PART II

CHAPTER II

(B) REVIEW OF LITERATURE
TURIN (1786) mentions about a man, whose spermatic path was obstructed, but yet the epididymis and the testicle itself showed natural character in volume and size and shape and contained much sperm (Brissaud, 1880).

HUNTER (1841), in the dissection of a human subject, found the testicle normally developed and containing spermatozoa inspite of the fact that it had not joined vas deferens. (Oslund, 1924a,b).

COOPER, ASTLEY, SIR (1845) mentions that he had performed unilateral vasectomy on a dog in 1823, and 6 years after in 1829, found the testis of the affected (operated) side somewhat larger and the vas deferens excessively enlarged and full of semen.

GOSSELIN (1847) in a number of autopsies found that complete stenosis of the deferent canal did not involve any degeneration or atrophy of the testicles, nor any appreciable change in the volume of the testicle, and there was presence of spermatozoa in the secreted liquid. The principal conclusions, which Mr. Gosselin draws from these facts are: (1) the testicles of which the sperm cannot reach the seminal vesicles, do not become atrophied; (2) the testicles deprived of communication with the conducts of excretion of the products, do not secrete less the sperm with its physiologic
characteristics (Brissaud, 1880). During dissection in a man aged about 20 years, Gosselin found that the vas was wanting on the right side but the epididymis on that side was distended with yellow fluid containing a large quantity of dead spermatozoa (Oslund, 1924a, b; Moore, 1926).

BERTHOLD (1849), a German investigator, experimented on cock by castration in some and in others by transplantation of testis beneath the skin of the abdominal wall after castration. Berthold's experiments showed that the effects of the testicle on the body must be of a chemical nature, and in his experiments, the hormonic action of testicle was fore-shadowed. Berthold thus initiated the series of investigations which culminated in the discovery by Laquer and his co-workers of the hormone of the testis, testosterone. (Schmidt, 1928; Robson, 1947).

GOSSELIN (1853) performed ligation and resection of the vas deferens using two dogs as experimental material and found the testes normal with normal spermatogenesis present four to six months after operation (Oslund, 1923-24).

CURLING (1866) mentions a number of human dissections where the vas deferens was either prenatally absent or had been occluded for a long time with no marked effect upon the testis. He also performed experimental vasectomy on three dogs and one cat and found between 2 - 8 months, distension
of the epididymis with testicular products, including spermatozoa, that no changes took place in the testicle proper (Oslund, 1924a, b).

TURNER, WILLIAM (1877) mentions that according to Letzerich, the nerve fibres pierce the proper wall of the seminiferous tubules, and end in clumps of protoplasm, having a direct relation to the sperm cells.

BRISSAUD (1880) performed experimental ligation of the deferent canal in rabbits and found that following ligation within 5 - 10 days epididymis and testis are found enlarged, seminiferous tubules dilated and spermatogenesis enhanced and very much active. After a long time following operation, many seminiferous tubules are found narrowed and the testis attaining a state of functional neutrality. He also mentions that his master Mr. Charcot, first experimentally produced visceral cirrhosis by ligation of the excretory canals of the glands.

BROWN-SEQUARD, CHARLES EDWARD (1818-1894) founded the doctrine of internal secretion of testis. In this connection the following remarks made by Walker (1924) and Schmidt (1928), are significant:

"The actual date at which it may be said the doctrine of the internal secretion of the testis was born was 1889,"
when Brown-Séquard described before a meeting of the Société de Biologie the results of his experiments upon himself with subcutaneous injections of fresh orchitic extract. This lecture not only established the fact that the testis had an internal secretion, but also laid the foundations of the whole conception of internal secretion, a conception which may have been hinted at by Berthold (1849) but had never before been clearly enunciated" (Walker, 1924).

"In 1889, Brown-Séquard made to the Paris Academy of the Sciences a report which attracted great attention. He himself was at that time 70 years of age, and on himself and other ageing men he had been experimenting, preparing fresh extracts from the testicles of dogs, and injecting them into himself and his patients; this French investigator was the real originator of the modern scientific idea of rejuvenation" (Schmidt, 1928).

GRIFFITHS, JOSEPH (1893) found that the testicle of a full-grown dog, when replaced within the abdominal cavity, dwindles to 2/3 to 1/2 its natural size. It loses its power of producing spermatozoa and the seminal tubules are much degenerated in their structures.

GUYON (1895) using dogs as experimental animals, found that degeneration of the testis does not follow ligation of the vas deferens (Oslund, 1923-24).
GRIFFITHS, JOSEPH (1896) described the effects of ligature of the spermatic artery, spermatic veins, and of both artery and veins in dogs; he found varying degrees of atrophy of the seminiferous tubules and reduction of the size of testes depending upon the different types of experimental operations.

SIMMONDS (1898) in human autopsies found occlusion of the vas deferens of years standing without any injury to the generative portion. Neither testicular degeneration nor less of the germinal epithelium had occurred and the epididymis was enlarged from the immense amount of spermatozoa carried to it (Moore, 1926).

BOUIN AND ANCEL (1903) performed ligation and resection of the vas deferens in rabbits and pigs, and as an effect found the seminiferous tubules reduced and having a single layer of columnar Sertoli cells, with no sperm forming cell present. They also mentioned that degeneration always resulted if the experiment (ligation) continued long enough (Oslund, 1923-24). Bouin and Ancel (1903) report degeneration of germinal epithelium and interstitial cell hypertrophy as a consequence of vasectomy (Oslund, 1924a). The basis of all questions concerning the place of production of hormones has been really created by the ingenious experiments of Bouin and Ancel, 1903-1904 (Sand, 1921).

RICHON AND JEANDELIZE (1903) stated that rabbit testes,
whose vas deferens had been experimentally occluded contained no spermatozoa, and that the seminiferous tubules were degenerate (Moore, 1926).

TOURNADE (1903), in reporting some vasectomy experiments, stated that when cysts formed at the point of resection of the vas deferens, no degeneration of the testis took place. He suggested that in such experiments the cyst forms a reservoir for the sperm and no increased testicular pressure results. In some, only a few tubules are affected. Epididymis is much distented and hard (Oslund, 1926). Tournade (1903) performed experimental vasectomy on rats and to explain the results of his observations during periods of nine days up to nineteen months, had recourse to a special phenomenon, the formation of "spermacysts" yellow intunescence, of varying size, from a grain of barley to a nut, which, after operation, have been often observed at the testicular end of the resected 'vas deferens'. Relating to the variable results, Tournade maintains that the pressure on the seminiferous epithelium is diminished by the formation of the cyst which should be necessary, although sometimes insufficient, to keep it intact (Sand, 1921).

SPANGARO (1903, 1904) reported that in human subjects, following vasectomy after 12 days, 6 months and 1½ years, the epididymis were found distended with spermatic fluid, but
the desired degeneration was absent and spermatozoa were found in the testicle (Oslund, 1923-24, 1924a, b).

SHATTOCK AND SELIGMAF (1904) found that resection of vas deferens after ligation in sheep and cocks, produced no degenerative effects in the testes. The epididymis was notably larger than normal from overdistension with secretion of the gland (Oslund, 1923-24, 1924a; Nonidez, 1924; Moore, 1926).

QUIN AND ANCEL (1906) state that by removing one testicle of a rabbit and ligating the vas deferens of the contralateral testis for a period of six months, they found the seminal cells were in degeneration in all the testicular tubules and completely absent in many of them, the Sertoli syncytium remained almost normal, but the interstitial gland was considerably hypertrophied. They concluded that:

(i) The ligature of the excretory canal of a gland brings about the degeneration of this gland wholly.

(ii) If one of the representatives of a glandular system is removed, the remaining one gets hypertrophied in such a way as to release in the organism a quantity of products equal to that supplied by the entire system.

WALLACE (1905) vasectomised 6 dogs and one cat for a period of 5 to 12 months. He found that the epididymis became
distended and enlarged by the retention in it of fluid but in every case the seminiferous tubules were normal in size and full of epithelial cells. In all but two of the dogs and in the cat, spermatogenesis was active. In these three also there was no degeneration and the tubules were full of epithelial cells. He concluded that the growth of the testicle and its function of producing spermatozoa is independent of the integrity of its vas (Oslund, 1924a, b). After ligation of the vas deferens in carnivora, he found no degeneration of the testis (Oslund, 1923-24).

MYERS, BURTON D. (1915) confined himself to the studies of the histological changes occurring in the testes of a series of white rats following ligation of the ductus deferens on each side. He found that the testes of those animals which had been permitted to live ninety days after operation show a high degree of disintegration of spermatogonial cells. The interstitial cells on the contrary are entirely unaffected. In the animals in which 120 days had elapsed between operation and date when killed, most seminiferous tubules are entirely free, in some only a few spermatogonia can still be discerned. He also mentions that, as a result of vasectomy, or vas ligation, it is certain that the sterilization of the individual is accomplished without in any way disturbing the internal secre-
tion of the testicle. The psychic life and secondary sex characteristics are, therefore entirely unaffected.

KUNTZ, ALBERT (1919a) in the paper "The innervation of the gonads in the dog" mentions that the testicular (external spermatic) nerves accompany the spermatic arteries distally and enter the gland with either the blood vessels or efferent ducts. The blood vessels and smooth muscle fibres in the testis receive a sympathetic nerve supply, but the seminal epithelium and the interstitial secretory tissue do not.

KUNTZ, ALBERT (1919b), in the paper "Experimental degeneration in the testis of the dog" that elimination of the sympathetic nerve supply to the testis is followed by degeneration of the seminal epithelium and accompanying hypertrophy of the interstitial secretory tissue. As the seminal epithelium receives no sympathetic nerve supply, the degeneration of the seminiferous epithelium probably is the result of nutritional disturbances due to paralysis of the blood-vessels in the spermatic cord and testis. The degeneration of the left testis (unoperated side) is, doubtless, associated with and conditioned by degeneration in the right testis (operated side).

MASSAGLIA (1920) after performing ligation of the vas deferens in the male fowl, claims that vasoligation is followed by degeneration of the seminal epithelium which may be complete three or four months after operation.
KUNTZ, ALBERT (1921) made experimental ligation and resection of the vas deferens in rabbits and dogs and found degeneration of the seminal epithelium of the testes of the operated side. He also found degenerative changes occurring in the testis on the opposite side synchronously with those in the testis of which the ductus deferens was occluded. He concludes that the degenerative changes which occur in the testis on the unoperated side following unilateral occlusion of the ductus deferens probably are an expression of the physiological state of the experimental animals.

BRACK (1921) has shown that congenital absence of the vas deferens in man is without effect on spermatogenesis (Moore, 1926).

SIMMONDS (1921) examined a series of forty human cases in which one or both of the vas deferentia had been closed by cicatrix formation. In thirty cases, spermatogenesis was normal. The case histories are not known for the ten cases in which complications might have been present (Oslund, 1923-24, 1924a).

TIEDJE, H. (1921) after performing unilateral and bilateral vas ligation experiments in guinea-pigs found that there was gradual degeneration of the seminal epithelium followed by complete regeneration later, mostly along with
the formation of spermatocele or sperm-vesicle. No increase of interstitial cells was noticed by Tiedje, which he said to have been noticed by Steinach.

WHEELON, HOMER (1921) mentions that following unilateral vasectomy, the seminiferous tubules, although showing the results of destructive processes, contained much spermatic tissue. Unilateral vasectomy does not cause complete disappearance of the spermatic cells from the seminiferous tubules as late as nine months following the operation, but the interstitial tissue in each of the two glands seemed to be somewhat increased.

SAND. KNUD. (1921), by his experiments confirmed essentially the theory of Bouin and Ancel (Unilateral resection of the vas deferens and contralateral castration results in excessive tubular atrophy combined with an extraordinary hypertrophy of the Leydig cells). Like Tournade (1903), he also observed "spermacysts" in some cases and mentions that the spermacysts consist of accumulated sperm with epithelial cells, and atrophied spermatozoa and that they are due to the dilatation of the end of the vas deferens and to the epididymis.

CREW F.A.E. (1921-22) concluded that imperfectly descended testis is aspermatic because the temperature of the abnormal position is not that at which the final stages of spermatogenesis occur.
SAND, KNUD (1922) reported very striking results from carrying out the Steinach operation on a senile dog and confirmed Steinach's earlier findings. From a lethargic, feeble animal, the dog was converted into an active, alert individual that was able to accompany a bicycle rider in his pleasure excursions with evident signs of enjoyment (Hoskins, 1922).

BENJAMIN, BERRY (1922) mentions "According to Steinach's theory, ligation (not vasectomy alone) causes inactivity and atrophy of the generative portion of the testis, with subsequent proliferation of the so-called puberty gland, consisting mainly of the interstitial (Leydig) cells. The ligation of the ductus deferens combined with vasectomy has become now generally known as the Steinach operation. By its effects, I am inclined to designate it as Endocrine Surgery". Benjamin further reports that in 22 cases of Steinach operation performed by him on human subjects no injurious effects have been observed.

HOSKINS, R.G. (1922) in "Some recent work on internal secretions", states that more recently, Steinach has turned his attention largely to so-called rejuvenation studies, and has evolved a technique of ligating the vas deferens on one side and extirpating the epididymis on the other, with the idea of bringing about atrophy of the spermatogenic tissue and stimulating the nutrition of the interstitial cells.
FUKUT (1923) experimented with cats, dogs, guinea-pigs, rats, goats and man and concluded that destruction and disappearance of the generative cells and hypertrophy of the interstitial tissues occur due to body temperature or heat.

RETTERER, ED. AND VORONOFT, S. (1923) performed ligation or resection on several dogs. They say that the diameter of seminiferous tubules are increased and the tunica propria is thickened after ligation or resection of the vas deferens, and the interstitial cells are not increased following ligation.

ANCEL, P. AND BOUIN, P. (1923) resected, between two ligatures, the deferent canal in diverse mammals (dogs, rabbits, guinea-pigs) and found that this operation causes, at the end of a rather long time, the total disappearance of the seminal elements and leaves intact the nutritional cells and the interstitial gland.

SAND, KNUD (1923) performed unilateral and bilateral vasectomy on rabbits, guinea-pigs, rats and dogs. He states that the resection of the vas deferens proved to be an operation as a rule slowly affecting the testis structure. Like Tournade (1903) he found "spermacysts" developed below the distal ligature, a phenomenon which, by relieving the sperm secretion, probably retards the results from going into effect.
OSLUND, ROBERT (1923-24) performed vasectomy on rats and guinea-pigs and concluded that vasectomy itself did not cause degeneration of the germinal epithelium, and that when such degeneration followed vasectomy it was due to the fact that the testis remained in the abdominal cavity following the operation: such a displacement of testis (artificial cryptorchidism) is sufficient to produce degeneration of the germinal epithelium. It was found that in all experiments where the testes resided in the scrotum following vasectomy, no degeneration took place. He suggested that degeneration of the germinal epithelium is caused by a rise of temperature which may be either local or general in the body of the animal. He cites Benedict and Slack (1902) who by their works show a temperature gradient of about 5°C between the body cavity and that of the surface of the body. He cites different workers who observed inhibition of sperm production or degeneration of the seminiferous epithelium or changes in the testes that closely resemble those found in cryptorchidism as a result of well-known factors, such as: pneumonia, inflammation, mumps, exclusive meat diet, obesity, alcoholism and influenza.

MOORE, CARL R. AND OSLUND, ROBERT (1923-24) performing experimental vasectomy on the sheep, concluded that unilateral vasectomy for 76 and 90 days does not produce complete degeneration of the seminiferous tubules and interstitial cell hypertrophy. Some tubules are degenerate, apparently from
Retention of the testicular products producing pressure atrophy. The intertubular tissue of testis with resected vas deferens has not been visibly affected. They also mention that vasectomy, of itself, does not result in germinal epithelium destruction and interstitial cell hypertrophy.

**OSLUND, ROBERT (1924a)** mentions in the paper "Vasectomy on dogs" that vasectomy in dogs for a period of two and one-half months has not caused degeneration of germinal epithelium. The epididymis is usually distended and hardened by accumulation of testicular products. An equilibrium is quickly reached between rate of production of testicular material and its absorption from the epididymis. The establishment of such an equilibrium is a factor in preventing pressure atrophy in seminiferous tubules. He further mentions that in all testes, following vasectomy, the interstitial cells were normal, both in quantity and appearance.

**OSLUND (1924b)** in his paper on "Vasectomy and Rejuvenescence" mentions that the Steinach operation has commanded considerable interest because of its rejuvenescence claims, i.e., by the remarkable character of these reported effects of restoring youthful vigor. The explanation usually offered is to the effect that there is produced degeneration of spermatogenic cells with attendant hypertrophy of interstitial tissue. The latter supposedly causes the rejuvenescence. The primary atrophy
of the spermatogenic cells is said to be followed by a subsequent regeneration which relieves the animal of the temporary sterility produced by the ligation. Oslund concludes that ligation of the vas deferens does not produce such hypertrophy. Vasectomy, therefore, cannot be looked upon as a method of causing rejuvenescence.

MOORE, CARL R. (1924) performed vasectomy experiments on rats, guinea-pigs, rabbits and sheep. He mentions that the operation leaves the testis in a normal functional condition, actively producing germ cells, provided that it retains its normal position in the scrotum. Not in a single case in all vasectomy operation, on any of the four groups of animals, has there occurred an interstitial cell hypertrophy. He believes that the degeneration which took place in the testis after vas ligation, can be explained on the basis of an abnormal testis-scrotal relationship. He states further: "Looking at the problem of vasectomy or vasotomy has been a battleground of opinions for more than fifty years. Opinions have been about equally divided that such an operation caused the generative part of the testis to atrophy and the supposed internal secretory part to undergo an increase, and that it leaves the testis normal". He emphasizes that on the most carefully conducted type of operation, he can find no biological justification for the ideas underlying Steinach operation.
NQNIDEZ, JOSE F. (1924) made a study on the gonads of fowl to observe the effect of ligation of the vas deferens on the structure of the testis. He found the effect of the operation only in the vicinity of epididymis which is much distended. He says that rupture of seminiferous tubules through increased intra-tubular pressure caused a reaction in the intertubular tissue, evidenced in the formation of granulation tissue with abundant plasma cells. The interstitial cells in most of the birds did not undergo hyperplasia. This operation procedure does not completely suppress spermatogenesis.

VAN WAGENEN (1925) mentions that ligation of the vasa deferentia in the rat has been found to be followed by an evident increase in the intratubular pressure and a prompt and profound degeneration of the germinal epithelium (Humphrey, 1926).

WARWICK, B.L. (1925) studied the effect of vasectomy on swine. Epididymis of each testicle was found to be enormously distended with spermatic fluid up to the point of occlusion. His findings provide further evidence in support of Oslund’s conclusion that vasectomy of itself does not cause degeneration of the seminiferous tissue. He further mentions that Steinach (1920) maintained an extravagant claim that vasectomy, or ligation of the vas deferens, always leads to degeneration of the germinal epithelium and hyperplasia of the
interstitial cells. The increase in the number of interstitial cells was supposed to produce more testicular hormone, and so stimulate rejuvenation.

MOORE, CARL R. (1926) mentions that the problem of vasectomy or vasotomy, by which is meant the production of an interruption in the course of the ductus deferens or vas deferens, has been one of the most confused problems relating to the testis. Popularly it is known as the Steinach operation for rejuvenation. By critical analysis of the observations of Cooper (1823), Gosselin (1847), Brissaud (1880) and Griffiths (1895), in respect of the results of occlusion of vas deferens, he pointed that it was well established before 1900 that blocking of the outlet duct from the testis in human subjects, dogs and rabbits had no effect in causing the testis to become aspermatic. About 1903 when results on experimental studies of the testis became more numerous contrary results began to appear. The greatest impetus to the conception of testis degeneration following vas deferens occlusion since Bouin and Ancel, is the striking and apparently conclusive work of Steinach (1910-1920) culminating in his suggestive work on rejuvenation. By ligation of the vas deferens in rats Steinach reported degeneration of the germinal epithelium accompanied by hypertrophy of the interstitial cells. Moore states that degeneration is not due to occlusion of the vas deferens but to an abnormal position of the testis and that ligation of the ductus deferens does not of itself cause the testis to
degenerate nor had in his laboratory ever seen a case of hypertrophy of the interstitial cells following vasectomy operation. He also mentions that Tiedje (1921) follows Steinach (1920) in the belief of first a degeneration of the germinal epithelium then a regeneration after vasectomy. It should be pointed out, however, that neither Steinach nor Tiedje give substantial evidence to support their contentions. He further mentions that Benjamin (1922) has been perhaps the chief advocate of the Steinach operation as applied to the human individual. Moore also cites different workers who observed aspermatic condition with degeneration of the testis as a result of pneumonia, tuberculosis, influenza, circulating toxins, chronic alcoholism, venereal diseases and deficiency of water soluble vitamins.

MAC GEE (1926) working in Koch’s laboratory prepared an extract of bull’s testis which was capable of promoting comb growth in capons and thus established definite proof that testicular action was hormonic in nature which was, however, only fore-shadowed in the Berthold’s experiments in 1849 (Robson, 1947).

SHARPEY-SCHAFFER, SIR E. (1926) supports the view of Bouin and Ancel (1904) that testicle after tying or cutting of the vas deferens, in adult animals, formation of sperma-
tozoa generally ceases, the seminiferous epithelium, with the exception of the lining cells, disappearing, whereas the interstitial tissue increases in amount.

HUMPHREY, R.R. (1926) observed the effect of vasoligation in sheep and goat. He found that epididymides were greatly distended and discharged a thick creamy fluid when cut. Neither testis showed hypertrophy of the interstitial tissue. He confirmed the work of Moore, Oslund and Others that vasoligation alone does not cause a degeneration of the germinal epithelium.

WANGENSTEEN (1927) shows that in dogs ligation of the spermatic arteries or veins or both cause atrophy of the tubules and of the interstitial cells of the testis (Rasmussen, 1928).

RASMUSSEN, A.T. (1928) in special cytology edited by Cowdry, cites a number of workers who observed tubular degeneration of the testis or cessation of spermatogenesis as a result of exposure to X-Ray and radium, deficiency of Vitamin B, C and E, high protein diet, alcoholism, intake of nicotine, administration of thyroid extract, injury to tuber cinereum and anterior lobe of pituitary or hypophyseal abnormality. He mentions further that Takahashi (1922) found atrophy of the testis after excision of the lumbosacral part of the sympathetic trunk in guinea-pigs.
SCHMIDT, PETER. (1928) mentions that ligature of the excretory duct of a gland was followed by a process of gradual atrophy and disappearance of the ordinary glandular elements as seen in the case of pancreas. Steinach induced the same process in the testicle by ligaturing the vas deferens. After the ligature of the vas deferens and the consequent atrophy of the ordinary glandular cells, more space is left for the interstitial tissue which can now proliferate luxuriously.

SIMEONE, F.A. AND YOUNG, W.C. (1931) concerning the fate of non-ejaculated spermatozoa in guineapig mention that spermatozoa which have attained their full functional maturity and are not discharged in the copulation, undergo regressive changes which end in their death and subsequent liquefaction within the epididymis, and particularly within the vas deferens.

They mention also the views of the following workers:

Regaud and Tournade (1911) described large cellular elements in the lumen of the epididymis of a rat, which they regarded as desquamated epithelial cells containing spermatozoa remaining in the process of being resorbed.

Marshall (1922) mentions that the spermatozoa which are not ejaculated degenerate. The tails break off and undergo a gradual liquefaction. The end products are ultimately absorbed.
by the epithelial cells of the seminal vesicles, and perhaps of the vasa deferentia or of the testis itself.

Priesel (1924) expresses a somewhat similar opinion in suggesting that non-ejaculated spermatozoa, particularly those which are abnormal, are liquefied and resorbed within the head of the epididymis.

ALLEN (1948) in "Wright's Applied Physiology" mentions that if the vas (ductus) deferens is ligated, the interstitial cells always persists as definite masses of epithelial cells, but the changes in the seminiferous tubules are variable. Sometimes they undergo degenerative changes; more commonly however spermatogenesis continues, the newly formed sperm undergoing liquefaction and being replaced by freshly formed cells.

ENGLE, EARL T. (1952) in his paper "The male reproductive system" mentions that the influence of other factors, such as toxins, genetic constitution, vascular conditions and the autonomic nervous system, as in anxiety states, on the inhibition of sperm production are strongly suspected.

BROWN, WILLIAM E. (1956) in a review of literature on the human testis, mentions that all the blood vessels are located in the interstitial area, so peritubular membrane or basement membrane must be permeable to nutritive elements for spermatogenesis, and likewise must permit an exodus of
the waste products of cell metabolism. The degree of atrophy of the germinal epithelium is directly proportionate to the thickness of the fibrosis, so it is conjectured that a thick tunica acts as barrier to the interchange of nutrient elements, thereby blockading spermatogenesis.

He further mentions that severe degeneration of the seminiferous tubules, results from denervation of the lumbar spinal nerves which probably pass through the sympathetic trunk.

POSENBOOM, D. (1956) mentions that vasectomy for surgical sterilization of the male is done for various reasons. Among these reasons are the following:

(1) To prevent pregnancy, as agreed on by husband and wife.

(2) To prevent pregnancy, when wife's health is too precarious for pregnancy and tubal ligation is not feasible.

(3) To prevent the occurrence of epididymitis, a fairly routine procedure in the treatment of prostatic obstruction.

(4) To prevent mental defectives, criminals, and psychotics from reproducing.

(5) For the purpose of rejuvenation, according to Steinach. But it was based on a false physiologic assumption and a clinical failure.
(6) For mass sterilization - racial limitation or extermination - as practised by Nazi Germany upon Jewish civilians. Manritzen states that in 1933 alone, a known 28,000 vasectomies were performed.

He further mentions that most patients who seek vasectomy have a strong basic marital, sexual or economic reasons.

HAMILTON, W.J. (1958) mentions that the testicular nerves contain both efferent and afferent fibres. In addition to sympathetic fibres the testis may also receive a small parasympathetic supply.

The terminal distribution of the testicular nerves is confined to blood vessels. The nerves to the epididymis end not only in blood vessels, but also in relation to the smooth muscle cells in the wall of the epididymal ducts.

TURNER, C.D. (1959) mentions that Steinach's chief contentions were (1) that vasoligation destroys the germinal epithelium of the testis and increases the number of interstitial cells, (2) that increased interstitial cells yield an increased output of male sex hormone by the testis, and (3) that the augmented secretion of male sex hormone brings about the rejuvenation of the senescent male. The experimental evidence indicates that vasectomy does not destroy
completely the gametogenic function of the testis, and there are no quantitative studies indicating that the operation results in an actual hypertrophy of the interstitial cells.

PAHDE, G.M. (1961) mentions that rapid increase in the population of our country (India) has been a matter of grave concern to the state. In the absence of an ideal contraceptive, one of the surest ways of preventing conception is the sterilization operation on either partner. Intensive propaganda and mass sterilization, especially in the male, seems to be the only immediate answer to our urgent need for reduction in the birth rate. He mentions further that indication for vasectomy are (1) to prevent further pregnancy, or due to poor health of wife. (2) to bring about rejuvenation. (3) to prevent infection from going to the epididymis after prostatic surgery.

DAVIES, D.V. AND DAVIES, F. (1962) in "Gray's Anatomy" mentions that the testicular plexus accompanies the testicular artery to the testis. The nerves in the testicular plexus contain efferent and afferent sympathetic fibres; the efferent fibres are vasomotor in nature. The parasympathetic fibres derived from the inferior hypogastric plexuses are probably vasodilator in nature.

BELL, GEORGE H., DAVIDSON, J.N. AND SCARBOROUGH, H. (1963) mention that ligature of vasa deferentia is
followed by atrophy of the seminiferous tubules of the testes.

ABERHART, CARL. (1963) in "Urology, P. 2798, edited by MEREDITH F CAMPBELL" mentions that vasectomy operation is utilized almost universally in association with prostatectomy.

HOTCHKISS, ROBERT S. (1963) in "Urology, P. 678, edited by MEREDITH F CAMPBELL" mentions that many thousands of such sterilizations (male sterilization of vasectomy) were done under the German laws of 1933 and in 27 of the United States of America there are laws that permit sterilization of mental defectives and of certain criminals.

COPENHAVER, WILFRED M. (1964), in "Bailey's Text-Book of Histology" mentions that the nerve fibres accompany the blood vessels and enter the interior of the testes through the mediastinum. Some fibres go to blood vessels and the termination of these fibres is not known.

HARDING RAINS, A.T., AND MELVILLE CAPPER, W. (1965) in 'Bailey & Loves' Short Practice of Surgery, mention that in all methods of prostatectomy operations, bilateral vasectomy is advisable. It prevents infection from the prostatic bed spreading to the epididymis.
SHIRER, WILLIAM L. (1965) mentions in connection with the persecution of the Jews and Slavs by the Nazi authorities in 1943, that sterilization experiments were carried out on a large scale at several camps by a variety of means on both men and women. He further mentions that S.S. physician, Dr. Adolf Pokerny, wrote to Himmler on one occasion, "the enemy must be not only conquered but exterminated. If he could not be slaughtered and to be used for slave labour then he could be prevented from propagating".