the lower roots of the *spinal-accessory* nerve. Through the brachial or cervical enlargement we found that the decussating fibres of the anterior commissure were destroyed to a considerable extent by fatty degeneration; that bloodvessels in the neighbourhood were enlarged and diseased; that the anterior roots of the nerves, in some sections, were more or less damaged; and that many of the fibres of the white column, especially the anterior and the lateral, had suffered in a similar way. And yet, notwithstanding these various lesions of structure, we have not a single corresponding symptom or impairment of function recorded in the history of the case. There is no mention of any abolition whatever of either motion or sensation in the upper extremities; and on making further inquiries upon this point I was informed that the patient had apparently the perfect use of his arms, and employed them in the usual way in eating his meals. Yet there can be no doubt that there was some abnormal condition of the arms and hands; and it is extremely probable that a closer scrutiny during life would have revealed its nature. In a former case of "wasting palsy" published in this Journal,¹ it was at first stated that the patient had the perfect use of his legs, and walked apparently quite well; but it was afterwards discovered that his "right foot was affected in some way," and that "there was no spring in the instep." These facts show, as I before insisted on, the importance of a thorough investigation of the patient's condition during life; and it is just in those cases in which only one or two particular spots of the cord are affected that the detection of some obscure or lurking symptom would be valuable in regard to the physiology as well as the pathology of this centre.

Of the spinal cord in this case I have made, and retain by me, upwards of one hundred preparations, including those from which the above sketches are taken, and displaying a great diversity of morbid appearances which it would be impossible, and indeed unnecessary, to describe or represent in this communication.

ART. IV.

Observations on Sterility in Man; with Cases. By T. B. CURLING, F.R.S., Surgeon to the London Hospital, and Examiner in Surgery to the University of London.

STERILITY is a condition which has usually been restricted in its application to the female, or in the male has been confounded with impotency; and until recently our knowledge of the impaired functions of the male reproductive organs has not warranted any distinction being drawn between an incapacity for sexual intercourse and an inability to procreate. The object of this paper is to show that a want of aptitude to impregnate may co-exist with the capacity for sexual intercourse; or, in other words, that man is subject to *sterility*, independently of *impotency*. The subject is not altogether new, MM. Gosselin, Follin, Godard, and others, having published some important facts in relation

to it, but opportunities of making the necessary inquiries are extremely rare; and as doubt exists of the soundness of the conclusions which have been arrived at, facts of a contradictory character having been adduced, I have been led to examine the question, and my practice has enabled me to collect some interesting observations bearing upon it. The importance of the subject, as respects the happiness and results of married life, must be my apology for giving details, the recital of which could not be avoided.

Sterility in man may arise from the following causes:—

1. Malposition of the testicles. 2. Obstructions in the excretory ducts of the testicles. 3. Impediments to the escape of the seminal fluid.

1. *Sterility from Malposition of the Testicles.*—The opinion of John Hunter, “that when one or both testicles remain through life in the belly, they are exceedingly imperfect, and probably incapable of performing their natural functions,” has been the subject of much comment, and in my work on ‘Diseases of the Testis’ I expressed my adhesion to the views of Professor Owen, who, in differing from Mr. Hunter, remarks that there is nothing in such a situation which necessarily tends to impair the efficiency of the testicles, since in many animals they constantly form part of the abdominal viscera; and in those in which the testes naturally pass into the scrotum, their continuance in the abdomen is accompanied only with a difference of size or shape. Now, we may readily suppose that this may influence the quantity, but not necessarily the quality of the secretion. The facts which I am about to adduce have corroborated Mr. Hunter’s opinion in a remarkable manner, and have led me entirely to change my own views on the point in question.

That a cryptorchic person, or a man with both testicles in the abdomen or in the groin, may have a masculine development, passion for women, and the power to copulate, is beyond question, being satisfactorily established by several well-authenticated instances, although there have been many cases in which such persons were impotent, and had not fully exhibited the external characters of the male sex. When the testicle has not passed into the scrotum, the gland is nearly always small in size; generally it is healthy, but undeveloped; that is to say, it has not undergone the enlargement and change in structure which take place at puberty. In some instances, especially when seated in the inguinal canal, it is withered and atrophied, having undergone fibrous and more rarely fatty degeneration, and exhibiting no trace of glandular structure. But the question to be considered is, whether a testicle which has not passed into the scrotum can secrete a fertilizing fluid—a fluid which, when emitted in sexual intercourse, is capable of impregnating the female. I assume, as quite established, that to possess this property the semen must contain zoosperms.

Professor Goubaux, a distinguished French veterinary surgeon, was the first who noticed in horses, not only that the testicles detained in the abdomen were soft and small in size, but that the fluid in the corresponding vesiculæ seminales was destitute of spermatozoa. In 1851 M. Follin

briefly alluded to three instances of detained testicle on one side in the human subject, in which he found the fluid in the vesicula seminalis of the same side destitute of spermatozoa, though they were present on the other side.¹ In 1855 I described² the examination of a man aged thirty-six, whose right testicle was in the abdomen, small and undeveloped. There were no spermatozoa in the efferent ducts nor in the right vesicula seminalis, but the left contained them in abundance. In 1856 Messrs. Goubaux and Follin, in a joint memoir, 'Sur la Cryptorchidie chez l'homme et les principaux Animaux Domestiques,' read at the Société de Biologie, adduced several instances in man and animals in which testicles remaining in the abdomen were small, and did not secrete sperm. They furnished also a few examples of animals which, though possessing the desire and power to copulate, were quite sterile. The late M. Godard, in a memoir read at the Société de Biologie on the same evening as the above, mentioned the cases of three cryptorchic married men who had no children, and affirmed that such persons were always sterile. This earnest and indefatigable pathologist, whose recent death is a loss to medical science, in a more recent work, supported this opinion by additional facts, to which I shall have occasion to refer. The proofs adduced, however, by these observers, were not sufficiently cogent and numerous to establish the law that cryptorchies are infertile; and it could not be expected that assent should be given to results so remarkable and unexpected without evidence of the most convincing character. Opposite opinions continue to be entertained, and Dr. Taylor, in the last edition (1861) of his work on Medical Jurisprudence, after briefly noticing some recent observations on this subject, states that when the power of sexual intercourse exists, "this imperfection does not offer any bar to marriage, nor is it a ground for divorce."

CASE I.—In 1859 a gentleman, aged thirty-eight, consulted me under the following circumstances:—His testicles had never properly descended into the scrotum, and though not deficient in copulative powers, he had been married eleven years without his wife becoming pregnant. He was desirous of knowing whether this was owing to any fault in himself. In external development, this gentleman had all the attributes of the male sex. On examination, I found his penis normal, and his testicles small in size, the right being less than the left. Both were lodged in the groin, just outside the outer ring. The right could be easily pressed up into the inguinal canal, through rather a large external ring. Pressure on the left caused it to recede into the upper part of the thigh, just below Poupart's ligament, where the integuments were loose. When the left testicle became thus displaced, which occurred occasionally, the patient felt uneasiness, referred to the navel. The scrotum was small and imperfectly developed; the left testicle could be depressed into it by a little force. He stated that he performed the sexual functions about twice weekly, and when younger had done so more frequently. The fluid emitted in intercourse was

¹ Archives Générales de Médecine, 4^e Série, t. xxvi. p. 265.

² Diseases of Testis, 2nd edit., p. 27.

carefully examined by myself and Dr. Andrew Clark separately, on three occasions, at intervals of about a week. It was found to be entirely destitute of spermatozoa. With the view of forcing the left testicle into the scrotum, and retaining it there, I recommended his wearing the moc-main lever truss, but this treatment was not persevered in.

CASE II.—In 1852 I was requested to see an inmate of a charitable asylum, a youth, aged eleven, whose testicles had not passed into the scrotum. The right was lodged just outside the external ring; the left was not discernible at all. He had no scrotum. In 1861, at the age of twenty-one, he again came under my notice. He was rather short in stature, but had a masculine development. He wore a moustache, and had abundance of hair on the pubes. His penis was rather large. He held a clerk's situation in the city, and had been married twelve months. He stated that he had frequent intercourse with his wife, followed by ejaculations. She had not become pregnant. Some fluid obtained from the urethra immediately after sexual intercourse was sent me on two occasions, the second being after an interval of eighteen months. It was carefully examined by myself and others, and found to be destitute of spermatozoa.

CASE III.—In April, 1861, I saw with Mr. Duchesne, of Woodford, a gentleman, aged forty-six, a married man, who had serious disease of the left testicle, which had commenced about a month previously. The gland, being quite disorganized, was removed by me on the 22nd. The wound healed favourably. During my attendance I noticed that the right testicle had not emerged from the abdomen. After his recovery, and quite two months after the operation, he had intercourse with his wife. The fluid emitted was examined, but no spermatozoa could be discovered in it.

CASE IV.—In March, 1863, I was consulted on the propriety of marriage under the following circumstances:—A gentleman, thirty-nine years of age, stated that about fourteen years ago he was in the habit of frequent sexual intercourse, when one night after connexion the left testicle was attacked with violent inflammation, which was followed by a gradual wasting of the gland. The right testicle was small and had not fairly passed into the scrotum. The sexual appetite was keen, and coition was effected with ease, the emission being fairly copious. My patient was healthy and moderately robust. The left testicle was reduced to the size of a pea; the right was properly formed and tolerably firm, but quite small, like an undeveloped testicle before puberty. Some fluid emitted in sexual intercourse was sent me on two occasions. In both instances it was thin and destitute of spermatozoa. I consequently gave an opinion adverse to his marrying, on the ground that he was unfit to procreate—that his wife would be barren.

In Table I. I have added to these four cases five others, well authenticated, in which the fluid ejaculated by men with retained testicles was submitted to examination and found to be wanting in spermatozoa.

In confirmation of the results obtained in these cases, I may adduce

some interesting observations made upon the lower animals. The following are related in Messrs. Goubaux and Follin's 'Memoir.'—A horse, twelve years of age, though presenting all the characters of an

TABLE I.

No.	Age.	Position of Testicles.	Sexual Condition.	State of Ejaculated Semen.	Authority.
1	38	.. Both in the groin, outside the abdominal rings.	.. Married eleven years; copulative powers satisfactory; no children.	.. Destitute of spermatozoa; examined three times.	.. Mr. Curling.
2	21	.. Right, outside abdominal ring; left, within the abdomen.	.. Married two years; powers satisfactory; wife had not become pregnant.	.. Destitute of spermatozoa; examined twice at an interval of eighteen months.	.. Mr. Curling.
3	46	.. Right, in the abdomen; left, removed by operation.	.. Married; powers satisfactory; no child.	.. Destitute of spermatozoa; examined once.	.. Mr. Curling.
4	39	.. Right, outside inguinal canal; left, completely atrophied.	.. Single; powers satisfactory	.. Destitute of spermatozoa; examined twice.	.. Mr. Curling.
5	44	.. Left, outside inguinal canal; right, in the scrotum, but epididymis obstructed after orchitis.	.. Married; competent, but weak.	.. Destitute of spermatozoa; examined once.	.. Godard: <i>Études sur la Monorchidie et la Cryptorchidie</i> , p. 103.
6	22	.. One in iliac fossa; the other in inguinal canal.	.. Single	.. Destitute of spermatozoa; examined several times.	.. Godard: <i>Ibid.</i> , p. 147.
7	24	.. Both in the abdomen.	.. Single; had contracted gonorrhoea.	.. Destitute of spermatozoa; examined three times.	.. Godard: <i>Ibid.</i>
8	Not stated.	.. Both in the inguinal canal.	.. Married; powers satisfactory	.. Destitute of spermatozoa; examined several times.	.. Puech: <i>Gazette Hebdom.</i> , Dec. 1856.
9	24	.. Both in the abdomen.	.. Single; had desires, erections, and emissions.	.. Destitute of spermatozoa; examined four times.	.. Partridge: <i>Path. Trans.</i> , vol. ii.

entire horse, bore the well-known marks of castration on the right side, but on the left side there was no trace of cicatrix, and no scrotal sac or testicle. Erections were manifested in the vicinity of mares. After covering one, the fluid emitted from the urethra was examined and found to be destitute of spermatozoa.—After the purchase of a horse six years old, a question arose between the buyer and vendor whether the animal could be used as a stallion. The veterinary surgeon could discover no testicles, although the skin of the region presented no marks of the animal having been castrated. In presence of a mare the horse manifested undoubted signs of the influence of the approach. He was allowed to cover her, but accomplished the act with more difficulty, and especially slowness, than usual with a vigorous stallion of the age. The examination of the fluid emitted on three occasions, at intervals of several days, afforded no trace of spermatozoa.¹ M. Godard relates² that a cryptorchic dog covered a bitch in heat four different times in March, 1856. The fluid ejaculated on each occasion was found destitute of spermatozoa. In February, 1857, the same dog, who was addicted to coition, again covered the bitch, and the sperm emitted was also found to contain no zoosperms.

I have already alluded to a few instances in which the fluid found after death in the substance of a retained testicle, in the epididymis or vas deferens, or in the vesicula seminalis on the side corresponding to the misplaced gland, has been examined and found destitute of spermatozoa. Many other examinations have been made. They are collected in Table II. (following page), which includes three observations of my own. Spermatozoa have not been discovered after death in the spermatic ways of a detained testicle in any one instance that I know of.

Gosselin and Godard make mention of several instances of cryptorchics who were married but had no children; and I know of another instance in addition to those related in this paper. Though it is most probable that in all these cases barrenness was owing to the absence of a fecundating property in the semen, yet, as it was not examined microscopically, no scientific value can be attached to these observations. It would be objected that the cause of sterility might *possibly* have been in the female.

The facts which have been adduced, as opposed to the conclusion that cryptorchics are sterile, are chiefly instances in which they are reputed to have procreated children. Mr. Poland relates that a man, aged twenty-nine, once in the Dragoons, was admitted into Guy's Hospital on account of an omental hernia. His testicles had not descended, and there was no scrotum. The penis was well developed, and he had all the other signs of virility. He married when he was twenty, had two children by his first wife, and had been married two

¹ Professor Spooner, of the Veterinary College, informs me that he has examined several testes taken from the abdomen of horses after death, and in all of them the gland was small in size, and without spermatozoa.

² Ibid., p. 147.

TABLE II.

No.	Age.	Cause of Death.	Position of the Testicles.	Condition of Malposed Testicle.	State of Seminal Fluid.	Authority.
1	36	. . Recent injury.	. . Right, within the abdomen; left, in the scrotum.	. . Healthy, but undeveloped; weight, 110 grs.	. . No spermatozoa in right vesicula seminalis, and ducts of right testicle.	. . Curling: Diseases of Testis, 2nd edition.
2	27	. . Intestinal obstruction.	. . Left, outside abdominal ring; right, in the scrotum.	. . Small and undeveloped.	. . Spermatozoa in left vesicula seminalis; no spermatozoa in left vas deferens and vesicula.	. . Curling: Patholog. Trans., vol. ix.
3	25	. . Disease of the heart.	. . Right, in the inguinal canal; left, in the scrotum.	. . Healthy, but small; weight, 132 grains.	. . Spermatozoa in right vesicula seminalis; no spermatozoa in right vas deferens and vesicula; spermatozoa in abundance in left vas deferens and vesicula.	. . Curling: Patholog. Trans., vol. xii.
4	24	. . Recent injury.	. . Right, within the abdomen; left, in the scrotum.	. . Healthy, but small.	. . No spermatozoa in right testicle, epididymis, vas deferens, and vesicula seminalis; spermatozoa in left epididymis, vas deferens, and vesicula.	. . Godard: Études sur la Monorchidie et Cryptorchidie, p. 54.
5	26	. . Meningitis.	. . Right, in the inguinal canal; left, in the scrotum.	. . Healthy, but small.	. . No spermatozoa in right vesicula seminalis; spermatozoa in left vesicula.	. . Godard: Ibid., p. 61.
6	50	. . Strangulated hernia.	. . Both outside abdominal rings.	. . Healthy.	. . No spermatozoa in the testicles, vasa deferentia, and vesiculæ.	. . Godard: Ibid., p. 124.
7	30	. . Peritonitis.	. . Both in inguinal canals.	. . Healthy.	. . No spermatozoa in the testicles, vasa deferentia, and vesiculæ.	. . Godard: Ibid., p. 127.
8	42	. . Strangulated hernia.	. . Both in inguinal canals.	. . Healthy.	. . No spermatozoa in the testicles.	. . Debrou: Jour. Hebd. de Médecine et de Chir., tome viii. p. 3.

years to a second wife.¹ Mr. Cock has mentioned to me the case of a man whose testicles had not descended, and in whom the virile functions were perfect. He had married twice, and had children by each wife. He was a man of dissipated habits, and had served in a public-house. Mr. Durham has communicated to me the particulars of the case of a man with double oblique inguinal hernia, and with both testicles lodged in the inguinal canals. He was a well-grown, healthy labourer, aged thirty-two, and was operated on by Mr. Durham, in Guy's Hospital, in consequence of strangulation of the hernia on the left side. The patient recovered favourably. The left testicle was exposed and handled during the operation. It was smaller than usual. He had a masculine development,² was married, and his wife had borne him two children. He stated that since puberty he had experienced strong sexual desires, and had always been competent. No opportunity was afforded for the examination of his seminal fluid, and the man scouted the idea of his testicles being inefficient.

I feel no little hesitation in calling in question the claims to paternity in instances of this kind, but it is remarkable that as yet no case has been found in which a retained testicle has been fully proved to be capable of secreting a fertilizing fluid. The observations collected in this paper seem sufficient to show that as a rule they do not; and although I see no valid reason why there should not be exceptions—and Mr. Durham's case may possibly be one—still, the evidence is wanting to establish the exception in either of the instances of reputed paternity which I have mentioned. Dr. Debrou (d'Orleans) relates the case of Lebert, a man aged forty-two, who died in the Hôtel Dieu, at Orleans, of strangulated inguinal hernia on the right side, after four days' illness. After death both of his testicles were found in the inguinal canals, the scrotum being wanting. The body in other respects was that of a robust, well-formed man. He had been married, and was said to have liked intercourse with his wife, who had borne him a son, then eight years of age. His testicles, which were normal in structure, were carefully examined by Gosselin and Godard separately. They were unable to discover spermatozoa in either of them;³ Debrou adduces this case as an argument to show that the spermatozoa are not necessary to the fertility of the semen; but as their presence is admitted by the best physiologists to be essential, and as they are constantly found in the testicles of robust men, we may fairly conclude that the impregnation of the wife was most probably due to another source than the legitimate one.

It has been suggested that the testicles may secrete spermatozoa at one time and not at another, and that although they were not discovered in the foregoing cases, impregnation may have occurred at a period when the testicles were performing their functions properly. Numerous observations on the spermatic fluid by myself, Dr. Davy,

¹ Guy's Hospital Reports, Second Series, vol. i. p. 162.

² I visited the man in Guy's Hospital, and can bear testimony to his manly appearance.

³ Gazette Hebdomadaire de Médecine et de Chirurgie, t. viii. 1861, p. 3.

and others, have fully shown that in healthy adults the vesiculæ seminales and vasa deferentia almost invariably contain spermatozoa, whilst there is no evidence whatever to show that the testicles secrete a fluid at one time perfect, and at another time destitute of its essential element. There is no analogy to be found in the periodic intermissions in the sexual functions of the lower animals, since in them, when the secretion of the testicles is suspended, the power to copulate is also in abeyance.

As a malposed testicle does not secrete a fertilizing fluid, we have a strong additional reason for promoting the passage of the gland into the scrotum; and in early life, when the testicle has emerged from the abdomen, much may be done by gentle manipulation to obtain this end.

It has not been ascertained satisfactorily why a retained testicle does not perform its secreting function. One cause, no doubt, is imperfect development; for, as I have already remarked, the misplaced glands are small in size, and frequently have not undergone the change which takes place at the approach of puberty. But in several instances, mentioned by Godard, this must have occurred, for he states that the tubuli could be completely unravelled, which is not the case in an undeveloped gland.¹

2. *Sterility from Obstructions in the Excretory Ducts of the Testicle.*
—In 1853, M. Gosselin made known some curious researches in relation to this subject. He carefully examined the semen in twenty men who had been attacked with double epididymitis after gonorrhœa. In fifteen of these cases which were comparatively recent, a callosity existed in the tail of the epididymis at the time they seemed to be cured. In all, the genital functions appeared fully restored and the sperm normal. The semen was repeatedly examined at intervals of several weeks, but no spermatozoa were detected. M. Gosselin lost sight of all but two cases, and in these the return of spermatozoa in the semen occurred after some months, and coincidently with the complete disappearance of the induration in the epididymis on one side. In the remaining five of the twenty cases the double epididymitis had occurred several years previously. One man, aged forty-five, had been attacked twenty years before, but the left callosity no longer existed, and spermatozoa were found in the semen. In another man the disease dated back five years, and had left a considerable induration at the lower part of each epididymis. The general health was good. No spermatozoa could be detected. In the three other cases

¹ With the view of ascertaining what influence simple position might have on the functions of the testicle, I commenced some experiments on animals. It is well known that in certain rodents the testicles remain in the abdomen until the season of heat, when they descend into the scrotum and secrete semen. My experiments on the adult guinea-pig did not answer, for the domestic animal was always in heat. I attempted to close the abdominal ring of the young animal with sutures, in order to prevent the testicle escaping at all from the abdomen, but the parts were so fragile and delicate, that the sutures soon came out, and the object was not attained. I refer to these experiments, because they indicate a course of inquiry which might still be followed out with advantage.

the disease had occurred ten, six, and four years before. There was hardness on both sides. The testicles were otherwise unaltered. The indications of virility were quite satisfactory, and the semen presented its usual appearance. The individuals had all been married several years, but had no children. The sperm was carefully examined and found destitute of spermatozoa. One of them had had children by a former wife before the attack of double epididymitis.¹ Since the publication of the preceding observations, M. Gosselin has met with two cases of men who, after suffering from bilateral epididymitis during their youth, had retained an induration on each side. They had been married several years and had no children. In both the virile powers were not, apparently, weak, but the sperm was entirely wanting in spermatozoa.²

The following cases which have occurred in my practice, show the importance of these inquiries :

CASE V.—A stout, well-built man, aged forty-two, a widower, desired to obtain my opinion on the propriety of marriage. In early life he had indulged freely in sexual intercourse, and at the age of twenty-eight contracted a gonorrhœa, which was followed by double orchitis. This did not cause any loss of power, and at the age of thirty, he married a young healthy woman. His wife had no children, and died ten years after the marriage. He then formed an illegitimate connexion with a young woman who had previously borne a child, but his acquaintance with her did not lead to her becoming pregnant. He stated that his sexual powers had declined slightly within the last two years, but he was quite efficient. He had repeatedly experienced uneasiness in the testicles the day after sexual intercourse. The question submitted to me was his ability to procreate children, as he contemplated a second marriage in the event of a decision in the affirmative. I found the right testicle of fair size, the left somewhat small, and both rather flaccid. In the lower part of the epididymis of each testicle there was a firm induration a little tender on pressure. Some discharge emitted in sexual intercourse was brought to me for examination. It was whitish, turbid, and glutinous. There was no trace of spermatozoa or spermatic granules. I gave my opinion that, in the event of marriage his wife would be barren.

CASE VI.—In 1860, a strongly-built man, aged forty-four, who had just arrived from a distant colony, consulted me in the following difficulty:—Twelve years ago he married a healthy young woman, who bore him a child, now eleven years of age. Two years after marriage he got a chill after a long fatiguing ride in wet boots. He was seized with pain in the loins and bladder, had turbid urine and an urethral discharge, and was afterwards attacked with double orchitis. He became weak and emaciated, and was laid up five or six weeks. On recovery from this illness he found his sexual powers diminished, but he stated that they were still strong, and he was capable of indulging

¹ Archives Générales, 5^e Série, t. 11.

² Note to the French translation, by M. Gosselin, of my work on Diseases of the Testis, p. 288.

two or three times a week. His wife, however, had not conceived again. She was dissatisfied, desiring to increase her family, and believed he was at fault. It was arranged between them that he should seek advice in the mother country, and in the event of his returning without the ability to beget children, that they should separate. His testicles were rather small and flaccid. At the lower part of the epididymis of each gland there was a distinct induration, and the swellings were morbidly sensitive. The fluid emitted during erotic dreams was examined on two occasions. It was thin, and entirely wanting in spermatozoa. After experiencing sexual desires he had uneasiness in the testicles. I gave the opinion that he was incapable of procreation; but I also ventured to intimate that, however great might be the desire for children, sterility acquired after marriage was not a sufficient ground to justify a separation, especially as he was able to gratify his wife, though not to make her a mother. He gave me to understand, notwithstanding, that the arrangement would be carried out.

CASE VII.—A medical gentleman of my acquaintance, aged forty-five, moderately robust, contracted syphilis twenty-five years ago, and the next year had an attack of acute orchitis on the left side. This was followed by complete atrophy of the testicle, the organ being reduced to about the size of a French bean. He suffered at the same time from epididymitis on the right side. Slight secondary symptoms occurred during nearly ten years, but since then there has been no trace of the disease. He married thirteen years ago. His right testicle is of fair size, but there is decided enlargement and induration of the epididymis. He has never been deficient in virile power, and the emissions have been abundant. His wife has never become pregnant. Between three and four years ago, he had occasion to examine the urine of a patient containing spermatozoa, and for the sake of comparison placed some of his own semen in the microscope. He was surprised to find it entirely destitute of spermatozoa. Since then he has frequently searched for them in the fluid emitted in sexual intercourse, but had never succeeded in finding any.

CASE VIII.—In 1858, a gentleman, thirty-eight years of age, consulted me under the following circumstances:—He stated that, in India ten years before, after excitement from drink and excessive indulgence in sexual intercourse, he was attacked with violent inflammation of the prostate or parts around. He was obliged to embark for England, and was unable to obtain advice on board the ship. An abscess formed and burst in three situations—into the rectum, into the urethra, and in the perinæum. After his return to England, an elastic catheter was retained in his bladder for the cure of the urinary sinuses. This caused inflammation of both testicles. He discontinued the instrument and went to the sea-side, where, after many months, the sinuses closed, but he has since been subject to a mucous discharge in his urine. His health was good, and he was robust and active. Seven years ago he married, but his wife had never become pregnant. His desires were strong and his powers sufficient. In intercourse no

distinct emission took place. He had the sensation of ejaculation with uneasiness at the neck of the bladder, but no discharge followed. His urine had been repeatedly examined after coition, but no spermatozoa had been discovered in it. He had no stricture nor enlargement of the prostate. There was a distinct induration in the lower part of the right epididymis. The testicles were, in other respects, sound and of fair size. The absence of emission led me to conclude that the inflammation and abscess had caused an obstruction in the ejaculatory canals. I recommended a prolonged course of the iodide of potassium, and the application of tincture of iodine to the perinæum, without any sanguine hope of absorption of the supposed source of obstruction after so long an existence. No change ensued. In March, 1863, this gentleman, for the first time, called my attention to a small tumour, about the size of a large pea, in the vas deferens, about an inch and a half above the left testicle, which, it was supposed, might obstruct the passage of semen. Being very anxious to acquire the power to impregnate, he requested me to remove the tumour. Though not anticipating a satisfactory result, I consented to perform this slight operation, April 4th. Sensibility having been annihilated by a freezing mixture, and the vas deferens fixed by a clamp, I cut upon the duct, and avoiding the veins around, opened it just below the tumour, and introducing a fine probe, found the canal completely obstructed by the swelling. It consisted of a cyst containing a soft whitish substance like sebaceous matter. This was removed, and an opening made into the duct both above and below. The small wound in the scrotum was closed with a single suture. Matters went on very well for three days when gout attacked one foot, and was shortly followed by orchitis on the left side, with considerable swelling and thickening of the spermatic cord. Under purgative treatment with colchicum the gout subsided, but the orchitis proved indolent. The patient's general health was a good deal disordered. Suppuration occurred in the spermatic cord, and the part did not heal for three weeks. There has been no restoration of the passage for the semen.

M. Godard has recorded an interesting case (Case V. in Table I.) of a strong, vigorous man who had the left testicle in the groin, and the right one, of full size, in the scrotum. When young he was much addicted to women, and became the father of a child. At the age of twenty-one the testicle in the scrotum was attacked with gonorrhœal orchitis, which became chronic, and left a deposit in the tail of the epididymis. This was followed after five years by stricture in the urethra, and a second attack of orchitis in the right testicle. At the age of thirty-three he married, but his wife never became pregnant. She died at the end of five years, and at the age of thirty-nine he married again, but had no children. The ejaculated sperm was examined by M. Godard and others, but no spermatozoa could be detected in it. This is a case of sterility arising from a double cause—from malposition of one testicle, and obstruction in the excretory duct of the other.

The preceding observations show that epididymitis, especially when

double, should not be regarded as a trivial and unimportant affection, and that the treatment of it should be prolonged until the effused matter is absorbed and all induration has disappeared, for if the disease be allowed to pass into and remain in a chronic state, permanent obstruction of the excretory duct is liable to ensue. It has been found that under careful treatment callosities obstructing the canal have disappeared at the end of many months, leaving the course of the semen free. M. Godard has related a case in which he had cured sterility from this cause that had lasted eighteen months.

The passage of the semen from the testicle may be prevented by congenital absence of the vas deferens. M. Gosselin examined the sexual organs removed from a man about twenty years of age. The funicular and inguinal portion of the vas deferens was wanting on the right side. The right testicle was healthy, but the ducts of the epididymis were gorged with yellow fluid which contained a quantity of dead spermatozoa. The testicle, vas deferens and vesiculæ seminales on the left side were normal, and contained abundance of spermatozoa. There were none in the right vesicula. John Hunter, in dissecting a male subject, found the vasa deferentia wanting on both sides. The testicles which were in the scrotum were sound and of good size. There are other instances on record of a double imperfection of this kind, the testicles being sound. In such a case the man would of course be sterile. Many years ago I made experiments on animals which were confirmatory of the observation that the testicles may be properly developed though a physical obstacle to the elimination of their secretion is present from birth; and that so long as these organs exist entire, the individual acquires and preserves all the marks of the male sex.¹

The excretory duct of the testicle is liable also to be interrupted by tubercular deposits in the epididymis. It is well ascertained that this part is much more frequently the seat of tubercle than the body of the gland, and is often extensively diseased whilst the substance of the testicle remains sound.

CASE IX.—A young man, aged twenty-eight, moderately robust, was under my care on account of large tubercular deposits in the epididymis of both testicles. Although the disease had existed seven years, and had softened down and suppurated, there was not the slightest indication of morbid change in the substance of the glands, which were of moderate size. His general health was good, and he had no symptom of tubercular disease elsewhere. He had fair sexual powers, but the emitted fluid was small in quantity and contained no spermatozoa.

This cause of sterility did not escape the searching inquiries of M. Godard. In a letter written to me in November, 1860, he remarks, "J'ai toujours constaté que les individus avec double affection tuberculeuse du testicule entraient en erection, pouvaient avoir des rapports sexuels, mais éjaculaient au plus une à deux gouttes de semence absolument privée de spermatozoïdes."

¹ Treatise on Diseases of the Testis, first edit., p. 63.

The capacity for sexual intercourse may exist, though in diminished force, in extensive chronic disease of both testicles when the secreting structure is almost entirely destroyed, such as in old-standing strumous orchitis. This will not appear remarkable when it is recollected that coition may be performed for a time even after double castration.

CASE X.—A gentleman, aged thirty-two, of robust frame, married, and the father of two children, came under my care on account of strumous orchitis, producing great enlargement of the right testicle. His left testicle had been excised for a similar affection seven years before. He still continued sexual indulgence. The disease having resisted all remedies, I removed the remaining testicle. On examination I could find no trace of tubular structure, the enlarged organ consisting of a mass of lymph with scrofulous pus in the centre. There were no spermatozoa in the epididymis and vas deferens. He had intercourse with his wife a week only before the operation.

3. *Sterility from Impediments to the Escape of the Seminal Fluid.*—It is well known that a close stricture in the urethra so completely interrupts the passage of the seminal fluid, that in ejaculation it regurgitates into the bladder, where it mixes with the urine. In erection of the penis the urethra becomes narrowed, so that a stricture which offers but a slight obstacle to the flow of urine may under congestion be sufficient to impede the emission of semen. I have grounds for concluding that sterility from chronic stricture in the urethra exists to a greater extent than is commonly supposed, being in some instances little suspected by the patient himself. The semen not having been ejected, dribbles afterwards from the urethra as erection subsides, and so misleads the patient. As this is a condition which is in most cases remediable by the cure of the stricture, it is unnecessary to say more than to call particular attention to it as not an uncommon source of infertility. In describing Case VIII., I have mentioned that the absence of emissions in copulation led me to conclude that inflammation and abscesses near the prostate gland had occasioned obliteration of the ejaculatory canals, so that there was apparently a double cause for sterility, the excretory ducts also being obstructed. But sterility originating in a closure of the ejaculatory canals is a subject which needs further investigation. They must be liable to injury in lithotomy, and sterility might be the result of a bilateral operation.

Accoucheur physicians have informed me that, in seeking for the cause of sterility in their married patients, they have observed an absence of spermatozoa in the fluid removed from the vagina after sexual intercourse, and they have ascertained that the true cause of barrenness has in many instances rested with the husband. It is supposed that in men exhausted by early excesses the testicles do not secrete the emitted fluid consisting of the secretions of the vesiculæ and prostate. No doubt this is sometimes the case, for in several weak patients I have detected an absence of spermatozoa. In advancing atrophy of the testicles, before the capacity for intercourse is wholly lost, the glands cease to supply the essential element.

CASE XI.—A gentleman, aged forty-seven, a married man of robust appearance, consulted me on account of wasting of both testicles, with

failure in sexual power. The wasting had been going on gradually for eighteen months. It commenced during a voyage at sea when he was separated from his wife. I found the testicles soft, and reduced to one-fourth their natural size. They were extremely sensitive. He still enjoyed connexion, but at long intervals. On examination of the fluid removed from the urethra shortly after intercourse, I could find no trace of spermatozoa.

But when the desire and capacity for intercourse are strong, I believe that spermatozoa are never absent from the ejaculated fluid, except from causes which I have described in this communication. When the testicles cease to secrete them, there is defective power of copulation, and the absence of spermatozoa is an indication of incompetency for marital duties.

Two important and delicate questions arise out of these inquiries : 1. Whether a man who has the inclination and power to copulate, but who is nevertheless sterile, is justified in contracting marriage—should such a person be condemned to celibacy ? 2. Whether this condition is a sufficient ground for divorce ?

1. That a man who is unable to fulfil the command “to be fruitful and multiply” is right in disappointing the hopes and perilling the happiness and perhaps health of a woman cannot, I think, be maintained by any casuist, and in some of the foregoing cases I have felt it my duty to give advice in accordance with this opinion.

It cannot be doubted that in women ready for conception frequent sexual excitement without impregnation is very likely to prove injurious to health. Dr. West mentions the occurrence of chronic ovarian irritation and chronic congestion of the womb leading to hypertrophy of the uterine substance and profuse bleeding from its lining membrane in cases where marriage is sterile.¹ It has been supposed that more important diseases of the female sexual organs, of a chronic character, have owed their origin to irregular and unfruitful excitement. In Case VII., the sterile patient, a medical gentleman, informed me that after six months of married life his wife suffered from some of those obscure symptoms of irritable cervix uteri called chronic inflammation, and he believes that his wife’s troubles were caused by non-impregnation. I know also that the wife of another patient whose case is described in this paper, a fine healthy woman before marriage, has since been constantly under the care of accoucheur physicians.

2. The second question is one upon which a surgeon is scarcely called upon to pronounce an opinion. But I may venture to remark, that as sterility in women is not considered an adequate cause for divorce, so the man ought not to pay such a penalty for unsuspected unfruitfulness.

¹ Diseases of Women, Part I., p. 55. Dr. Priestley remarks:—“It is highly probable that sexual excitement which is not followed by the occurrence of pregnancy leads in many cases to permanent congestion of the ovaries, and this may readily be lighted up into more active disease.” (Clinical Lecture on Menorrhagia, Medical Times and Gazette, vol. i., 1863, p. 445.)