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Castration for Sex Offenders: Treatment or Punishment? A Review and Critique of Recent European Literature

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The recent European literature on surgical castration in treatment of sex offenders is reviewed. Results are reported of the most important empirical studies conducted in this field of sex research in Germany, Switzerland, Norway, and Denmark. Methodological problems of follow-up studies on castrates as well as the subject of castration as treatment for sex offenders as a whole are discussed. The main conclusion is that there is no scientific or ethical basis for castration in the treatment of sex offenders.

KEY WORDS: castration; sex offenders; treatment of sexual deviants; sexual behavior; testosterone.

INTRODUCTION

Castration has been practiced on human beings and animals in all cultures for thousands of years. Therefore, it is not surprising that the extirpation of the testes was one of the earliest surgical procedures. Apart from autocastration or self-imposed emasculation because of religious beliefs or artistic or medical grounds, compulsory castration as a consequence of violence or revenge has always played a dominant role in the past. In the Middle Ages, castration was performed to punish such crimes as rape or adultery according to the *jus talionis*

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("an eye for an eye, and a tooth for a tooth"). In Europe, castration was done on modern psychiatric indication for the first time in Switzerland in 1892, as an imbecile was cured of his neuralgic pains from the testes and his "hypersexuality" (Stürup, 1972). Castration for sex offenders has been generally known in modern Europe since 1906 (Stürup, 1972). Since that time castration has been performed as treatment for sex offenders in several European countries. Denmark was the pioneer country in legalizing this medical treatment by the Act of June 1, 1929 (amended 1936 and 1973). Germany (1933, 1935, 1969), Norway (1934), Finland (1935, amended 1950), Esthonia (1937), Iceland (1938), Latvia (1938), and Sweden (1944) followed. Sex offenders within the walls of a prison in Switzerland, the Netherlands, and Greenland are surgically treated without any existing legal rules. As to countries with a majority of Catholics such as Spain, Portugal, France, Belgium, Italy, and Austria, it may be assumed that castration does not play any role in the medical armamentarium for the control of sex offenders, as no publications exist on this subject. The same is largely true of England (Stone and Thurston, 1959).

The Nazi German Act of November 24, 1933 (effective date January 1, 1934) that provided compulsory operation by decision of the court was abolished in 1945. A further Nazi German Act, that of July 26, 1935, as well as Article 226a as a general rule of the penal code remained in force after World War II because these rules granted access to "voluntary" castration for incarcerated sex offenders. In order to obscure the origin of the former of these legal rules and to find a more democratic basis for this treatment for sex offenders, the law of August 15, 1969, was enacted after long controversy. It came into force on February 18, 1970, and provides that castration, i.e., the removal of both testicles or the lasting demolition of their functioning, is allowed for men older than 25 years if they agree voluntarily to the operation. The medical measure is permitted only (1) if the treatment is indicated according to the knowledge of medical science to prevent, cure, or ease serious diseases, mental disorders, or complaints of the subject that result from his abnormal sexual drive, or (2) if, because of the subject's abnormal sexual drive, his character, and his previous manner of living, it may be assumed that he will commit further sexual offenses, again given that castration is indicated according to the knowledge of medical science to meet this risk, and that it is thus possible to help the person with regard to his future way of life. Whether the operation will be effected or not depends finally on the vote of an independent commission of experts. People who because of insanity are unable to understand the whole procedure and the meaning of the operation must be represented by a guardian.

Official statistics showing how many sex offenders have been castrated in the countries mentioned above since 1906 are not available. There is no doubt, however (and this gives an indication of the potential extent for all

concerned countries), that in Germany between 1934 and 1944 at least 2800 sex offenders were subjected to the widely used compulsory castration. This history of misuse caused a kind of therapeutic abstinence from the practice of this somatic treatment during the first 10 years after the end of World War II, although there were no legal impediments at that time. In the middle 1950s, however, conservative psychiatrists again stressed the advantages of castration as a therapeutic measure for sex offenders, particularly in view of its low recidivism rate. It seems to be a reliable estimate that at least 800 sex offenders were castrated in West Germany between 1955 and 1977. It must, however, be noted that the total number of incarcerated sex offenders has steadily diminished as a consequence of the sexual liberalization in German society, which has resulted in relaxation of the sex criminal laws. This number amounts now to approximately 2000 males per year.

In Denmark, there have been about 1100 cases of castration since 1929. The last review of the law concerning castration appeared on June 13, 1973. The principle of the law is still the same; only administrative arrangements have been changed. Although the law is still in force, it has not been used in relation to criminal offenders for several years (Stürup, 1977). On the other hand, psychiatrists in Czechoslovakia are just beginning to institute castration as a medical treatment for sex offenders. Initial results are reported by several authors (Raboch and Nedoma, 1970; Vozenilkova, 1971; Taus and Susicka, 1973; Hynie, 1973).

The few figures noted above suggest that, in comparison to former times, castration is no longer used as a general treatment for all types of sex offenders, at least not in West Germany and Denmark. Nevertheless, somatic treatments, i.e., castration and psychosurgery (stereotactic hypothalatomia has been performed in West Germany since 1962 in 75 cases of sexual delinquents), play an important role in West Germany, mainly for dangerous sex offenders for whom protective measures are imposed in addition to ordinary imprisonment. Adult sex offenders sentenced to prison are normally treated exclusively by antiandrogens (cyproterone acetate), sometimes in combination with psychotherapy.

It is the purpose of this article to review the recent European literature on surgical castration because the results of some important studies are not available in English. There are four relevant monographs that should be mentioned: the Norwegian follow-up study of Bremer (1959), the Danish investigations reported mainly by Stürup (1968), the German study of Langelüddeke (1963), and the Swiss study of Cornu (1973). The two studies mentioned first are published in English, the two others in German. In this review, we shall focus mainly on the two studies in the German language. We shall also discuss some methodological problems and the subject of castration as treatment for sex offenders.

REVIEW OF RECENT EUROPEAN LITERATURE ON CASTRATION

Goals of the Study

Langelüddeke (1963) had two goals: (1) to present empirical data for legal arguments and for further scientific investigations and (2) to inform psychiatrists and other physicians about castration so that they would be able to counsel people who run the risk of colliding with the law because of their sexual deviations. After reviewing the history and the world literature of castration up to that time, the author presents his own empirical investigations.

Subjects and Methods

Langelüddeke (1963) analyzed excerpts from the criminal records of 1036 sex offenders who were castrated compulsorily and released soon after. Among them were 638 persons who were castrated between 1934 and 1938. For 259 sexual delinquents, castration was performed between 1939 and 1941, and for another 139 inmates castration was performed from 1942 to 1944. The excerpts from the criminal records dated back to 1953. For comparison, the author analyzed the excerpts from the criminal records for 685 sex offenders who were released untreated (noncastrates). Between 1955 and 1959, a total of 89 castrated males were interviewed and medically examined in their homes by the author.

Results

Recidivism Rate for Sexual Crimes

The analysis of 1036 excerpts from the criminal records showed that 24 castrated males (2.3%) recidivated with one sexual crime each. Before castration, these sex offenders had a recidivism rate of 84% (see Table I). Thus 3402 sentences to prison because of committing sexual crimes before castration were contrasted with 24 after operation. Correcting for those castrates who died (assessed at 10% of $N = 1036$, thus reducing the sample to $N = 932$), the corrected recidivism rate rose to 2.6%. The intervals between castration and recidivism ranged from 6 weeks to 20 years after release. After more than 5 years, nine of the 24 castrates committed a sexual crime. Among the 24 recidivists were 20 sentenced to prison because of committing nonsexual crimes in addition. Sex offenders castrated between the age of 20 and 30 years (ten recidivists) tended to show a higher recidivism rate than inmates castrated at an older age. Castrated inmates sentenced to prison once or twice tended to have a lower recidivism rate than castrated sex offenders with three or more convictions (see

Table I. Recidivism Rate for Sex Offenders Before and After Castration

Number of convictions	Sex offenders before castration				Recidivisms of castrates	
	N		%		*N*	%
Once		166		16.0	1	0.6
Twice	278		26.4		1	0.4
3 times	254		24.5		10	4.0
4 times	126		12.6		4	3.3
5 times	81		7.8		4	4.9
6 times	53		5.1		2	3.9
7 times	40		3.9		0	0.0
8 times	9		0.9		1	11.0
More	29	870	2.8	84.0	1	3.7
Total		1036		100.0	24	2.3

Table I). Among the 24 recidivists were 11 homosexuals (46%) (number of homosexuals in the sample 184 or 19.5%).

Analysis of the excerpts from the criminal records for 685 untreated sex offenders showed that 268 (39.1%) recidivated (see Table II).

Recidivism Rate for Nonsexual Crimes

The analysis of 1026 excerpts from criminal records showed, in general, a decline of the nonsexual crimes after castration. Before castration 606 sex offenders committed nonsexual crimes; afterward 230 of them were either

Table II. Recidivism Rate for Sexual Crimes of Noncastrates

Number of convictions	Noncastrates			
	N		%	
Once		417		60.9
Twice	148		21.6	
3 times	71		10.4	
4 times	26		3.8	
5 times	12		1.7	
6 times	7		1.0	
7 times	2		0.3	
8 times	0		0.0	
More	2	268	0.3	39.1
Total		685		100.0

sentenced to prison or fined. However, out of 420 sex offenders who did not commit a nonsexual crime before castration, 54 were sent to prison after the operation. It should be stressed that the decline is mainly due to the aging of the criminals and not to castration.

Follow-up Study of 89 Castrates

Sexual Drive

Fifty-eight castrated males (65%) informed Langelüddeke (1963) that their libido and potency had been extinguished instantly or soon after castration. In 15 cases (17%), the interviewed castrates reported a considerable fading and finally the extinction of sexual drive. Most of the remaining 16 castrates (18%) told the investigator that they were still able to practice sexual intercourse more than 20 years after castration. None of these 16 castrates had lost the capability for sexual intercourse before 10 years after the operation. The lower the age of castration, the longer libido and potency will prevail. Only at a castration age over 30 was there a rapid extinction of sexual drive (see Table III).

Somatic Sequelae

Some subjects experienced extreme weight loss, while others underwent marked gains. The type of constitution was much more important for these changes than the age of castration. Pyknics were mainly overweight; leptosomes and asthenic people were underweight.

Eight subjects (9%) developed subcutaneous fatty tissue after castration like that of females. Fifteen subjects (17%) showed a cushion of fat that was

Table III. Potency of Castrates ($N = 89$)

	Potency still prevailing or weakened slightly		Potency became obviously weaker		Potency extinguished soon after castration	
Age at castration	*N*	%	*N*	%	*N*	%
21–30	10	11.24	4	4.49	5	5.61
31–40	4	4.49	6	6.74	18	20.22
41–50	0	0.00	4	4.49	23	25.84
51–60	2	2.25	1	1.12	10	11.24
61–70	0	0.00	0	0.00	2	2.24
Total	16	17.98	15	16.84	58	65.15

markedly greater than average. The fatty tissue of the remaining 64 subjects (74%) was judged normal ($N = 87$).

Nine subjects (11%) had a strong gynecomasty. Twenty-two subjects (25%) developed weak gynecomasty. Fifty castrates (57%) showed unchanged breasts. In six cases (7%) the breasts were diminished ($N = 87$).

The skin of 45 castrates (51%) became softer and more pliant after castration, as well as somewhat more slack and flabby. In the remaining 44 cases (49%) no significant changes were recognized. Twenty-two subjects (25%) developed the so-called castrate-face, a strangely puckered face with many small wrinkles and a sallow complexion. Some of the remaining castrates had a noticeably soft-looking face. Hair on the head was scarcely changed by castration. Two who were bald before castration grew thin hair after operation. Growth of beard became weaker in 15 cases (17%), body hair was reduced with 59 (69%), and axillary hair was lessened in 39 (45%). With regard to pubic hair, in 48 (55%) there was a change from the male to the female form. In all the other cases, there was no noticeable change in type of hair.

How far the muscular system was influenced by castration could not be clearly judged. In many cases, the muscular system of the arms felt somewhat soft. However, the lack of tonicity could also be caused by the subjects' aging. Between the time of castration and the follow-up study (from 12 to 25 years), the castrates developed some diseases, but none of the 89 subjects thought that they were caused by the operation. Several castrates were diagnosed as suffering from rachiopathy. Osteoporosis was detected in one of the 89 cases. Thirty-five subjects (39%) claimed they were not bothered after castration by any bodily complaints. In 37 cases (42%) slight complaints such as hot flashes, feeling of brain pressure, vertigo, and sudoresis occurred and lasted for several years. Seventeen castrates (19%) also suffered from serious troubles such as heart disorders, respiratory difficulties, dorsalgia, and night sweating or chronic body pains which manifested themselves several years after operation.

Psychic Changes

Eighteen castrates (20%) stated that the operation had positively influenced their lifestyle. They specified that they felt calmer and more balanced and were able to be more active and efficient than before castration. However, 27 subjects (31%) complained that they were often depressed since the operation, and had feelings of inadequacy, isolation, and passivity. The remaining 43 subjects (49%) showed no obvious psychic disorders ($N = 88$).

Social Integration

Langelüddeke (1963) used two criteria to check the social integration of the 89 castrates: (1) the rate of nonsexual crimes and (2) the job efficiency of

the castrates. It was again confirmed that the rate of nonsexual crime is little influenced by castration. Concerning job efficiency, there seems to be a pacifying effect resulting from castration. According to the ratings of the castrates, job efficiency had improved in 21 cases (24%). Six subjects (7%) mentioned that their occupational abilities deteriorated after operation. In 59 cases (69%) no change was noticed by the castrates ($N = 86$).

Attitude Toward Castration

Forty-six subjects (52%) said that they were content with the outcome of the operation, although having been compulsorily castrated. Twenty-three castrated males (26%) were ambivalent. They agreed to the beneficial effects on loss of "criminal energy" but were less satisfied with the somatic and psychic sequelae of the operation. The remaining 20 subjects (22%) were markedly discontent, some even embittered that they had been mandatorily castrated.

Indication for Castration

Langelüddeke (1963) emphasizes that castration should be practiced as a last resort, but this principle would not preclude the operation's being performed after the first sex offense on males who commit aggressive sexual crimes, i.e., mainly rapists, but also child molesters and exhibitionists. The investigation results scarcely justify castration for homosexuals if they have erotic relationships with other homosexual partners. Langelüddeke (1963) feels that castration is indicated for all sex offenders who are sane, and also for mild psychopaths and people with minimal to moderate pseudodementia. For schizophrenics and severe psychopaths, castration is contraindicated.

CATAMNESTIC STUDIES ON CASTRATED SEX DELINQUENTS FROM A FORENSIC-PSYCHIATRIC VIEWPOINT

Cornu (1973) intended to prove that castration as a medical treatment should not be restricted to sex offenders who are sane, but also should be performed on subjects who are severely imbecilic, psychopathic, or even schizophrenic.

Subjects and Methods

The sample consisted of 127 sex offenders from Bern (Switzerland) who were evaluated by psychiatrists and who had lived as castrates for at least 5 years after release. Moreover, there was a comparison group of 50 sexual criminals

who were also examined by psychiatrists but who had refused to have their testes removed although they had to endure a long period of confinement (these subjects are hereinafter called "refusers"). According to psychiatric diagnoses, the sample was much more pathological than that of Langelüddeke (1963). The sample composed the largest number of castrates ever followed up in Switzerland, and is at least representative for Bern. The catamneses ranged from 5 to 35 years. The investigation is based on analyses of files from the court, police, and psychiatric hospitals as well as excerpts from the criminal records for 177 sex offenders. In addition, 68 castrates were interviewed and medically examined in a hospital.

Results

Recidivism Rate for Sexual Crimes

Of 121 subjects, nine castrates (7.44%) recidivated with one sexual crime each. Before the operation, these sex offenders had a recidivism rate of 76.86% (see Table IV). Thus 370 sentences were contrasted with nine after release.

The nine recidivists committed sexual crimes within the first 5 years after operation. Younger castrates (castration age under 30 years) seem to have a higher risk of recidivating than those older. In comparison with the results of Langelüddeke (1963), significantly more castrates recidivated. But Cornu (1973) judged only five recidivisms as "true," so that his corrected recidivism rate for sexual crimes after castration is 4.13%.

Table IV. Recidivism Rate for Sexual Crimes of Sex Offenders Before and After Castration

Number of convictions	Sex offenders before castration				Sex offenders recidivated after castration	
	N		%		*N*	%
Once		28		23.14	9	7.44
Twice	35		28.93			
3 times	23		19.01			
4 times	13		10.75			
5 times	10		8.26			
6 times	3		2.47			
7 times	5		4.13			
8 times	4	93	3.31	76.86		
Total		121		100.00	9	7.44

In the comparison group ($N = 50$), 26 offenders (52%) committed (several) sexual crimes again within 10 years after castration was recommended to them by a judge or an expert. Before that time the recidivism rate amounted to 66% (see Table V). The number of sentences decreased from 130 to 56 after castration had been proposed to this kind of sex offender.

Recidivism Rate for Nonsexual Crimes

Analysis of the data showed a strong reduction of the recidivism rate for nonsexual crimes which was not largely due to the age of the castrates as Langelüddeke (1963) had found, but mainly to castration as a medical treatment. There was some evidence that the basic psychiatric disorders of the patients, from which the nonsexual delinquency seems to result, could be favorably influenced by castration.

Comparison Between Castrates and Refusers

There were no significant differences between castrates and refusers as to psychiatric diagnoses, sexual deviations, life histories, or single status. The refusers recidivated significantly more often than the castrates, mainly within the first 5 years after castration was suggested to them. Their recidivisms were significantly more influenced by alcohol. The refusers were significantly more often diagnosed as having diminished mental soundness and their family background was judged to have been disruptive more frequently than that of the castrates.

Table V. Recidivism Rate for Sexual Crimes for Refusers Before and After the Proposal

Number of convictions	Sex offenders before castration was proposed				Sex offenders with recidivisms after castration was proposed	
	N		%		*N*	%
Once		17		34	15	30
Twice	11		22		4	8
3 times	11		22		3	6
4 times	6		12		0	0
5 times	1		2		1	2
6 times	2		4		2	4
7 times	0		0		1	2
8 times	1		2			
9 times	1	33	2	66		
Total		50		100	26	52

Follow-up Study of 68 Castrates

Sexual Drive

Forty-three castrated males (63%) stated that their libido and potency had been extinguished quickly after castration. In 18 cases (26%) there was a gradual decline of the sexual drive. Seven castrates (10%) mentioned that they were able to have sexual intercourse 8-20 years after they were castrated. At a castration age between 26 and 45 years, there will be a rapid extinction of the sexual drive (see Table VI).

Bodily Complaints

Thirty-nine castrates mentioned an average of three bodily complaints that were due to castration (see Table VII). In 30 cases, the bodily complaints caused troubles for more than a year after castration, some even until the beginning of the follow-up study.

Somatic Sequelae

Medical examination showed that 21 castrates (51.2%) were extremely overweight (N = 41). In two cases (4.9%) emaciation resulted from the operation. Gynecomasty was seen in four cases (9.8%). Hair on the head had decreased in one case (2.4%) and increased in two cases (4.9%). Hair on the body was strongly reduced in 26 castrates (63.4%). Growth of beard vanished in two castrates (4.9%). Axillary hair, as well as public hair, was lessened in 18 and 21 cases, respectively (43.9% and 51.2%). Fourteen castrates (34.1%) were

Table VI. Potency of Castrates (N = 68)

	Potency still prevailing or weakened slightly		Potency became obviously weaker		Potency extinguished soon after castration	
Age at castration	*N*	%	*N*	%	*N*	%
14–25	0	0.00	1	1.47	4	5.88
26–35	4	5.88	5	7.35	17	25.00
36–45	2	2.94	8	11.77	14	20.58
46–55	1	1.47	4	5.88	6	8.83
56–65	0	0.00	0	0.00	2	2.94
Total	7	10.29	18	26.47	43	63.23

Table VII. Bodily Complaints After Castration ($N = 39$)

Bodily complaints	Frequency	
	N	%
Hot flashes	21	18.6
Feeling of brain pressure	6	5.3
Flutters	26	23.0
Vertigo	21	18.6
Sudoresis	24	21.2
Disorders of sleep	6	5.3
Palpitation of heart	1	0.9
Tiredness	8	7.1
Total	113	100.0

judged to have a "castrate face." The skin of many castrates became softer, more pliable, and slacker.

Osteoporosis After Castration

Of 68 subjects, the lumbar vertebral column of 60 could be X-rayed laterally. The result was that in 49 cases (81.6%) osteoporosis was diagnosed. Bodily complaints such as bone pains, mainly in the vertebral column, were mentioned by 21 of 49 castrates (42.8%). Mainly subjects between 41 and 60 years suffered from these kinds of complaints, often up to 20 years after castration.

Psychic Changes

Nineteen castrates (28%) stated that they did not experience any psychic disorders caused by the operation. Twenty-seven subjects (40%) had the opinion that castration had favorably influenced their moods. They specified that they felt much calmer, happier, and more active than before the operation. In comparison with Langelüddeke (1963), these positive psychic changes were significant. Twenty-two castrates (32%) stated that they still felt miserable after the operation. Some lamented that they were often depressed, irritable, and isolated. Some had a feeling of having been maimed.

Effects on Job Efficiency

Fifteen subjects (22%) argued that their capacity for work had deteriorated after castration. In comparison with the results of Langelüddeke (1963), significantly more castrates reported a lessening of job efficiency. In 11 cases (16%)

the ability to perform was deemed to have become better. Forty-one castrates (61%) had the opinion that there was no change in their job efficiency ($N = 67$).

Suicides After Castration

Three men committed suicide after castration. This was discovered only by accident, because it was methodologically impossible to analyze the true incidence of suicide. Two had attempted suicide before castration, so that, in Cornu's (1973) opinion, castration played only a minor role in the suicides.

Attitude Toward Castration

Of 68 subjects, 48 castrates (71%) accepted their former decision to have their testes removed and stated that they were content with the operation, usually for one of the following reasons: the abnormal sex drive had vanished, confinement was prevented, state of health had improved or marriage was possible for the first time. In comparison with the results of Langelüddeke (1963), there were significantly more castrates content with the operation, although the sample included a high rate of disturbed people. Eleven subjects (16%) were ambivalent, because they felt they were forced to agree to the operation, or because they lost their fertility. Nine subjects (13%) felt effeminate and mutilated and were therefore very discontented after castration.

Indication for Castration

As a group, the subjects were pathological (for instance, 41 subjects were diagnosed as mildly to severely moronic, 19 others as mild to severe imbeciles; of 63 psychopaths, 48 were regarded as severely disturbed and 23 were judged to be very aggressive). Nevertheless, the corrected recidivism rate was only 4.13% for sexual crimes committed by castrates. Thus it was empirically demonstrated that, contrary to the results of Langelüddeke (1963), castration should not be limited to sex offenders who are sane but is also indicated for imbeciles, psychopaths, and schizophrenics.

BREMER (1959): ASEXUALIZATION: A FOLLOW-UP STUDY OF 244 CASES

Goals of the Study

This Norwegian study was conducted from the viewpoint of legal castration as medical therapy. The author intended to arrive at a comprehensive

evaluation of castration; for example, he tried to show under what presuppositions a subjectively and objectively satisfactory or unsatisfactory result was achieved.

Subjects and Methods

The sample consisted of 216 male and 28 female castrates. Of the 216 male castrates, 215 were followed up. The psychiatric diagnostic grouping of this population was as follows: 16 sexual deviates (7%), 24 psychopaths (11%), 109 oligophrenics (51%), 53 schizophrenics (25%), ten epileptics (5%), and three others (1%).

Consistent with the extreme psychopathological character of the group, 147 subjects (68%) were castrated at the request of another person. Only 68 subjects (32%) asked for castration. The group of sex offenders brought before court consisted of 102 males (47%). A smaller group comprised 37 individuals (17%) whose sex offenses were left to be treated purely administratively. Seventy-six subjects (35%) were castrated on psychiatric indication, i.e., various indications related to supervision and care of chronic mental patients.

The age distribution of the subjects at the time of castration ranged from 13 to 68 years. Fifty-three subjects (25%) were under 25 years when castrated (17 of these even under 20 years).

Of 209 subjects, 45 (22%) were under catamnestic observation for 1–2 years. For 67 subjects (32%) the length of the observation period ranged from 2 to 5 years. Sixty-two subjects (30%) were under observation for 5–10 years, and for the remaining 35 subjects (16%) the follow-up period extended more than 10 years.

The method was based on questionnaire interview with the castrate and/or information from those in contact with him. Moreover, documentary sources were analyzed (files from the court and mental hospitals, excerpts from the criminal records, etc.).

Results

Recidivism Rate for Sexual Crimes

Of 102 sex offenders, only three castrates (2.9%) relapsed into sex offenses. However, in only 41 cases was the period of observation long (5–10 years). Therefore, there was a maximum of 7% recidivism during this observation period. The recidivism incidence before castration was as follows: Of 102 subjects, 59 (58%) had relapsed. Out of these, 39 (66%) had one relapse, 20 (34%) had more than one recidivism (of the latter, nine subjects had two re-

lapses, eight had three, and only three exhibitionists recidivated more than three times). This implies that, of the 41 cases mentioned, 24 subjects (58%) would have relapsed if they had not been castrated.

Changes in Sexual Function

In 66% of the cases – 103 of the 157 persons for which the effect of castration on the sexual function could be judged – all sexual interest, reactivity, and activity had essentially disappeared. In the majority – 74 of 103 subjects (72%) – the asexualization was reported to have occurred immediately or shortly after operation. In the remaining 29 cases (28%), sexual urge was reported to have disappeared gradually in the course of a few months to 1 year. In 54 cases (34%) a sexual interest and reactivity, possibly activity or pronounced sexual coloring of psychotic syndromes, persisted for more than 1 year. The homosexuals showed fundamentally the same quantitative reduction in sexual activity as the heterosexuals, but the sexual direction was definitely not changed by the operation. Sexual urge was considerably more persistent in the age group 20–49 than in the younger and older age groups.

Changes in Somatic State

One hundred and thirty-nine subjects (69%) stated no essential complaints besides the standard castrate changes in secondary sex characteristics. Striking castration characteristics after an observation period of 6–15 years were reported by 37 persons (18%). They can be summed up as follows: troublesome gain in weight (10–47 kg); exceptionally aged appearance; troublesome climacteric symptoms; complaints of weakness; and deterioration in general health.

The operation mortality rate was almost 2% (four cases). In addition, 22 subjects (11%) died during the observation period. Of the 16 persons castrated with the exclusive purpose of calming them down, nine subjects (56%) died. This proportion illustrated the failure of castration to exert a predictably calming effect. It is possible that castration was responsible for an ostensible reduction in somatic health or for death in at least 26 of the 202 cases (13%).

Psychic Changes

An endocrine psychosyndrome was diagnosed in 44 of 175 cases (25%). The symptoms were mostly of an asthenic and dysphoric-depressive nature. On the whole, they were slight and did not appear to have had any appreciable influence on the efficiency of the castrates. The course of schizophrenia was

not fundamentally altered by castration. No change in the frequency or character of epileptic seizures was encountered.

Attitude Toward Castration

Of the group of sex offenders (N = 102), 37 subjects (41%) were satisfied regarding the benefits gained from the operation. Twenty-three castrates (26%) were dissatisfied or bitter, and 29 (33%) were indifferent (lack of information in 13 cases).

Indication for Castration

Castration was of therapeutic significance only in behavioral disturbances involving an urge for sexual relief. By far the most satisfactory results were obtained in the case of the habitual sexual deviates, including the homosexuals, and the oligophrenics. Castration therapy was also of help to some of the psychopaths and deteriorated schizophrenics whose sexual disturbances were predominant. Psychopathic personalities and psychotic symptoms, however, were complicating factors in most cases and were not favorably influenced by castration. Castration yielded poor results in schizophrenic and epileptic psychoses, and many complications of emotional origin ensued in the psychopaths.

STÜRUP (1968): TREATMENT OF SEXUAL OFFENDERS IN HERSTEDVESTER, DENMARK: THE RAPISTS

Stürup's (1968) monograph focuses mainly on the most serious rape cases (38 sex offenders) committed in Denmark during the period 1935–1961. Eighteen of these 38 rapists were castrated. None of these castrated males committed another sexual crime, but six (33%) were convicted for nonsexual crimes. Among the 20 sex offenders who were not castrated, it was found that two persons (10%) committed a sexual crime after release and that one person (5%) was charged with a nonsexual crime.

In addition, a brief account of the results of legal castration in Denmark was given. The follow-up study of 900 cases covered the 30-year period 1929–1959 (Sand *et al.*, 1964). Altogether, some 4000 separate follow-up investigations were conducted on these 900 castrates. In some cases, castrated individuals were examined up to 16 times; most subjects were examined from one to five times. The most important findings can be stated as follows:

Asexualization was found in 97% of the castrated individuals. Only 20 of the 900 sexual criminals recidivated (2.2%). However, only ten castrates (1.1%) were judged as real sexual recidivists. More than 90% of these persons were satisfied with the operation. Medical observations showed that castration was

seldom followed by obesity. Castration of fat males resulted often in a change of fat distribution; that is, there was more fat on the breasts and the hips. Periods of hot flashes and sweating were common, but usually the symptoms were only of short duration. The beard and body hair was usually diminished after castration, but not head hair. Head hair may even increase, and baldness after castration was unusual. Diminished vitality, energy, and initiative could not be seen definitely as a general effect of castration. Several castrated men were seen who had built new careers with extraordinary energy and had a high degree of success. Therefore, it must be emphasized that serious psychological consequences of castration were not observed in adult men.

Regarding the psychological side effects just mentioned, some caution is necessary. Some castrates killed themselves after operation. In a group of 284 sex offenders who had been treated surgically during the period 1935–1967 at Herstedvester, the Danish institution for the criminally insane, it was found by Stürup (1968) that at least five castrates (1.8%) had committed suicide. Nevertheless, the main conclusion to be derived from this material on castrated men is, according to the Danish author,

> that the persons who are convinced that life before castration was terrible and burdensome and who have a great guilt complex concerning the terrible things they have done are nearly always very happy that they have been castrated. This is also true of that portion of them who after castration have no sexual initiative at all. (p. 15)

METHODOLOGICAL PROBLEMS IN FOLLOW-UP STUDIES ON CASTRATES

Whereas Bremer (1959) has written a detailed chapter on his empirical approach, Langelüddeke (1963) and Cornu (1973) did not include relevant methodological discussion in their monographs. It is therefore doubtful that the two authors have seen the plenitude of potential sources of error which are inherent in an interview situation as a special kind of social interaction and that they have adequately assessed the reliability and validity of their data. Moreover, we find operational definitions neither of such vague terms as "potency" and "libido" nor of such doubtful classifications as "potency still prevailing or weakened slightly," "potency became obviously weaker," or "potency extinguished soon after castration."

In interpreting their data, Langelüddeke (1963) and Cornu (1973) state that the reduction of potency is connected with an equivalent decrease of libido. This interpretation is obviously wrong, as can be gathered from the case material presented by Langelüddeke (1963) in the appendix of his monograph and shown in Bremer's (1959) and Tauber's (1940) reports. It is in this context not only important to know whether castration terminates male sexual reactions, but just as necessary to know the consequences, especially with regard to the

libidinal attachment to sexual stimuli and how a postoperative disproportion between potency and libido is psychically handled by the subjects.

Langelüddeke (1963) and Cornu (1973) did not eliminate from their samples those subjects who were already sexually inactive before castration. [Bremer, 1959, eliminated 39 such subjects, i.e., almost 20% of his cases (N = 196).] Considering that in these samples castration was practiced as a method of choice just for sex offenders whose sex crimes were the result of their sexual hypofunction, it is evident that the claim that castration has a strong physiological effect on male sex drive is doubtful because of this methodological mistake. Apart from the astonishing fact that in 16 and seven cases, respectively (18% and 10%), castration had no effect on the male sex drive, it should be stressed that to find that the potency of 15 and 18 castrates, respectively (17% and 26%), became obviously weaker over some period of years is meaningless because it was not possible in these two studies to show that this diminution of sexual activity occurred more rapidly than that in the male population as a whole.

In the Danish reports, some later published details on the sex activities of castrates are confusing. Stürup (1972) states that desexualization was found in 90% of 900 cases. During the 6 months following castration, this effect was seen in only half the cases, with 87% desexualized by the end of the first year after castration. In 3% of the subjects the expected effect of castration was delayed more than 6 years. These figures and terms are partially contradictory to those reported by Stürup (1968), albeit the sample population (N = 900) and the investigation period (1929-1959) were the same.

What is more, the four most important European studies on castrates mentioned above fail to allow for the fact that for most males the frequency of sexual activity steadily decreases with advancing age, even if they are not castrated (Kinsey *et al.*, 1953). In evaluating the high rates of asexualization noted, mainly those reported in the Scandinavian studies, we must not forget that these figures are based on the self-ratings of sex offenders who must have learned during counseling by psychiatrists or other physicians to define themselves as sexless human beings. These biased data, therefore, by no means prove empirically that there is a strong connection between sex hormones and sex behavior in males (Beach, 1976; Rogers, 1976; Rose, 1976), as is still believed by some therapists in Europe who are proponents of castration as a useful treatment for sex offenders. We agree therefore with Bermant and Davidson (1974), who argued that in view of the countless times this operation has been performed it is amazing that there is so little precise and scientifically valid information on its effects. Hence it must be emphasized that it is still unclear whether castration has important physiological effects on libido and/or potency. There is good evidence that the effects of castration on the male sex drive depend mainly on the psychological attitude toward castration. This evidence

was summed up by Ford and Beach (1951) as follows:

> It is unlikely that the purely physiological sequelae of castration are as variable as the subjective reports indicate. We consider it more probable that some men, being convinced in advance that the operation will deprive them of potency, actually experience a lessening of sexual ability. Other individuals unprejudiced by such anticipatory effects are able to copulate frequently despite loss of hormonal support. (p. 232)

GENERAL PROBLEMS

To the aforementioned methodological objections it should be added that there are no studies available based on thorough and replicable clinical, psychiatric-psychological, and sexological testing of sex offenders before and after castration. All investigations mentioned above are retrospective and, with the exception of the Danish reports, single *post factum* studies including all methodological flaws that are endemic to such methods. The Danish longitudinal studies seem to be of doubtful value inasmuch as many castrates were medically examined, but without using X-ray photography, so that over a long period of years it was incorrectly claimed that there was no risk of a castrate developing osteoporosis: a risk which is indeed very high, as shown by Cornu (1973).

The studies cited here are methodologically poor and allow few conclusions about the physical, psychiatric-psychological, social, or geriatric side effects of castration. Only Bremer (1959) has seen the methodological dilemma which seems to exist for all follow-up studies on castrates, and therefore suggested comparing, in a sophisticated longitudinal study, groups consisting of castrated sex offenders, castrated male patients (e.g., because of testicle or prostate cancer), and sexually "normal males" in order to be able to control all relevant variables of scientific interest in this field. Unfortunately, such an important study has never been conducted. Only once was there a serious attempt to conduct a well-designed investigation, known as the California Sexual Deviation Project (1950–1954). In this case, a very carefully controlled series of castration cases was planned in order to come to a conclusion concerning whether castration is a useful and reasonable kind of medical treatment for sex offenders (Bowman, 1952). However, this project was halted by several psychiatrists of the psychoanalytic school (Campbell, 1967). Thus a thorough scientific study is still needed in this field.[3]

[3] After this article was finished we discovered two studies that might be interesting for the reader in this connection: Bowman and Crook, 1960; Yamamoto and Seeman, 1960.

PITFALLS IN ANALYZING RECIDIVISM RATES

On the basis of the aforementioned studies, it appears that the risk of committing a subsequent sexual crime is reduced for sex offenders after they have been castrated and released. Methodological objections raised by Gaensbauer (1973) are essentially valid regarding older European studies on castrates but largely not in the ones reviewed here. We have seen in these studies that the follow-ups are of very long duration and that the knowledge of the sample is detailed. The studies of Langelüddeke (1963) and Cornu (1973), even if there are some statistical problems in this connection, contained comparison groups, and in the Swiss study offenders were rated for diagnostic purposes by independent psychiatrists. These two studies also report in detail the subjects' previous records and include mainly castrated sex offenders whose probability of recidivism was very high before castration. Thus, in the German study, recidivism totaled 84% (see Table I) and in the Swissstudy 76.86% (see Table IV).

Unquestionably, however, castrated sex offenders with a low risk of recidivism, mainly first offenders and probably many one-time recidivists, should be eliminated from the total of a sample population, and any recidivism rate of castrates should be referred to the total of a sample population thus reduced. Nevertheless, this was not done in any of the four European studies mentioned. It follows that the "real" percentage for recidivism rates is higher for sexual crimes of castrates than had been originally stated by the authors. This shortcoming in analyzing recidivism rates, remedied only for the Danish study by Stürup (1972), must not be neglected, even if it is right to stress that it cannot be considered absolutely proved in any case that any low recidivism figures are exclusively due to the influence of castration. To draw that conclusion, one would need controlled studies on treated and untreated sex offenders focusing over a long period of time on all personal and environmental variables (including any undisclosed incidence of sexual delinquency) which are important to the life parttern of this kind of offender after release. Indeed, great care is required in any statements one makes about the influence of castration on lowering sexual recidivism rates. For instance, Allen (1969) discussed Danish statistics comparing sexual recidivism rates of castrates (five of 117 castrates were convicted of new offenses, i.e., 4.3%) with those of noncastrates (out of 58 noncastrates, 25 repeated, i.e., 42.4%). Conclusions that the chance of an uncastrated sex offender committing another sex crime is almost ten times higher than that of a castrated one are unwarranted because these statistics compare two different types of men and are therefore not valid. On the basis of these limited data, it is justified to argue that the decision to be castrated was "voluntary" in Denmark and no doubt those who asked for it were very different from those who rejected it. They may have been men who would have avoided further misconduct in any case even if they had not been castrated. The man who decided to stand a long term of imprisonment is not comparable to the man who voted for castration.

This argument seems also to be true for the Norwegian statistics reported by Bremer (1959).

CASTRATION AS A SOMATIC PANACEA FOR SEX OFFENDERS: TREATMENT OR PUNISHMENT BY SURGICAL MEANS?

To understand and explain the incidence of sexual crimes, we must take into account a multiplicity of factors. We have to consider many interacting determinants in the developmental process, such as genetic factors, prenatal influences, neuroanatomical and neuroendocrine interrelationships, early childhood experiences, familial role expectations, and ethnographic and cultural attitudes. A motivation analysis for sexually deviant behavior must also allow for situational factors such as the presence and type of sexual objects, and the affective moods and the cognitive complexity of the interacting partners (Gaensbauer, 1973). Keeping this multifactorial paradigm in mind, we must admit that there always exists a theoretical gap between the etiology of sex deviations and the various kinds of somatic or nonsomatic treatment. As to castration as a somatic kind of treatment for sex offenders, however, it is justified to say that the gulf just mentioned is the largest among all treatment possibilities available; and it is, as will be shown later, unbridgeable.

One of the most persistent myths about sex offenders is that such crimes are rooted in an abnormally strong sexual drive. Apart from the fact that nobody knows exactly what the scientific meaning of the term "abnormally strong sexual drive" is and, if it does exist, how it might be quantified, it has often been shown that many sex offenders suffer from just the opposite, namely from a sexual hypo- or dysfunction (Gebhard *et al.*, 1965; Groth and Burgess, 1977). Although long-term scientific endeavors in Europe attempting to prove that the testicles of sex offenders or their hormone production is pathological did not succeed, the myth that sex offenders are driven to their crimes by an unbridled sexuality remains. It is a fact that in the European literature on castration, biological factors, i.e., hormonal components, have always been overaccentuated in the treatment of sexual deviations. However, findings reported by Rada *et al.* (1976) indicating that plasma testosterone levels in rapists and child molesters are not significantly different from those of normals reemphasize that there is no physiological-hormonal reason and therefore no medicoscientific legitimacy for practicing castration. This conclusion is supported by measurements of Karacan *et al.* (1972), who demonstrated that convicted rapists exhibited nocturnal penile tumescence which was more like that of "normals" than that of the nonsexual prisoners. This result indicates again that the motivation for sex offenses is less dependent on physiology than on the psychological makeup of the individual. Therefore, on this point the rationale for castration in the treatment of sex offenders is weak.

Another point is that inferences drawn from animal investigations do not justify castration in humans. Rogers (1976) concludes that in many animals castration after puberty had little effect on sexual performance. He continues that circulating levels of sex hormones are necessary for the initial establishment of sexual behavior in the animal's repertoire. However, once the pattern of sexual behavior has been established, it becomes to a large extent emancipated from hormonal control. Beach (1970) discovered that male dogs continue to copulate for years after castration. He argues that the results of animal investigations indicate that male carnivores may be less dependent on testosterone than are male rodents and that male monkeys may be found to be even less dependent on testicular secretion than are male dogs. "If this proves to be the case, it would be reasonable to speculate that men whose testes are removed after adulthood has been reached would not suffer any pronounced reduction in sexual responsiveness or capacity" (Beach, 1970, p. 445).

Despite these findings, castration in some European countries is still deemed appropriate for male sex offenders. In fact, these outcomes are essentially ignored in the European literature on castration, and, if they are mentioned, are dismissed. Thus Pirke (1977) cites generalizations based on animal investigations and concludes that they are irrelevant on the basis of the high degree of asexualization reported in the studies of Bremer (1959) and Langelüddeke (1963). It was one of our aims in this article to demonstrate that there are many methodological problems endemic to this subject so that we cannot accept this objection and its concomitant rejection of important scientific results. Indeed, Eibl (1978) succeeded in proving for the first time on the basis of a larger sample that the sexual responsiveness of castrated males is much more varied and nuanced than had been supposed up to now: out of 38 castrated sex offenders whose penile erections were measured while viewing a sex movie (penile plethysmography), 19 (50%) exhibited full erections up to the plateau phase, although time since castration ranged from 3 to 5 years. Another empirical approach for the first time practiced in this field by Heim (1978) demonstrated that out of 20 castrates who were questioned by mail about their sexual behavior, eight (40%) answered that they have still been able to experience sexual intercourse, although they had been castrated 3–7 years ago. Three subjects claimed a coitus frequency in the range of one to three times a week; the coitus frequency of the remaining five subjects was less than one to three times a month.

It is necessary to keep in mind that the intent of castration in the treatment of sex offenders is a deliverance not to but from human sexuality. Viewing as a whole the arguments presented in this article on the sexual behavior of castrates, we can say that the only effect on male sexuality after castration which is absolutely predictable is that the concerned sex offenders will lose their genitality. This assessment makes evident, however, that what is so freely called a useful kind of somatic treatment is in fact a punishment by surgical means. No doubt, the purpose of practicing this operation on sex offenders is to cut one of the fundamental needs of human beings, namely the need of the warmth and

sensation of close body contact and genital proximity (Money, 1961). It seems that therapists who are propagating castration are acting out archaic feelings of revenge. However, what would be necessary instead of such a harsh method as castration, whose use as well as its symbolic meaning is overkill, is just the opposite: namely that therapists would protect incarcerated sex offenders against repressive sex ideology. As sex laws are subject to social, and in the long run to legal, changes, the practice of irreversible treatments for sex offenders, based only on incomplete and/or inaccurate data, is not justified. Ignoring this means to act irresponsibly in the same way as has been done in many countries to homosexuals who were castrated for sexual behavior which is now no longer punished.

On the basis of the scientific and ethical considerations presented here, it follows that castration is not a responsible treatment for sex offenders. Unquestionably there are, in the United States, at least, nonsomatic treatment possibilities available which are effective and much more humane (e.g., Kozol *et al.,* 1972; Brancale *et al.,* 1972; Abel *et al.,* 1976, 1978). The consent to castration, based on the free decision of an inmate, may be a legal fiction in some European countries. The fact is that incarcerated sex offenders have a choice only between two evils: loss of manliness or loss of freedom through long-term imprisonment (Rees, 1977; Klerman, 1975; Dworkin, 1975). It is evident that castration turns the clock back to medieval times, when amputation of the hands was practiced as a means of curing thievery.

REFERENCES

Abel, G., Blanchard, E., and Becker, J. (1976). Psychological treatment of rapists. In Brodsky, S., and Walker, M. (eds.), *Sexual Assault,* Lexington Books, Lexington, Mass., pp. 99-115.

Abel, G., Blanchard, E., and Becker, J. (1978). An integrated treatment program for rapists. In Rada, R. (ed.), *Clinical Aspects of the Rapist,* Grune and Stratton, New York, pp. 161-214.

Allen, C. (1969). *A Textbook of Psychosexual Disorders,* Oxford University Press, London.

Beach, F. A. (1970). Hormonal effects on socio-sexual behavior in dogs. In Gibian, H., and Plotz, E. J. (eds.), *Mammalian Reproduction,* Springer, Berlin, pp. 437-466.

Beach, F. A. (1976). Hormonal control of sex-related behavior. In Beach, F. A. (ed.), *Human Sexuality in Four Perspectives,* John Hopkins University Press, Baltimore, pp. 247-267.

Bermant, G., and Davidson, J. (1974). *Biological Bases of Sexual Behavior,* Harper and Row, New York.

Bowman, K. (1952). Sexual Deviation Research, March, 1952. Assembly of the State of California.

Bowman, K., and Crook, G. (1960). Emotional changes following castration. In West, L., and Greenblatt, M. (eds.), *Explorations in the Physiology of Emotions,* American Psychiatric Association, Psychiatric Research Reports, #12, pp. 81-96.

Brancale, R., Vuocolo, A., and Prendergast, W. (1972). The New Jersey program for sex offenders. In Resnik, H. L. P., and Wolfgang, M. E. (eds.), *Sexual Behaviors: Social, Clinical, and Legal Aspects,* Little, Brown, Boston, pp. 331-350.

Bremer, J. (1959). *Asexualization: A Follow-up Study of 244 Cases,* Macmillan, New York.

Campbell, H. (1967). The violent sex offender. *Rocky Mountain Med. J.* 64: 40-43.

Cornu, F. (1973). *Catamnestic Studies on Castrated Sex Delinquents from a Forensic-Psychiatric Viewpoint,* Karger, Basel (in German).
Dworkin, G. (1975). Can convicts consent to castration? *Hastings Center Rep.* 5(5): 18-19.
Eibl, E. (1978). Treatment and after-care of 300 sex offenders, especially with regard to penile plethysmography. In Justizministerium Baden-Württemberg (ed.), *Proceedings of the German Conference on Treatment Possibilities for Sex Offenders in Eppingen, 1977,* Stuttgart (in German).
Ford, C., and Beach, F. A. (1951). *Patterns of Sexual Behavior,* Harper, New York.
Gaenbauer, Th. (1973). Castration in treatment of sex offenders: An appraisal. *Rocky Mountain Med. J.* 70: 23-28.
Gebhard, P., Gagnon, J., Pomeroy, W., and Christenson, C. (1965). *Sex Offenders: An Analysis of Types,* Heinemann, London.
Groth, N., and Burgess, A. (1977). Sexual dysfunction during rape. *New Engl. J. Med.* 297: 764-766.
Heim, N. (1978). Castration in treatment of sex offenders: Results of a pilot study. In Justizministerium Baden-Württemberg (ed.), *Proceedings of the German Conference on Treatment Possibilities for Sex Offenders in Eppingen, 1977,* Stuttgart (in German).
Hynie, J. (1973). Preventive custodial therapy of sex delinquents serving their sentences. *Cesk. Psychiat.* 69: 29-31 (in Czech).
Karacan, I., Hursch, C. J., Guerrero, M. W., and Williams, R. L. (1972). The nocturnal penile tumescence of convicted rapists and other prisoners. *Sleep Res.* 1: 138.
Kinsey, A., Pomeroy, W., Martin, C., and Gebhard, P. (1953). *Sexual Behavior in the Human Female,* Saunders, Philadelphia.
Klerman, G. (1975). Can convicts consent to castration? *Hastings Center Rep.* 5(5): 17-18.
Kozol, H., Boucher, R., and Garofalo, R. (1972). The diagnosis and treatment of dangerousness. *Crime Delinq.* 18: 371-392.
Langelüddeke, A. (1963). *Castration of Sexual Criminals,* de Gruyter, Berlin (in German).
Money, J. (1961). Components of eroticism in man. I. The hormones in relation to sexual morphology and sexual desire. *J. Nerv. Ment. Dis.* 132: 239-248.
Pirke, K. M. (1977). Endocrinology of sexual reactions. *Sexualmedizin* 6: 40-42 (in German).
Raboch, J., and Nedoma, K. (1970). Indication for testicular pulpectomy in sexual delinquents. *Cesk. Psychiat.* 66: 152-157 (in Czech).
Rada, R., Laws, D., and Kellner, R. (1976). Plasma testosterone levels in the rapist. *Psychosom. Med.* 28: 257-268.
Rees, J. (1977). "Voluntary" castration of mentally disordered sex offenders. *Crim. Law Bull.* 13: 30-48.
Rogers, L. (1976). Male hormones and behavior. In Lloyd, B., and Archer, J. (eds.), *Exploring Sex Differences,* Academic Press, London, pp. 157-184.
Rose, R. (1976). Antiandrogen therapy of sex offenders. In Sachar, E. (ed.), *Hormones, Behavior, and Psychopathology,* Raven Press, New York, pp. 121-124.
Sand, K., Dickmeis, P., and Schwalbe-Hansen, P. (1964). *Report on Sterilization and Castration,* Publication 353, Copenhagen, pp. 46-57 (in Danish).
Stone, E., and Thurston, G. (1959). Castration for sexual offenders: A commentary on a recent case. *Medico-Legal J.* 27: 136.
Stürup, G. K. (1968). *Treatment of Sexual Offenders in Herstedvester, Denmark: The Rapists, Acta Psychiatrica Scandinavica,* Suppl. 204 (Vol. 44).
Stürup, G. K. (1972). Castration: The total treatment. In Resnik, H. L. P., and Wolfgang, M. E. (eds.), *Sexual Behaviors: Social, Clinical, and Legal Aspects,* Little, Brown, Boston, pp. 361-382.
Stürup, G. K. (1977). Personal communication dated November 20, 1977.
Tauber, E. (1940). Effects of castration upon the sexuality of the adult male. *Psychosom. Med.* 2: 74-87.
Taus, L. and Susicka, L. (1973). Five years long observation of sexual deviants after therapeutic intervention. *Cesk. Psychiat.* 69: 51-55 (in Czech).
Vozenilkova, A. (1971). Admissibility of castration as means against sexual delinquency. *Cesk. Zdravot.* 19: 284-287 (in Czech).
Yamamoto, J., and Seeman, W. (1960). In West, L., and Greenblatt, M. (eds.), *Explorations in the Physiology of Emotions,* American Psychiatric Association, Psychiatric Research Reports, #12, pp. 97-103.