatomical sex and may or may not be associated with recognizable endocrine abnormality.

Hermaphroditism

True hermaphroditism is rare: there is a separate ovary and testis, or an ovo-testis.

Case 1: Woman aged 66.—Her mother died when the patient was 8 years old. She looked after six other children and received no proper schooling. During this period she regarded herself as a woman and wore women's dress, but at the age of 18 realized there was some doubt about her sex and tried to commit suicide on this account. Subsequently she led a vagabond life doing farm work and hawking. She shaved about once a week. For some years she has been becoming progressively bald on the top of the head, after the manner of a man. In May, 1952, she was taken to a welfare institution and transferred to Bensham General Hospital for investigation.

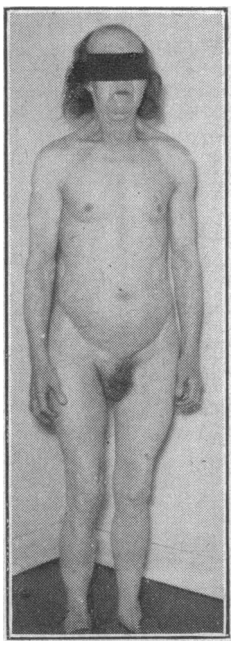


FIG. 1

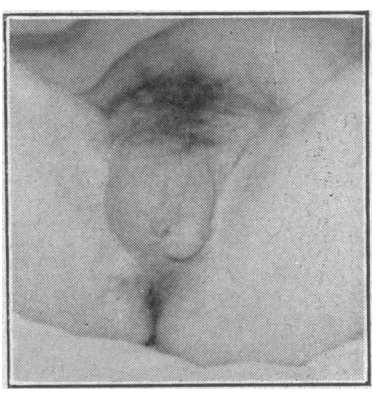


FIG. 2

FIG. 1.—Case 1. True hermaphroditism. Sex regarded as female; has lived as a female, although general appearance rather masculine. One gonad a testis; the other an ovary. Ketosteroids, 3.8 mg.
FIG. 2.—Case 1. True hermaphroditism. Scrotum on right containing a hydrocele; short phallus with hypospadias orifice on the perineum; no vagina. Testis in the right inguinal canal.

On examination the skin and hair distribution were seen to be those of a man. She had a short stubble of beard, long unclipped hair, but central baldness (Fig. 1). The external genitalia also looked masculine, there being a well-formed scrotum on the right containing a hydrocele, a short penis with a hypospadias orifice on the perineum, and no vagina (Fig. 2). An organ in the right inguinal canal was considered to be an undescended testicle. On closer examination the skin fold on the left side appeared like a labium. The urethra opened on the perineum and there was a slight opening ¼ in. (1.9 cm.) long at the end of

*A paper read to Newcastle-upon-Tyne Obstetrical and Gynaecological Society on March 4, 1955.

the penis, but the scrotum was empty apart from the hydrocele. Urinary 17-ketosteroid estimation was 3.8 mg. per 24 hours.

Laparotomy was performed on June 20 by Mr. David Smith. There was a small uterus with broad ligament and left ovary. No right ovary could be seen. A rudimentary right tube disappeared into the inguinal canal. The gonad was removed from the right inguinal canal for section. Histological examination showed a rudimentary uterus; a Fallopian tube; an ovary with numerous corpora albicantia and calcified vessels, showing in its mesentery large clumps of interstitial cells; a testis with fibrosed seminiferous tubules and grossly increased numbers of Leydig cells. On this side there was in addition a structure which might be a tube of a ductus deferens. Unfortunately it has not been possible to obtain skin or a blood film for determination of chromosomal sex because the patient has been transferred to another hospital.

Pseudohermaphroditism

Pseudohermaphroditism, male and female, is much more common, and is a condition in which the gonads are of one type—testes or ovaries. There are two varieties of male pseudohermaphroditism.

Male Pseudohermaphroditism

(1) Cases with testes and general male external characteristics with the exception of the external genitalia: undescended testes and hypospadias.

Case 2: A girl aged 13.—This girl's mother consulted her home doctor because it was noticed that the child had enlarged genitalia. Otherwise she was very healthy, a good scholar, active, and good at games.

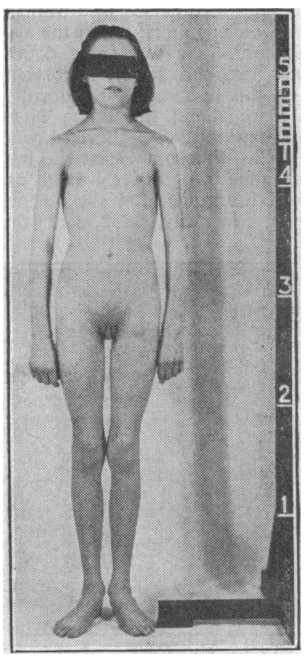


FIG. 3.—Case 2. Male pseudohermaphroditism. "Girl" aged 13 Enlarged "clitoris" and undescended testes Ketosteroids, 9.6 mg. Has assumed male sex after a plastic operation and hormone treatment.

On examination she was tall for her age and thin, with a deep voice; pubic hair was present (Fig. 3) and the clitoris was enlarged. A swelling in the right inguinal region felt like a testis. She had an infantile vagina with no evidence of cervix or uterus; no breast development. Urinary 17-ketosteroid estimation, 9.6 mg. per 24 hours.

Laparotomy was carried out by Professor Bentley. The right inguinal canal was opened, and what appeared to be a normal testicle for a child of this age was delivered; a biopsy specimen was taken: on microscopy the testicle tissue looked normal. The inguinal canal was then closed. A midline subumbilical incision was made and the pelvis explored. There was no evidence of any rudimentary female viscera. The midline incision was then closed in layers without drainage.

Histologically the specimen was morphologically testis, with well-formed tubules and considerable aggregation of interstitial cells. There was no evident spermatogenesis. The results of the operation suggested, therefore, that this child was essentially a male.

A plastic operation was carried out by Mr. Fenton Braithwaite and the patient has assumed the male sex very successfully.

(2) These are cases with external female characteristics and absence of internal female organs, and in which the gonads are testes and the chromosomal sex is male. This type of male pseudohermaphroditism is commonly mistaken for female, but should always be suspected in a female of adult age who has never menstruated, has no pubic hair, and is without signs of hypopituitarism. Cases have been published by Armstrong (1953) and Beatty, Champ, and Swyer (1953).

Case 3: Girl aged 17.—This patient was referred to hospital on April 22, 1952, because she had never menstruated. She was a twin—the other twin died *in utero*. There was a family history of late menarche. She was of normal stature with well-developed breasts and a normal head of hair. There was no axillary or pubic hair, and her skin was generally somewhat hairless (Fig. 4). The vulva was infantile but otherwise appeared normal. The vagina was only ½ in. (1.3 cm.) in length. On rectal examination no internal female organs were palpated. No abnormal signs were found in the heart, lungs, abdomen, and central nervous system; blood pressure 130/90; urine normal; *x*-ray examination of sella turcica, normal; urinary 17-ketosteroid estimation, 8.9 mg. per 24 hours.

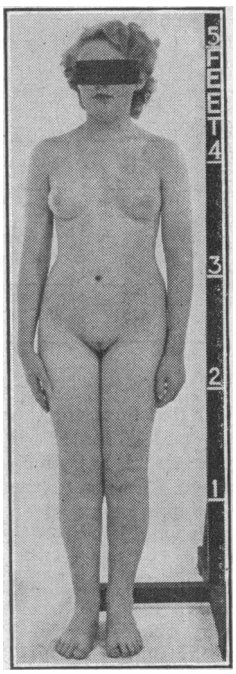


FIG. 4

She had the mental attitude of a girl. Socially and occupationally, the adaptation is that of a girl of 17 of rather above average intelligence. Sexually she is a little immature, but her inclinations are entirely female. She has had girl's toys, has female daydreams, reads love stories, and identifies herself with female fictional and film characters; she hopes to marry and is fond of babies.

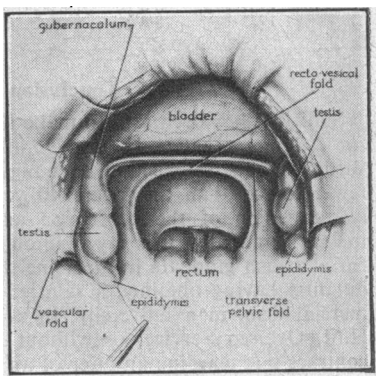


FIG. 5

FIG. 4.—Case 3. Male pseudohermaphroditism. "Girl" aged 17: external feminine characteristics; breasts developed, no pubic hair, infantile female vulva. Gonads undescended testes; no female internal organs and no vagina. Chromosomal sex, male. Ketosteroids, 8.9 mg. Oestrogen excretion in urine: oestriol 2 μg., oestrone 2.4 μg., and oestradiol 0.5 μg., which are at male level.
FIG. 5.—Case 3. Drawing showing appearance of pelvic organs at laparotomy: undescended testes and no female organs.

At laparotomy there was no uterus, but a broad fold of peritoneum ran across the pelvis in the corresponding position. On the left side, lying on the psoas muscle, was a gonad anatomically resembling a testis. On the right side a similar structure was found, but more inferiorly placed so that it was lying right at the internal ring (Fig. 5). The arrangement was quite consistent with undescended testes. Both inguinal regions were bimanually palpated and no swelling was noted in either groin. The broad fold of peritoneum running across the pelvis is the transverse pelvic fold, a remnant of the uro-rectal septum or genital fold, and its attachment to inguinal fold (gubernaculum) appears almost ligamental and may well have been a factor in checking the descent of the testis. Such an attachment as this occurs in the female from the lateral aspect of the body of the uterus to the ovary, to form the ligament of the ovary.

Material from each gonad was identical histologically and consisted of testicular tissue. There were numerous immature seminiferous tubules which showed no evidence of spermatogenesis. Numerous and increased numbers of interstitial cells were present.

17-Ketosteroid fractionation carried out by Professor Charles H. Gray gave the following results. Total excretion of 17-ketosteroids, 8.8 mg. a day. The 17-ketosteroids could be separated into eight fractions, as follows:

I, II	Containing mainly artefacts of fraction	19%, 0%
III	Transdehydro*iso*androsterone	13%
IV	Containing mainly androsterone	18%
V	„ „ acetocholanolone	33%
VI, VII	„ „ 11-oxygenated 17-ketosteroids	11%, 0%
VIII	„ unknown artefacts	6%

This fractionation is within normal limits.

Adrenocortical Steroid Analysis (all figures in μg. per 24 hours)

	Δ⁴-3-Ketosteroids			Reducing Steroids		
	Free			Glucuronide-conjugated		
	Comp. E	Comp. F	Comp. X_4	Comp. X_6	Tetra-hydro-Comp. E	Unidentified Comps
Normal range:	20	20	60	80	1,200	240
Male ..	20–200	10–80	20–120	0–200	240–3,000	0–1,500
Female ..	30–110	10–120	10–320	10–4,000	160–4,000	0–2,200

X_4 and X_6 are unidentified Δ⁴-3-ketosteroids with RF values of 0.24 and 0.39 in benzene/50% methanol system. Excretion of free compound E of 20 μg. a day is within normal limits for males.

Dr. J. E. Gray was of the opinion that the chromosome content of the skin was male.

Professor G. F. Marrian estimated the oestrogen excretion in the urine, and reported the following results:

	1st Week	2nd Week
Oestriol	2·0 μg. ..	1·6 μg.
Oestrone	2·4 „ ..	3·1 „
Oestradiol	0·5 „ ..	1·4 „

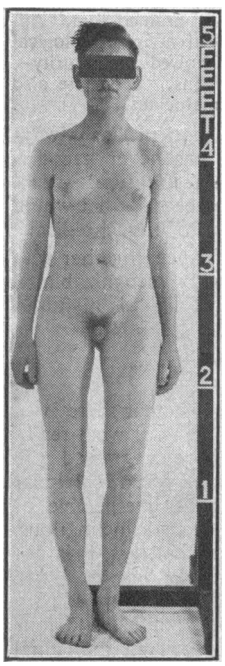
These figures are at male level.

The patient whose case was reported by Beatty *et al.* (1953) was admitted to the Royal Victoria Infirmary on December 1, 1954, as an emergency under my care because of haematemesis. Dr. G. I. M. Swyer reported on the oestrogens as follows: oestriol, 2.1 μg. in 24 hours; oestrone, 1.5 μg.; oestradiol, 2.6 μg. This patient intends to marry in the near future.

In both these cases the oestrogen excretion in the urine is at the male level, which suggests enhanced response of target organ to oestrogen or that there is another oestrogen not yet determined.

Female Pseudohermaphroditism

Female pseudohermaphroditism is a condition in which the gonads are ovaries, the chromosomal sex is female, but the external appearance is more or less masculine. Usually there is lack of breast development, with a male type of hair distribution, and the clitoris is enlarged to a degree which resembles a penis but micturition is feminine in type. The condition either is of genetic determination or is due to adrenal hypersecretion, starting in foetal life. These subjects are seldom brought up as boys, and such a case is reported here.



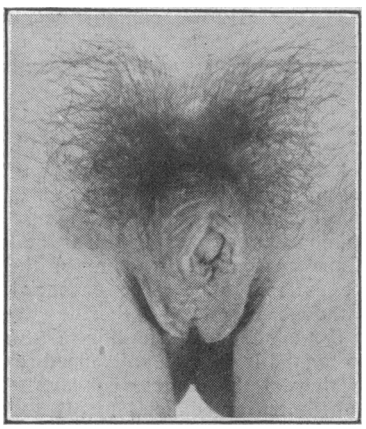


FIG. 6 FIG. 7

FIG. 6.—Case 4. Female pseudohermaphroditism. "Boy" aged 16; external genitalia: phallus with appearance of a penis, and urethral opening on the ventral surface. In perineum, two sinuses, from one of which menstrual bleeding occurred. Ketosteroids, 6.3 mg. FIG. 7.—Female pseudohermaphroditism. Photograph shows appearance of external genitalia.

Case 4: Boy aged 16.—This patient was referred to me as a boy with hypospadias which had been repaired by a surgeon 12 months previously, but since then breasts had developed and there was periodic bleeding from a perineal sinus.

On examination he was thoroughly imbued with a boy's mode of behaviour; nevertheless he had a round face with fresh complexion and absence of any facial hair. Pubic hair was present and level (Fig. 6). Breast development was such as would have been consistent with an adolescent girl. External genitalia consisted of a reconstructed phallus with urethral opening on the ventral surface (Fig. 7). In the perineum there were two sinuses, from one of which periodic bleeding occurred. Lipiodol injection showed it to have a connexion with the urethra. Ketosteroids were 6.3 mg. per 24 hours.

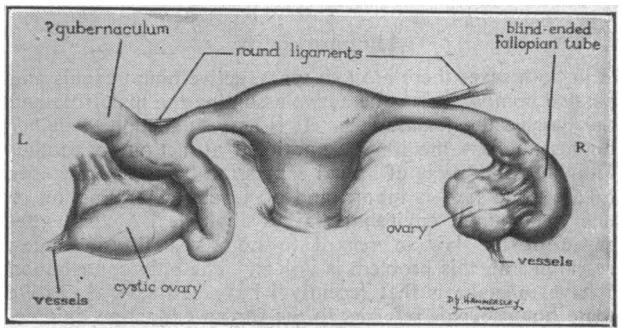
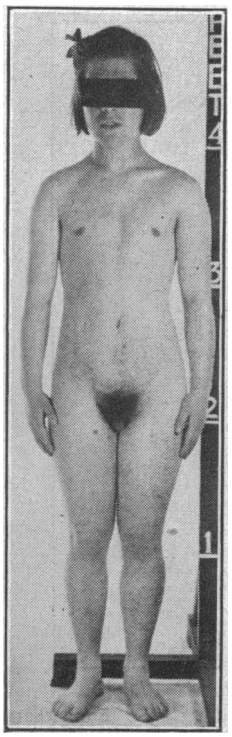


FIG. 8.—Case 4. Female pseudohermaphroditism. Drawing illustrating pelvis at laparotomy; uterus and ovaries present; no male organs.

Laparotomy, carried out by Mr. D. J. Tibbs, revealed a normal adolescent uterus which connected by a rudimentary vaginal canal with the perineal sinus (Fig. 8). Gonads were present in the position of normal ovaries. Biopsy showed them both to contain ovarian tissue histologically. Fallopian tubes were malformed.

This patient has refused to assume female sex.

The more common type of female pseudohermaphroditism has enlarged clitoris, male type of hair distribution, no breast development, and non-establishment of menstruation. These cases of adreno-genital syndrome respond to treatment with cortisone.



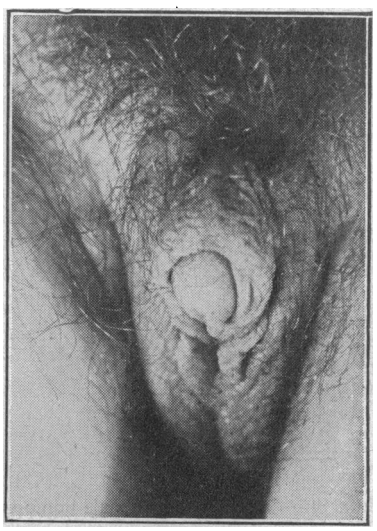


FIG. 9 FIG. 10

FIG. 9.—Case 5. Female pseudohermaphroditism. Girl aged 14. Enlarged clitoris: thick pubic hair, no breast development and no menstruation. Ketosteroids, 23.0 mg. Since above photograph was taken has been treated with cortisone: ketosteroids have dropped to 6 mg., breasts have developed, and menstruation established. FIG. 10.—Case 5. Female pseudohermaphroditism. Photograph showing enlarged clitoris.

Case 5: Girl aged 14.—This patient was referred to me at 11 years of age with the complaint that she was changing her sex. The history was that at 1 year the clitoris was found to be enlarged and at 2½ years pubic hair began to grow. At 4 years laparotomy had demonstrated a normal uterus and ovaries, with histological confirmation. Examination confirmed the presence of a small vagina and separate urethral passage (Fig. 9). The urethral opening is set very far back (Fig. 10). Ketosteroids were 23 mg. The condition in this case was considered to be adrenal hyperplasia. She has continued to be successfully treated with cortisone: the breasts have developed and menstruation has been established.

Homosexuality

In both sexes there are two types, active homosexuals and passive homosexuals—the active assuming the male role and the passive the female role. It is as yet indefinite whether homosexuality—the libido, emotional attraction to another individual, and urge of sexual expression being to a member of the same sex—is inborn and of genetic determination or due to acquired environmental psychological factors. Because of the law in regard to homosexuality in males, research into this problem is urgent. The only contribution I have to make is that recently I have had several passive male homosexuals referred to me for an endocrine opinion, and in each instance I have been able to recognize certain female characteristics.

Case 6: Man aged 22.—This patient was referred to me at Royal Victoria Infirmary in September, 1954. He had previously been admitted to the Department of Psychological Medicine, where it was thought that little could be done to help him. He volunteered the information that he was of the opinion that from very early childhood he had had female tendencies and female habits, and at the age of 13 a neighbour had had homosexual activities with him. Later he used to be called a "cissy." He joined the Royal Navy for his National Service at 18 and was immediately recognized by active homosexuals, which led to frequent physical homosexual practices taking place to a degree which eventually led to his seeking the advice of the padre, who recommended his discharge from the Navy. Since leaving the Royal Navy homosexual intercourse has continued, and he sought the advice of his doctor, who referred him to hospital at the age of 22.

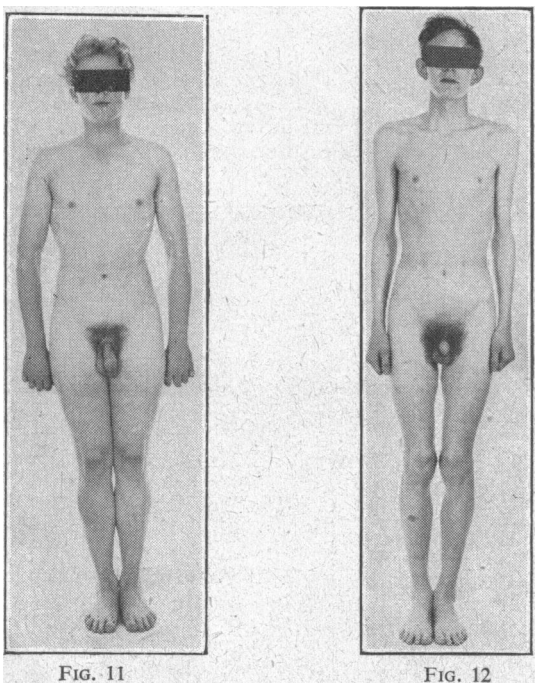


FIG. 11 FIG. 12

FIG. 11.—Case 6. Passive male homosexual, aged 22. Somewhat general feminine appearance and contours; deficient beard—can go without shaving for two weeks without being noticeable; level pubic hair; well-developed genitalia; ketosteroids high normal, 22.2 mg.; and high sperm count, 110 millions per ml. FIG. 12.—Case 7. Passive male homosexual, aged 17. Rather eunuchoid appearance with feminine voice, small penis, level pubic hair, scanty axillary hair, and no facial hair—he does not shave. Ketosteroids, 8.5 mg.

On examination his general appearance had undoubtedly certain feminine characteristics in general contour (Fig. 11). His head hair was male pattern in distribution, but his beard was deficient, and he required to shave only once in three days, and can go as long as two weeks without it being hardly noticeable. Pubic hair was level. Genitalia were well developed. There was no gynaecomastia. Legs were of feminine contour. Urinary 17-ketosteroids were 22.2 mg. per 24 hours. Semen analysis: count, 110,000,000 spermatozoa per ml.; 90% of the normal spermatozoa highly motile and normal in appearance.

There are undoubted feminine endocrine features in this case, together with a high urinary 17-ketosteroid excretion and a high sperm count.

Case 7: Youth aged 17.—This patient wrote direct to me, and the following is an extract from his letter. "I have seen my doctor because ever since I was young I have always felt like a girl and I've always wanted to show I am one. I played with dolls and girls instead of boys. I detest boys' games, but have loved to play girls' games. I love girls' clothes and look into every clothes shop in town. I am now nearly 18, and for just over a year I have been in love with a man, and it grows more sincere as the months go by. I love little children, and some day hope to have some of my own; but I don't want to be a father—a mother is more in my line. I think like a girl, act like one. I've been told I look and try to dress like one; of course I do—anything that makes me look feminine I'll wear. I blush when a handsome man looks at me, and am embarrassed when they start talking about male subjects. My mother and family know about this; I thought it best to tell them. Well, my doctor sent me to a psychiatrist, who asked me everything. She sent me to another; after going five times he sent me to another, who asked the same questions as the others. It started all over again, but none of them have done anything for me; the last one said if I go on like this I will be a homosexual, yet I have done nothing sexual or ever suggested doing it."

On examination he was tall, slender in build and contours, with a rather feminine voice and small penis; testes were descended, pubic hair was level; axillary hair was scanty, and facial hair was absent—he does not shave. Head hair was of male pattern but worn rather long. Urinary 17-ketosteroids were 8.5 mg. per 24 hours. *X*-ray examination of the sella turcica showed nothing abnormal. Semen analysis:—Wet film: The majority of the spermatozoa were actively motile, but several abnormal and immature forms were seen; no pus cells, red blood cells, or crystals present. Count, 21,200,000 per ml. Stained film. Approximately 60% of the spermatozoa showed no morphological abnormalities, but the remaining 40% showed immaturity—swollen or pyknotic heads or other aberrations. There are also an excessive number of spermatids and spermatocytes.

This case is of interest because the patient has always felt that his outlook was female. He has never had any physical homosexual contacts, and there are features—small genitalia, level pubic hair, and absence of beard—that would suggest masculine deficiency amounting to eunuchoidism.

The general form, contours, and appearance, together with deficiency of male type of hair, are easily recognizable in these cases. The ketosteroid excretion in Case 6 is high and in Case 7 low.

Discussion

I should like to draw attention to the fact that there is as yet no precise definition in law or in medicine of what really constitutes male or female sex. I have expressed the opinion (Armstrong, 1953) that the legal sex of an individual is the anatomical structure of the gonads irrespective of the external appearance or social or sexual inclinations. Although most legal authorities would accept this, it is not in fact a true legal definition (*British Medical Journal*, 1954). So far the law has never defined sex, which is extraordinary in view of the homosexual laws in this country, and it is sometimes very difficult to say to which sex an individual belongs. Histological examination of the skin and of the polymorphs will reveal the chromosomal sex of the individual, which corresponds to the gonad sex, but this is not definite proof of the genetic sex. With the exception of the cases of female pseudohermaphroditism the hormone secretion estimations are not what one would have expected.

In Case 3 and in Dr. Swyer's case the oestrogen excretion in the urine is male level, which suggests enhanced response of the target organ to oestrogen or that there is another oestrogen not yet determined. In one of the female-role homosexuals with some signs of feminization the ketosteroid excretion and the sperm count are high. All of this goes to suggest that external sexual characteristics are dependent upon factors other than the level of hormone secretion.

It is obvious from the cases illustrated that it is sometimes not easy to draw a hard-and-fast line between the sexes and define exactly to which sex an individual belongs. In Case 3 the gonads are male and the chromosomal sex is male, and this patient might have a good case in claiming sex as male if the question of legacy, etc., in law arose, but would hardly be likely to be prosecuted for practising female-role intercourse with a male. On the other hand, Case 6 would be liable to be prosecuted, although I submit there are endocrine signs present suggesting a mild degree of feminization: such signs might pass unrecognized by the normal individual, but they are recognized amazingly easily by active male homosexuals. Such passive homosexuals have told me that at boarding school and in the Forces they are pestered by active male homosexuals, even by those they dislike and to whom they give no encouragement. One boy knew all his life that his outlook was female, but he had high moral principles and managed to steer himself through his public school life without physical contact in spite of the fact that he was attacked by the active homosexuals and his life made miserable. These active homosexuals were able to recognize what to me was not clinically obvious, yet I was interested to find that androgen excretion was low in this particular case. There is no doubt that active male homosexuals recognize passive male homosexuals by some means unknown. Is there a sixth sense?

In my experience these passive male homosexuals have really known all their lives that their outlook is female, and if when young they are subjected to interference by adult males this experience is not the initiating cause although often blamed as such.

It seems to me extremely likely that these homosexual characteristics are inborn and of genetic determination; this is supported by the research carried out by Kallmann (1952) on identical twins—both homosexual, although brought up in totally different environments. If this is so, psychoanalysis is a waste of time.

Active male homosexuals may be a different problem: I have had insufficient experience on which to express an opinion.

If passive (female-role) male homosexuality is of genetic determination it is open to consideration whether homosexuals should be subject to prosecution for physical expression of an inborn and genetic characteristic, an urge so strong that some individuals are unable to control it. In spite of the legal attitude towards homosexuality, society regards it as quite in order for a boy visiting a respectable household to have to occupy the same bedroom or even the same bed as the son of the house, for boys' boarding schools to sleep several boys in the same room, for hotels to accommodate two men in the same bedroom, or for British Railways to put two men alone in the same sleeper. The natural sexual urge must obviously be very strong: persons will go through fire and water and put themselves to all manner of hardships to achieve gratification. Nature has to make the instinctive urge strong or the human race would die out. The perverted urge may be no less strong. This is a legal problem, as also is the definition of sex. The medical profession also has a problem in its attitude to these diversities of sex. I think, so far as Cases 2 and 4 are concerned, it should be our duty as medical practitioners to repair physical abnormality and advise the patient to assume his or her true sex.

Case 3 is more difficult; it is obvious that it would be impossible to make the external appearances male. My advice would be to leave alone. I would not advise a plastic vagina and be party to promoting relationships or a marriage which may well end in disaster. I do not consider the medical profession should further pathology. For the same reason I should consider it also wrong for physicians and surgeons to administer hormones and carry out plastic operations on homosexuals with the object of making homosexual transvestists appear more like the opposite sex—converting males into pseudofemales and females into pseudomales.

Summary

Diversities of sex are divided into hermaphroditism, pseudohermaphroditism, and homosexuality, and cases are described illustrating the different types. Attention is drawn to the fact that sex of gonads, chromosomal sex, and hormone excretion may not correspond to the external physical appearances. Passive (female-role) male homosexuals may present certain physical feminine characteristics and, whether this is obvious or not, active (male-role) male homosexuals can readily recognize female-role homosexuals. It is suggested that passive male homosexuality is of physical origin rather than due to psychological environmental circumstances. There is no definition of what constitutes male or female sex in medicine or in law.

The problem of what should be the attitude of the medical profession to this problem is discussed. The opinion is expressed that in cases of pseudohermaphroditism in which the patient's sex is anatomically obvious, with corresponding external characteristics excepting minor abnormality, treatment should be by hormones or plastic surgery and the patient assume the correct sex, but in all other cases of pseudohermaphroditism or homosexuality the medical profession should leave alone and not administer hormones and carry out plastic operations to further an already pathological condition.

I should like to thank Professor Charles Gray for the adrenocortical steroid analysis and Professor Marrian for estimating the oestrogen excretion in Case 3; Dr. J. E. Gray for determining the chromosomal sex; my surgical colleagues, Professor F. H. Bentley, Mr. David Smith, Mr. D. J. Tibbs, and Mr. Fenton Braithwaite, for their help; Professor Alexander Kennedy and Dr. Robert Orton for the psychological investigation of some of the cases; Dr. D. W. R. Ashby for asking me to see Case 1 when under his care; Mr. C. J. Duncan for the photographs; and Mr. D. P. Hammersley for the drawings.

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The possibility of using sulphate-reducing bacteria for the production of hydrogen sulphide, and hence sulphur, is being studied at the Chemistry Research Laboratory of the Department of Scientific and Industrial Research (*Chemistry Research 1954*, H.M.S.O., London). Significant progress has been made, but industrial application is unlikely to be economically attractive under existing conditions. However, the method might well be useful should there be the threat of another sulphur shortage. Sewage sludge is the most promising raw material for sulphide production that has been examined. Three problems have been investigated during the year—the rate of sulphide production in sulphated sludges, the inhibition of methane production, and the possible use of two reactors producing methane and sulphide separately to give a gas mixture from which sulphur could be recovered. Experiments indicate that under certain conditions it may be possible to produce both methane and hydrogen sulphide simultaneously from raw sludge.