EUNUCHOIDISM

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Castration was probably the first surgical operation. If that be correct, then the first surgical operation was not done to relieve human suffering but to satisfy one of the lower human instincts — jealousy. From the time of Semiramis to that of Abdul Hamid, eunuchs have been employed to guard the harems of the wealthy. Lipa Bey¹ vividly describes the barbaric way in which they are castrated and the tortures they undergo as children during and for a long time after this operation. Suffice it to say that according to Hirschfeld,² 80 per cent. of these unfortunates die either immediately during the process of operation or soon after from exhaustion due to pain and infection. Even today some of the children of the Orient are not free from the horrors of castration. In those parts of the East which are under the control of England stringent laws against this barbarism have been enacted.

It must, however, be admitted that even some of the ancient people protested rigidly against this form of brutality. The Hebrews considered castration an unpardonable sin. It was not lawful to castrate even animals. They went so far as not to allow a man whose sexual apparatus was cut off or otherwise mutilated to enter the house of the Lord.³ We are informed, nevertheless, by that linguist and scholar in Semitics, Dr. Alexander Harkavey, that the Jewish kings employed foreign eunuchs in their harems. In fact, the Hebrew word "sarīs" had a double meaning. It is translated as eunuch and minister of court. Apparently the eunuchs occupied important positions in the courts of Jewish kings.

Human psychology is very strange indeed. We often inflict on ourselves brutalities in the name of ideals. In the eighteenth century

1. Bey, Lipa: *Sexual Problem* 7:674, 1911.

2. Hirschfeld, M.: *Sexual Problem*, 8:81, 1912.

3. Deuteronomy, XXIII, 11.

in Russia and in Roumania arose a Christian sect who thought that through castration they could enter with more ease the gates of Heaven. This sect called themselves Skoptzi in Russia and Lipowaner in Bukarest. They based their belief on the following passage from the New Testament:

For there are some eunuchs which were so born from their mother's womb, and there are some eunuchs which were made eunuchs of men; and there be eunuchs which have made themselves eunuchs for the kingdom of heaven's sake. He that is able to receive it, let him receive it.—Matthew XIX, 12.

LITERATURE

It was among the Skoptzi that Tandler and Gross⁴ made their investigation which has since become classical. The importance of their studies consists mostly in the fact that acquired eunuchoidism very closely resembles or, better still, is almost identical with eunuchoidism, the latter being a congenital condition.

Larey,⁵ in "Campagne d'Egypte," was the first to describe a group of soldiers in Napoleon's army who had high pitched voices, fine skin, smooth and hairless, and no axillary or pubic hair. Their sexual organs were atrophied. For a long time these individuals were looked on as curiosities. Only a good deal later, when the study of the glands of internal secretions became more advanced, the pathology of this condition was taken up more seriously. Brissaud, de Santi, Levi, Anton⁶ and others have shown this condition to be the result of a disturbed pluriglandular activity.

Pierre Marie, through his demonstration that acromegaly is due to pituitary disease, stimulated the study of this gland. Among other things it was shown that the hypophysis has control over the sexual glands. Later, Fröhlich⁷ demonstrated his famous case of dystrophia adipositas genitalia which added a new asset to the knowledge of the pituitary. Soon after Cushing⁸ demonstrated that the anterior lobe was responsible for giantism, hypoplasia of the genitalia and adiposity of the feminine type. Fränkel-Hochwart⁹ demonstrated a patient in whom the power of erection returned after the excision of the pituitary gland. The literature soon became flooded with illustrations of the

4. Tandler, Julius, and Gross, Siegfried: *Arch. f. Entwicklungsmechanik der Organismen* **30**:236.

5. Larey, Baron: Quoted from W. Falta, *Berl. klin. Wchnschr.* **49**:1412, 1912.

6. *Ibid.*

7. Fröhlich, A.: *Wien. klin. Rund.* **15**: No. 47-48, 1901.

8. Cushing, Harvey: *The Pituitary Body*, J. B. Lippincott Co., Phila., 1911, p. 178.

9. Fränkel-Hochwart: Quoted from Peretz, *Neurol. Centralbl.* **29**:1286, 1910.

relation of the pituitary and sexual glands. McIver¹⁰ reported a case of a giant eunuchoid, and ascribes it to hypopituitarism because the sella turcica is deep and the posterior clinoidal processes are well developed. Cocrayne¹¹ reported a young eunuchoid of the fatty type with genu valgum and also calls it hypopituitary. In Langmead's¹² case, one of mixed type of infantilism and dystrophia adipositas genitalia, the author finds the cause in deficiency of pituitary secretion.

Maranon and Pintor¹³ report a case of eunuchoidism of the adiposita-genital type which developed following a bullet wound in the head. The necropsy, performed two years after the injury, showed an interruption of communication between the middle ventricle of the brain and the hypophysis. The hypophysis itself had undergone no direct lesion or compression. A case somewhat similar to this occurred in the Montefiore Hospital.

A girl, aged 11, with double optic atrophy, clinically showed symptoms of a pituitary tumor. The roentgenographic report was as follows: "The sella turcica is greatly enlarged; the clinoid processes are markedly thinned out and partly obliterated. Diagnosis: Neoplasm of the pituitary gland." The same report was issued on more than one occasion independently by two roentgenologists. The history was typical of increased intracranial pressure. At the beginning of the disease the child was markedly emaciated and the entire panniculus was wasted. A few months before her death she suddenly began to put on weight and in a short while she gained 40 pounds. She died from acute ascending paralysis. The necropsy showed a normal hypophysis and no tumor was found anywhere in the brain. Instead, a localized basal tubercular meningitis was present. This constricted the stalk of the hypophysis and thus interfered with its secretion. Symptoms of increased intracranial pressure were due to the internal hydrocephalus produced by the occlusion of the third ventricle. The rapid and enormous gain in weight can be explained by an interference with the proper function of the posterior lobe of the pituitary.

Manirot¹⁴ reports a case of diabetes insipidus, general dystrophy and genital hypoplasia. He found a small sella turcica and attributes the symptoms to a diminution in the function of the hypophysis. Cases of eunuchoidism which resulted primarily from a disease of the pituitary are reported by Ebstein,¹⁵ Weicksel¹⁶ and Mattiolo.¹⁷ St. Chauvet¹⁸ discusses at length the subject of the relation of the pitui-

10. McIver, J.: *J. Nerv. & Ment. Dis.* **45**:443, 1917.

11. Cocrayne, E. A.: *Brit. J. Child. Dis.* **14**:52, 1917.

12. Langmead, F.: *Brit. J. Child. Dis.* **12**:241, 1915.

13. Maranon and Pintor: *Nouv. Iconog. de la Salpêtrière*, No. 4, 1917, p. 185.

14. Manirot, A.: *Arch. de méd. des enfant* **16**:927, 1913.

15. Ebstein, E.: *Mittlg. a. d. Grenezgeb. d. Med. u. Chir.* **25**:441, 1912-1913.

16. Weicksel, J.: *München. med. Wchnschr.*, No. 22, p. 1227, 1914.

17. Mattiolo, G.: *Revista di Patol. Nerv. et Ment.* **19**:513 (Sept.) 1914.

18. St. Chauvet: *L'Infantilism Hypophysure*, Thèse de Paris, 1914.

tary to eunuchoidism as well as to infantilism, while Mouriquand¹⁹ divides the hypophyseal dystrophies into various types. Saenger²⁰ also speaks of the relation of the gonads to the pituitary. Contrary to established principle, as will be seen later, the fifth case of his series developed all the features of a eunuchoid in spite of the fact that the interstitial cells of the testicles were present. On the other hand, Fiessinger and Saurdel²¹ report a case of gonadal atrophy associated with unmistakable signs of diminished thyroid and suprarenal functions. Rebattu and Gravier²² report two eunuchoids, one with visible disturbance of the internal secretion and normal external secretion of the testicles, the other case with disturbed external and internal secretion of the testicles. They attempt to prove that the eunuchoidal characteristics of the individual depend on the absence of the cells of internal secretion in the testicle.

This condition was demonstrated experimentally by Ancel and Bouin,²³ who tied the blood vessels of the vas deferens in young animals, and although these afterward discharged normal spermatozoa, they acquired all the characteristics of castrated animals. One such case is reported in this article. Falta²⁴ discusses eunuchoidism acquired late in life either due to some disease or traumatism attacking the gonads. He tries to show that in these conditions we are dealing with a pluriglandular sclerosis.

Hecht²⁵ reports a case of eunuchoidism in an individual whose penis was very large, but whose testicles were of the size of lima beans. The patient had all of the other characteristics of a eunuchoid. He also showed levulosuria. Hecht comes to the conclusion that the condition is due to a pluriglandular disturbance.

Laignel-Lavastine and Courbon²⁶ report the case of a young soldier, 22 years of age, whose genital organs were normally developed until the age of 21. At that time he was stricken with mumps and a double orchitis. In the course of the next seven months the testicles and penis became markedly atrophied, the breasts increased in size, the abdomen became rounded, erection diminished, and sexual desire and power became weakened. Severe physical exercises in which he

19. Mouriquand, G.: *Paris Medicale* **6**:26, 1913.

20. Saenger, A.: *Deutsch. Ztschr. f. Nervenhe.* **51**:178, 1914.

21. Fiessinger, Noël, and Saurdel: *Presse méd.*, No. 6, p. 541, 1911.

22. Rebattu, J., and Gravier, L.: *Nouv. Iconog. de la Salpêtrière* **26**:257, 1913.

23. Ancel, P., and Bouin, P.: *Compt. rend. Acad. d. sc.* **138**:110 (Feb.) 1904.

24. Falta, W.: *Späteunochoidismus und Multipledrüssensklerose*, *Berl. klin. Wchnschr.* **49**:1412.

25. Hecht, D.: *J. Nerv. & Ment. Dis.* **38**:684, 1911.

26. Laignel-Lavastine and Courbon, P.: *Le Bulletin Med.* **30**:408, 1917.

formerly excelled were no longer possible. Briefly, the individual presented a progressive transformation of the secondary sex characteristics into those of the opposite sex.

Butte and Halbeon²⁷ report a case of acquired eunuchoidism in a man 32 years of age. This was due to a syphilitic and gonorrheal infection at 20 which at 32 caused a general sclerosis of the glands of internal secretion. The patient became completely impotent, his testes atrophied, hair and teeth came out, he put on weight, and mentally he was a child. His blood pressure was low. With all that there was not a single sign of organic change in the cerebrospinal system. The authors attribute the syndrome to a sclerosis of all the glands of internal secretion.

Costa²⁸ reports a case of eunuchoidism with giantism in whom he could demonstrate a deficiency of all the glands of internal secretion. The author believes that the original cause was an infection of the testes in early childhood. A case of the same type is also reported by Schwaer.²⁹ Zambaco Pasha³⁰ claims that in eunuchoidism the gonads are not the only glands affected, but that the entire system of glands of internal secretion must be damaged in order to produce the clinical picture of the eunuchoid. Zambaco endeavors to show that each gland has its own definite function, but by damaging one gland all must necessarily be involved. Timme³¹ expresses a similar view. Pende³² reviews the subject of eunuchoidism and lays stress on the relation of the pituitary to the gonads. Goldstein³³ ascribes eunuchoidism to a pluriglandular disturbance. He, however, again repeats the hypothesis of Tandler and Gross that there is a mutually double interaction, inhibitory and acceleratory, between the hypophysis and the gonads. He believes that the anterior lobe, the one responsible for acromegaly, inhibits the sexual apparatus, while the posterior lobe accelerates it, that is, the two lobes are antagonistic to each other. In states of eunuchoidism the balance is lost and abnormalities in growth result which will depend on the predominating lobe. If the anterior lobe leads, there will be an abnormal growth of the skeleton; if the pos-

27. Butte and Halbeon: *Bull. de mém. de la soc. méd. d. Hôp. de Paris* **31**:365, 1915.

28. Costa, S.: *Paris méd.*, No. 43, p. 378, 1913.

29. Schwaer, G.: *Deutsch. med. Wchnschr.* **40**:963, 1914.

30. Pasha, Zambaco: *Les eunoques d'aujourd'hui et ceux de jadis*, Monograph, Paris, 1911, p. 152.

31. Timme, Walter: A New Polyglandular Compensatory Syndrome, *Endocrinology* **2**:209, 1918.

32. Pende, N.: *Endocrinology* **1**:924, 1916.

33. Goldstein, Kurt: *Arch. f. Psych. u. Nerven.* **53**:649, 1914.

terior lobe leads we have a fat, bloated individual. This is a very attractive but as yet unproven theory.

More recently Ewing³⁴ has thrown new light on the subject. He epitomizes: "The fate of the human body is not a matter of chance, but in general is controlled by certain intrinsic physical tendencies that are of congenital origin." He teaches through necropsies that eunuchoidism is in many respects akin to status lymphaticus. In his postmortem reports of eunuchoids, Ewing especially emphasizes the hypoplasia of the cardiovascular system and a delicacy of all the blood vessels. This condition of the entire arterial system accounts for the frequent apoplexies in young individuals. The frequent interstitial myocarditis found at necropsies is responsible for the sudden death in these individuals.

A necropsy made by Dr. Harlow Brooks on a eunuchoid at the Montefiore Hospital in 1902 confirms Ewing's statement. We will repeat here a part of the necropsy findings.

Large vessels of abdomen small and sclerotic (the individual, a boy, was 15 years old), especially the smaller trunks. Heart below normal in size, the weight being 9 ounces, with a slight amount of endocarditis. Thyroid small with an incomplete isthmus; weight 8 gm. Tuberculous lymph glands on neck. Liver small. *Spleen very large and asymmetrical. Adrenal bodies small and a portion of right adrenal lost.* The tissue has apparently undergone degeneration in the cortical portion. The kidneys are about one third of their normal size and show pathologic and congenital lobulation. Many cystic bodies are present. The genital organs are very small, a heavy fold of adipose tissue projecting over a very small penis 2 inches long, and covering mons veneris. The prostate is very small. The brain showed primitive sulci; it was small. Optic atrophy was present. Pituitary gland small, no gross lesions.

The individual was a eunuchoid of the fatty type.

More recently Citelli et Caliceti³⁵ report a number of young soldiers with feminine features who suffered mainly from adenoids. Caliceti³⁶ even goes so far as to demonstrate a case of pituitary disease associated with eunuchoidism cured by the removal of adenoids. He confirms the theory of Poppi who claims that all hypophyseal diseases are due to adenoid vegetations. As far as the gross pathology is concerned, particularly the skeleton, we cannot do better than to refer to Tandler and Gross,³⁷ and also Duckworth.³⁸

34. Ewing, James: Military Aspect of Status Lymphaticus, J. A. M. A. **71**:1525 (Nov. 9) 1918.

35. Citelli, S., and Caliceti, P.: Il Policlinico Lezione Pratica **25**:245, 1918.

36. Caliceti, P.: La Pediatria **25**:233, 1918.

37. Tandler, Julius, and Gross, Siegfried: Arch. f. u. Entwicklungsmechanik der Organismen **27**:35, 1909.

38. Duckworth, W. L. H.: J. Anat. & Physiol., 3d Series **2**:30.

DEFINITION OF THE TERM

Clinically, the term eunuchoid was first used by Duckworth and adopted by Tandler and Gross. The latter authors divide the eunuchoids into two classes: (1) tall, slender individuals with abnormally large extremities, and (2) stout, bloated people with accumulations of fat at the upper eyelids, breasts, lower abdomen, cristae iliae and

Fig. 1 (Case 1).—Eunuchoid, with spastic paraplegia due to apoplexy in cord.

nates. A number of intervening types are present. The symptomatology of eunuchoidism may be shown by a description of the following cases.

ILLUSTRATIVE CASES

CASE 1 (Fig. 1).—*History*.—A. H. entered the Montefiore Hospital Oct. 8, 1917. Father died at the age of 58 of cancer; seven brothers and sisters living

and well; one sister died in labor. Patient had been married six years and claimed to have had sexual intercourse. He, however, soon left his wife. Present illness dates back ten months prior to his entrance into the Montefiore Hospital. He complained of prickling sensations around the anus and right costal cartilage which lasted for a few days. Suddenly at night he was stricken with paralysis of both lower extremities. He could not pass any urine and had to be catheterized for three weeks. His bladder condition gradually improved, and at time of examination he had perfect control of the urinary sphincter.

Examination.—The patient is 5 feet, 11 inches tall. Circumference of head, 20 inches. From acromion to styloid process of radius, 28 inches. Distance between anterior superior spines, 10 inches; anterior superior spine to internal malleolus, 34 inches; umbilicus to internal malleolus, 36½ inches; umbilicus to symphysis, 7 inches, and suprasternal notch to umbilicus, 12 inches. The patient has the typical appearance of a eunuchoid with pronounced features of feminism. There is an abundant growth of blond hair on the head, but the face is covered only with a whitish lanugo. The skin is smooth, soft, and velvety to the touch; it is of a pinkish hue with a tendency to flush. There is a profuse perspiration pouring down from axillae which are absolutely hairless. The abdomen is well rounded and shows a pigmented middle line. The pelvis is broad with a feminine contour. There is a perfect mons veneris covered with a few straight hairs which stop short in an almost straight line immediately above the mons veneris.

Genitalia: The penis is that of a child of 5 years. It measures 1½ inches from symphysis to meatus urethrae. The scrotum is markedly furrowed in the middle and as the patient lies recumbent it resembles the labia majora of the vulva. The testicles are very small, about the size of small gooseberries. When the scrotum is lifted the perineum is larger in size than the average man's perineum and has a tendency to shape itself into a fourchette. No hairs are to be seen on the perineum.

The lower limbs are feminine in type; they look as if they were chiselled of marble and have a fine pinkish hue. The breasts are well formed and are the size of those of an average girl at puberty. There are accumulations of fat at the lower abdomen and buttocks. The neck is perfectly round and the pomum adami is not visible. Voice is high pitched and feminine in character. Lower chin is somewhat protruded. Abdominal and thoracic viscera are negative.

The patient lies flat on his back being unable to stand or walk. He has a complete syndrome of spastic paraplegia; Babinski sign and other confirmatory great toe reflexes, double clonus, knee jerks and patellar reflexes are very lively. Cremasteric and lower abdominal reflexes not elicitable; upper abdominal reflexes present. While patient is being examined twitching of both lower extremities of the spinal epilepsy type is present. There is an area of hyperalgesia beginning at second lumbar vertebra and extending down to upper buttocks, where it becomes very marked. Here a prick of a pin throws both lower extremities into convulsions. Anteriorly there is a line of hyperalgesia at about the umbilicus and from Poupart's ligament down to the knee on left side and on the right side to the middle of the thigh. From here down to about the middle of legs sensation is intact, then there is anastomosis down to the toes. Analgesia follows the same distribution. There is a marked dissociation of temperature sense in the outlined areas. Vibration sense is absent in both lower extremities.

The upper extremities as well as the cranial nerves showed no abnormalities. There was no nystagmus and the disks were negative. The blood Wassermann test was negative. Cerebrospinal fluid taken on three occasions showed a normal pressure, clear, negative Wassermann, and globulin cells 6 to 8 to the field. The urine showed on one occasion granular and hyaline cells with some albumin; otherwise negative.

After giving 100 gm. of glucose in one hour doses, the blood showed 0.155 per cent. sugar. Urine was passed an hour after ingestion—quantity 160 c.c. and 1 per cent. of glucose. Twenty-four hours later no sugar was seen. The blood showed an average of lymphocyte count 25 per cent.; hemoglobin, 80 per cent.; red blood cells, 4,500,000; white blood cells, 10,000.

Roentgenographic Report.—Skull: spots of irregular bone condensation throughout the frontal and parietal bones; sella normal in size; hyperostosis of posterior clinoid processes. Marked diffuse atrophy in bones of feet. The lower extremities showed a moderately advanced bony rarefaction throughout the intratrochanteric portions of both femora.

Subsequent History.—The patient received practically no medication. He began to improve slowly and steadily and on April 28 we read the following bedside note made by the intern: "Complains of burning sensation in lower parts of legs. This sensation is especially distressing on prolonged walking." The motor power in his lower extremities markedly improved. In August he left the hospital to return to work. On September 29 he was again seen by one of us. He was working at his trade as a tailor. He still presented the spastic syndrome of paraplegia, but he was able to walk without any great difficulty. A marked improvement was also noticed in his sensory status. Otherwise the condition was unchanged.

Mentality.—The patient was a tailor and his mentality was that of the average tailor of his race and nativity. He could read Yiddish and understood some Hebrew. He spoke English not worse than the average Jewish tailor who has been in America a number of years, having been six years in New York. Simple questions in arithmetic were answered satisfactorily. As to his sexual status he felt a desire for women; he had married and had erections. He believes he had orgasms although there never were any ejaculations. When asked whether he would marry again, he smiled and stated that he had had quite enough of one wife. He is bashful and reserved, his nature soft and mellow. He absolutely refused to be demonstrated at a medical meeting. "God," he said, "has punished me enough. Neither you nor your colleagues can help me. Why should I expose my shame."

An analysis of this case shows that we are dealing with a eunuchoid with marked features of feminism. He is an intermediary type, being both tall and graceful and having the normal eunuchoid accumulation of fat. In spite of the roentgen ray report that the sella turcica is normal, he showed clinically distinct interference with the proper function of the pituitary gland. The lowered sugar tolerance as well as the accumulation of fat speak distinctly for a posterior lobe involvement, while the large and disproportionate skeleton together with hypoplasia of the sexual glands indicate an overactivity of the anterior lobe. The thyroid could not be palpated, but the profuse perspiration, the pronounced vasomotor change, evidenced both in flushes and dermatographia, speak for an involvement of the thyroid and adrenals. We thus have a picture of pluriglandular disturbance.

The neurological syndrome can be explained only on the basis of a hemorrhage into the cord. The sudden onset of complete paraplegia followed by a gradual but steady improvement without medication, cannot be explained by any other condition except hemorrhage. As mentioned above, Ewing describes forms of apoplexies in eunuchoids and attributes them to an abnormally small heart and small walls of arteries. From the paresthesia that existed before the onset of the hemorrhage, we can conclude that there was a minute bleeding initiating the final hemorrhage. The present spasticity can be accounted for by secondary gliosis following the hemorrhage. Gliosis

Fig. 2 (Case 2).—Giant eunuchoid.

in eunuchoids was also reported by Burdels.³⁹ We therefore formulate our conclusion: The patient, a eunuchoid with marked feminism and pluriglandular disturbance, is suffering from a spinal gliosis following hemorrhage into the cord. After carefully searching the literature we could not find another case of apoplexy into the cord in eunuchoids, and came to the conclusion that this is probably the first case of its kind ever reported.

CASE 2 (Fig. 2).—*History*.—D. S., aged 55, entered the Central and Neurological Hospital, Blackwell's Island, on Nov. 13, 1916. He complained of heart disease and inability to work. The patient is of a low grade mentality and no family history was obtainable beyond that he was born in Ireland and

39. Bartels, cited from Ewing.

his parents were farmers. He is a laborer, unmarried, and temperate in his habits, neither smoking nor drinking.

Examination.—The patient is fully 6 feet, 2 inches tall and of the appearance of a giant or atropoid. His head is small, 28 inches in circumference. As he stands he stoops somewhat forward. Double knock-knee, genu valgum, and flat feet. His hands are large and wide (Fig. 3) and spade-like in appearance. The face shows no growth of hair. The skin is yellow or parchment color and thrown into many folds and furrows. His forehead is narrow, lower chin protruded, eyebrows are thin and narrow. The skin over the body is thin and smooth. Chest is narrow with a tendency to pigeon breast. Thyroid

Fig. 3 (Case 2).—Genitalia and hands of eunuchoid.

not palpable. Pomum adami not visible. Distinct brown colored pigmentation over lower part of abdomen. Each pigment spot appears like a plaque and is the size of a lentil. The pelvis is broad, of the female type. Sergent's line is present.

The prostate was not palpable. His muscular power is greatly diminished. The muscles are flabby and appear atrophic. No electrical changes are found. His reflexes are sluggish, but no symptoms pointing to organic nervous disease is present. Wassermann test of the blood and cerebrospinal fluid is negative. The urine showed a few hyaline and granular casts with some albumin. One hundred gm. of sugar gave a distinct Fehling's reaction in the urine one hour after ingestion. Hemoglobin, 70 per cent.; red blood cells 4,000,000; white blood cells, 15,000; polymorphonuclears, 80 per cent. Some

of the ulcers on the legs were purulent. The heart shows a double systolic apical murmur. There was prolonged expiration and some dulness at both apices. The sputum was negative; blood pressure, 100. His voice was high pitched with some hoarseness. Unfortunately we could not secure an roentgenogram of his skull.

Genitalia: Distinct mons veneris covered with fine crisp gray hair. A small vermiform appendix that has the semblance of a penis and measures $1\frac{1}{2}$ inches. The scrotum is mainly made up of adipose tissue. It is unproportionately large as compared with the penis. It is furrowed in the middle and resembles a vulva. Within each side of the scrotum is a small hard body, the size of a pea, probably a rudimentary testicle. Marked varicosity of lower extremities and ulcerations due to these varicosities.

Mentality.—He can neither read nor write, and is very poor in figures. He knows the days, but has some trouble with the months. In general his mentality is not above that of a child of 6 years. When asked as to his sexual feeling he looked blank and did not seem to comprehend the question well. He is obedient, reserved, not plaintive. When asked to stand before the camera there was no objection as is the case with so many of the eunuchoids.

This is a case of a giant eunuchoid with marked mental deficiency. The skeletal appearance is almost that of an acromegalic. It only differs from this condition in being congenital. Acromegaly is acquired later in life. This together with the low sugar tolerance would justify us in concluding that the pituitary is involved. The general weakness, the peculiar eruption, as well as the low tension, together with Sergeant's white line, would speak of diminished adrenal function. That the adrenals are responsible for infantilism and eunuchoidism is also related by Morlat.⁴⁰ The testicles are certainly not functioning. If we now remember the close relation between the adrenals and thyroid we would say that the thyroid too must necessarily be involved. Therefore the case is the result of a pluriglandular disturbance.

A case of moderate imbecility associated with eunuchoidism where the libido was altogether absent is reported by Schwenkenbecher.⁴¹ The patient was 17 years of age. Penis that of a child of 3, no testicles, no hair, small prostate, thyroid not palpable, small sella turcica, long extremities, separation of epiphysis. Moderate imbecility, kind nature, libido missing, no erections.

CASE 3 (Fig. 4).—*History.*—M. S., aged 25, was born in Russia of Jewish parents. His father died of carcinoma of the stomach. *An older brother was not allowed to land in this country because of his low mentality. His*

40. Morlat, A.: *Infantilisme et Insuffisance surrénale*, Thèse, Paris, 1903. Quoted from B. Onuf. *A Study of Eunuchoidism*, etc. *Am. J. Dermat.* **16**:518, 1912.

41. Schwenkenbecher, A.: *München. med. Wchnschr.* **60**:444, 1913.

genitalia were also undeveloped. The patient is the third child, was born normally, breast fed, and had uneventful development until the age of 5. At that time he was stricken with scarlatina and says he was so sick that he could not speak for a number of weeks. At about the age of 10 he suffered from nasal obstruction. Soon after he had frequent urination and

Fig. 4 (Case 3).—Eunuchoid, status thymicolymphaticus.

enuresis. Frequent urination and nycturia, instead of enuresis, are still persistent. He attended a rabbinical school until the age of 12 and was of average brightness. At 18 it was brought to his attention that he had no desire for the opposite sex. It was also at that age that he first noticed that his sexual organs were not developed.

Examination.—He came to the Mt. Sinai Clinic complaining of “nervousness” and frequent urination and nycturia. He is 5 feet, 5 inches tall, and weighs 142 pounds. Circumference of chest at nipples, 34 inches. Circumference of head, 24 inches; upper arm 14½ inches, lower arm 10 inches. The hand measures 7 inches from the middle of a straight line thrown from the tip of the radius to the tip of the middle finger. Between outward superior 12 inches; from anterior superior to lower border of patella, 21½ inches; from there to internal malleolus, 15 inches. Length of foot, 11 inches.

Fig. 5 (Case 3).—Genitalia and thighs of eunuchoid.

As seen from figure 4, his form is that of a young woman. The breasts are well developed. The arms are round and well curved. The buttocks are round, hemispherical in shape. The thighs and legs and arms appear as if chiselled. The head dolichocephalic, thickly covered with jet black hair; face hairless, lower chin protruding, and on the perfectly round neck no pomum adami is visible; thyroid not palpable. The teeth are visibly separated and irregularly set. The posterior pharynx is full of adenoids; the breathing is

therefore through the mouth which is almost always slightly open. The hard palate is high arched. His voice is distinctly feminine with a nasal twang. The entire skin is smooth, soft and glossy. No hair on the axilla. The middle of abdomen is pigmented as seen in some women.

Genitalia: There is a perfectly well formed mons veneris covered with a few short and rarefied hairs ending abruptly at a straight line. The penis (Fig. 5), as well as the scrotum, is that of a child of 5 or 6. It is perfectly well formed, but measures only $1\frac{3}{4}$ inches. The scrotum is masculine in type but miniature in appearance.

Clinical Examination.—No heart lesion was found. There was some dullness present at upper manubrium; abdominal viscera negative; spleen and liver not palpable. Pulse 80 to 70. Blood pressure 110/70. Negative Wassermann reaction in blood and spinal fluid. Urine examination is negative. Blood Examination: Red blood cells, 4,000,000; white blood cells, 10,000; polymorphonuclear cells, 50 per cent.; small lymphocytes, 40 per cent.; large mononuclears, 4 per cent.; eosinophils, 4 per cent.; transitionals, 2 per cent.; hemoglobin, 80 per cent. No sugar was found in the urine following glucose given up to 400 gm. on an empty stomach.

Roentgenographic Report (Fig. 9).—Examination of the skull does not show the sella turcica very plainly but it appears somewhat flattened out and the clinoid processes seem to approach one another, if not almost touching. Examination of the chest shows a shadow at the root of the neck. Otherwise no abnormality is seen in the lungs, aside from marked enlargement of the bronchial lymph nodes.

Mentality.—His mentality is that of the average tailor. He is kind and soft natured. He takes part in the social movements of his class and belongs to some labor organizations. He obeys commands willingly. Has no objection to being demonstrated at medical meetings. He told one of us that he was released by the selective service draft board, but that he would rather fight and be a man than to be in his present condition.

This case is eunuchoid with a typical picture of status lymphaticus. Characteristic in this case is his family history. *A brother suffered from the same condition* which brought out the fact of this being a familial disease. This is mentioned by Ewing and many other writers on the subject. Unlike the findings of Tandler and Gross, Peretz⁴² and many others, this patient has a *very small sella turcica*. He is one of those cases with congenital abnormalities which do not permit the hypophysis to expand in size. The roentgenogram of the chest suggests very plainly the possibility of a persistent thymus. This is still more emphasized by the adenoids and increased lymphatics in the bronchi as well as the rather increased number of lymphocytes in the blood. A. Müntzer⁴³ also speaks of observing a lymphocytosis in eunuchoids.

42. Peretz: Refer to footnote 9.

43. Müntzer, A.: Berl. klin. Wchnschr. **472**:2052, 1910.

CASE 4.—*History*.—W. L., school boy, aged 15, admitted Nov. 9, 1916, to Mt. Sinai Hospital, service of Dr. B. Sachs. The chief complaint was obesity. Mother and father also obese; brother died of convulsions. Patient has always been a fat boy. Up to time of operation for appendectomy in 1913 his weight was 130 pounds and he now weighs 176 pounds. No cardiac, pulmonary or renal symptoms. Enuresis occasionally. He had measles in childhood.

Examination.—There is generalized obesity showing itself on face, chest, abdomen and extremities. Skin soft and white. No axillary hair. Head well formed. Neurological status, negative. Mouth negative except for markedly enlarged tonsils. Chest well formed; expansion good. Heart not enlarged, negative. Pulse equal; good force and tension. Abdomen: scar over appendicular region; no masses. Liver and spleen not palpable.

Genitals: Pubic hair scanty and ends in a straight line (feminine type). Small penis. Testicles very small, size of peas. Dilatation of internal mammary veins in right chest. Persistent thymus. Status thymicolymphaticus.

Roentgenographic Report (Nov. 14, 1916).—The skull shows rather large protruding frontal sinuses, large sphenoidal sinuses, and a marked prognathia of the jaws. At the same time the sella turcica is seen to be rather small. No other abnormality is seen in the skull. In the jaws the third lower molars are seen to be unerupted on both sides and are impacted against the second molars in a way which will interfere completely with their eruption. The third upper molars on both sides are also unerupted but they are not impacted.

COMMENT

In this group of four cases we have a state of a congenital eunuchoidism, three of which, the first, third and fourth, can easily be put into the class of status lymphaticus, the first case giving clinical symptoms of apoplexy into the cord, a condition hitherto unreported, although apoplexies into the brain have been known to exist. The third case shows a sella condition that is also very rare and is contrary to the adopted opinion that in the eunuchoids the sella turcica is enlarged. It probably illustrates the fact that our judgment of the function of the pituitary must not be based on the size of the sella as evidenced through the roentgen ray appearance. The fourth case is a mixed type of eunuchoidism with characteristic fat accumulations and strongly suggestive of status lymphaticus. It will be noted that here also the sella turcica was rather small. The second case is in a class by itself. He resembles the anthropoid much more than does the average human being. His skeletal frame looks as if it belonged to an intermediary stage between the human and the anthropoid. His intelligence is low.

The question of the psychology of the eunuchoid has recently been studied by Sterling,⁴⁴ who divides the eunuchoids into three

44. Sterling, W.: Klin. Stud. u. Den Eunuchoidism, Ztschr. f. d. Gesam. Neurol. u. Psych. **16**:235, 1913.

classes: (1) Moderately diminished mentality; (2) imbecility, and (3) parasitic type. The first, third and fourth of our cases are, as regards mentality, normal beings anxious to be useful to themselves and others around them. Our case of imbecilism shows also an inversion to the lower stages in the development of the human race.

One thing can be said about the eunuchoids; all of them lack the masculine earmarks of psychology. They are conspicuous for lack of pugnacity, for their softness of character, weakness, and seeking the protection of others as do women. On the other hand, they lack

Fig. 6 (Case 5).—Acromegalic features.

the attractive part of woman's psychology. If we remember Virchow's aphorism that a woman is only a woman because she has ovaries, we must in our study of eunuchoids admit that whatever is masculine in a man is because of his testicles. Onuf,⁴⁵ who studied the eunuchoids from the standpoint of etiology and classification, also goes into the sociologic aspect, but arrives at no positive conclusion as to the social standard of this class of people.

CASE 5 (Figs. 6 and 7).—*History*.—R. H., a woman, aged 22, was admitted to the Montefiore Hospital, June 16, 1918. The chief complaint was headache. The family history was negative except for a neurotic taint. The patient is

45. Onuf, B.: A Study of Eunuchoidism, etc., *Am. J. Dermat.* **16**:459, 1912.

married, but has no children. Menstruation began at 14 years, was regular for about six years when it ceased completely. She has had an abscess on the neck, but previously no serious illness.

The present illness which brought her to the hospital began about three years ago with headache localized over the right eye and right ear. For half a year the headache was not so severe, but after that it continued day and night. She never vomited. She had no trouble with eyesight, but believed that hearing on the right side was poor; no buzzing in the ears. Appetite fair, bowels constipated. No pulmonary, cardiac or renal symptoms. Configuration of face changed in one year.

Fig. 7 (Case 5).—Posterior aspect—patient acquiring male shape of buttocks.

Patient noticed that the growth of hair on her legs and lower abdomen increased within a year. Tonsils and adenoids were removed on two occasions, and in the spring of 1916 she had a nasal operation performed, thinking that these minor operations would relieve her headaches. However, no relief was noticed. (The relation of adenoids to pituitary disease has been emphasized above.) The nasal operation was a resection of the cartilaginous and bony septum. There are no pathologic conditions in the nose, but there is a remnant of adenoid tissue in the nasopharynx. The fundi are normal. Blood Examination: Hemoglobin, 75 per cent.; red blood cells, 4,500,000; white blood cells, 10,000; polymorphonuclear cells, 50 per cent.; lymphocytes, 43 per

cent.; eosinophils, 1 per cent.; large mononuclear cells, 1 per cent.; transitionals, 4 per cent.

Physical Examination.—The head and neck were negative. Face: acromegalic; prominent lower jaw, brows and nose; high cheek bones, pasty skin, receding forehead and dry hair. The eyes were normal. The ears were negative externally. Mouth: tongue coated, teeth poor. Cranial nerves normal except a diminished sense of smell. Thyroid not enlarged. Glands: small inguinals palpable. Chest: expansion good; lungs negative anterior and posterior; heart: apex in sixth space, good force and quality, no thrills, action good, no murmurs. Abdomen soft and tympanitic, no masses; slight tenderness over the appendix.

Genitals.—Male distribution of pubic hair; uterus retroverted and retroflexed, small and atrophic. Extremities: Lower limbs: knee jerks and Achilles tendon reflex were present; no clonus, Babinski or Kernig signs; wide distribution of hair over entire legs. Upper limbs: wide distribution of hair on arms; hands have beginning acromegalic appearance, wide fingers and thick skin. The diagnosis of hypophyseal tumor was made and operation was advised. The urinalysis was negative except for diminished sugar tolerance. The blood Wassermann reaction was negative. The breasts were atrophied.

Roentgenographic Report.—Examination of the head shows a very large sella turcica with marked thinning of the anterior and posterior clinoid processes. The jaw is somewhat protruded, but there is no evidence of increased thickness in the bones of the skull. The frontal sinuses are entirely obliterated. The appearance is that of a tumor of the hypophysis.

This case is practically a eunuchoid of the female type developed subsequently to an involvement of the pituitary gland. The acromegalic features practically changed her countenance from a comely girl into the rude masculine type, with protruded eyebrows, well pronounced cheek bones, prognathism of the lower jaw and receding forehead. The color of the face changed from a blond and rosy hue into a dark color with a yellowish reflection. The skin lost all smooth and velvety feeling; it became more rough. Her buttocks have assumed a male contour. Her hands and feet have become large. The growth of hair that developed over her entire body completes the picture of inversion of secondary sexual characteristics. In other words, due to a diseased pituitary, a female has become a eunuchoid and has assumed masculine features.

Roberts,⁴⁶ in his travels in the surroundings of Bombay, observed women whose ovaries were cut out in early childhood. They too had assumed the masculine secondary characteristics. The mutual interrelation of the pituitary and sexual glands is once more illustrated. Our patient was practically castrated by nature interfering with the proper function of the pituitary gland.

46. Roberts: Quoted from St. Chauvet. *L'Infantilisme hypophysaire*, Thèse de Paris, 1914.

CASE 6 (Fig. 8).—*History.*—This patient, L. B., aged 41, was born in Russia, and is a laborer by occupation. He married twice, having divorced his first wife because she had no children. He had mumps in early childhood. He came to the Mt. Sinai Clinic complaining of itching all over the skin.

Fig. 8 (Case 6).—Eunuchoid with large penis, but very small testicles, with some secondary feminine features.

Examination.—The patient is 5 feet, 10 inches in height, weighs 170 pounds, and is proportionately built. There is a fairly well grown moustache, and the face is wrinkled but not feminine. His breasts, however, are well developed and there is no hair on the body or in the axillae and the pubic hair is of the female type. The penis is normal in size. The scrotum is small in comparison with the penis. The testicles are the size of small gooseberries

and must be searched for within a scrotum that is much too large for such small testicles. The perineum is partly covered with hair. The prostate is very small. The contour of the buttocks is of the female type. The urinalysis is negative; 400 gm. of sugar give no glycosuria. The Wassermann test of the blood is negative. No neurological signs. Normal intelligence. Blood Examination: Red blood cells, 4,000,000; polymorphonuclear cells, 70 per cent.; small lymphocytes, 30 per cent.; large lymphocytes, 5 per cent.; transitionals, 2 per cent.; eosinophils, 1 per cent.; hemoglobin, 70 per cent. Blood pressure, 140/80. Voice high pitched. Seminal fluid shows a small number of monad

Fig. 9 (Case 6).—Large sella turcica with posterior clinoid processes overshadowing and concretions in the pineal gland.

cells, but not a trace of spermatozoa is found. He has indulged in coitus two and thrice a week. While this patient has acquired some feminine features, in the main he is masculine in type.

Roentgenographic Report (Fig. 9).—Large sella with well developed and overshadowing posterior clinoid processes. Calcification of pineal gland.

FUNCTIONS OF THE INTERNAL SECRETIONS

Reports of the relation between the pineal and sexual glands have been made by many reliable authorities. Bailey and Jelliffe⁴⁷ report

47. Bailey, P., and Jelliffe, S. E.: *Arch. Int. Med.* 8:851 (Dec.) 1911.

teratomas of pineal with sexual precocity in part and adiposo-genitalia syndrome. Fou⁴⁸ found that a removal of the pineal gland in cockerels caused a precocious development of the testicle and secondary sexual characteristics. Dana and Berkeley⁴⁹ found that the administration of pineal extract by mouth and intravenously is followed in young animals by a precocious development of the sexual glands. Tilney and Watson⁵⁰ showed that the pineal body is a gland *sui generis* and not a vestige of the third eye as it was maintained by Gaskel.

Fig. 10 (Case 3).—Sella turcica, flattened and proximal clinoid processes.

In Case 6 did the destruction or calcification of the pineal inhibit the testicular growth? We cannot assume any such deduction with any amount of certainty as we have seen through roentgen-ray examination so many calcified pineal glands without any clinical manifestations that it really cannot be considered as a sign of any value.

48. Fou: Quoted from E. A. Schäfer, "The Endocrine Organs."

49. Dana, C. L., and Berkeley, W. L.: Med. Rec. **83**:835, 1913.

50. Tilney, F., and Watson, L. F.: American Anatomical Memoirs, No. 9, Feb. 1919, Wistar Institute of Anatomy and Biology.

This case, however, illustrates another very valuable fact, namely, that the testicles have really a double secretion; an external, the procreative, and an internal which helps to make up the secondary sexual characteristics of the individual. In our patient the external secretion of the testicles was absent, yet he retained in main the secondary sexual characteristics and was able to indulge freely in coitus. The latter was observed by Tandler and Gross in some eunuchs in whom the testicles only were removed. All of our patients, except the imbecile, stated that they had a desire for the opposite sex. Lipa Bey⁵¹ states that in the harem of Abdul Hamid a eunuch killed a young woman out of jealousy. It is, however, difficult to establish whether these people have a real libido.

One could probably interpret as a desire to be like others their apparent yearning for women. Our first case, though possessing only an infantile penis, even married. He wished to have a home. He left his wife, however, when she miscarried for he knew the child was not his. The high pitched voice is peculiar in all these cases. Scherer,⁵² who studied this subject extensively, shows that in eunuchoids true laryngeal cartilages do not ossify, and that the bridge between the two thyroidal plates is much narrower than in men.

TREATMENT

In Case 2 all sorts of opotherapy were used without results. It is almost needless to say that no treatment in these cases is of any avail. They are finished products and to improve or cure them would mean to create new tissues, an achievement as yet still to be looked for.

The subject of eunuchoidism is fascinating to those interested in the glands of internal secretion. The eunuchoid is *par excellence* a product of deficiency in the adjustment of the entire confederacy of these glands. It is in the eunuchoid that the key to a solution of some of the vital questions in endocrinology will be found.

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51. Lipa Bey: Refer to Footnote 1.

52. Scherer, Max: Ueber den Kehlkopf des Eunuchen, Berlin, 1901.