

ON SOME
MALFORMATIONS

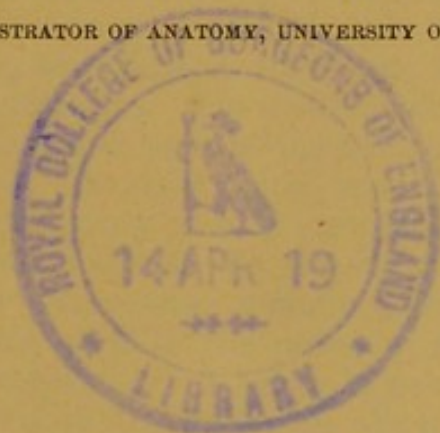
OF THE

ORGANS OF GENERATION.

BY

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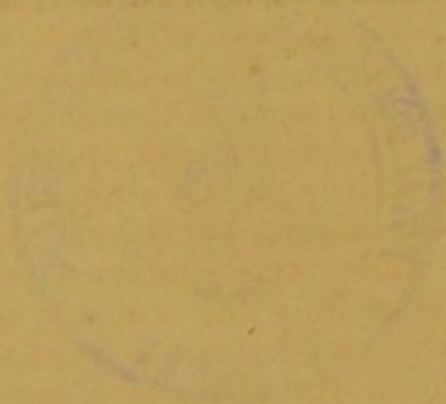


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MALFORMATIONS
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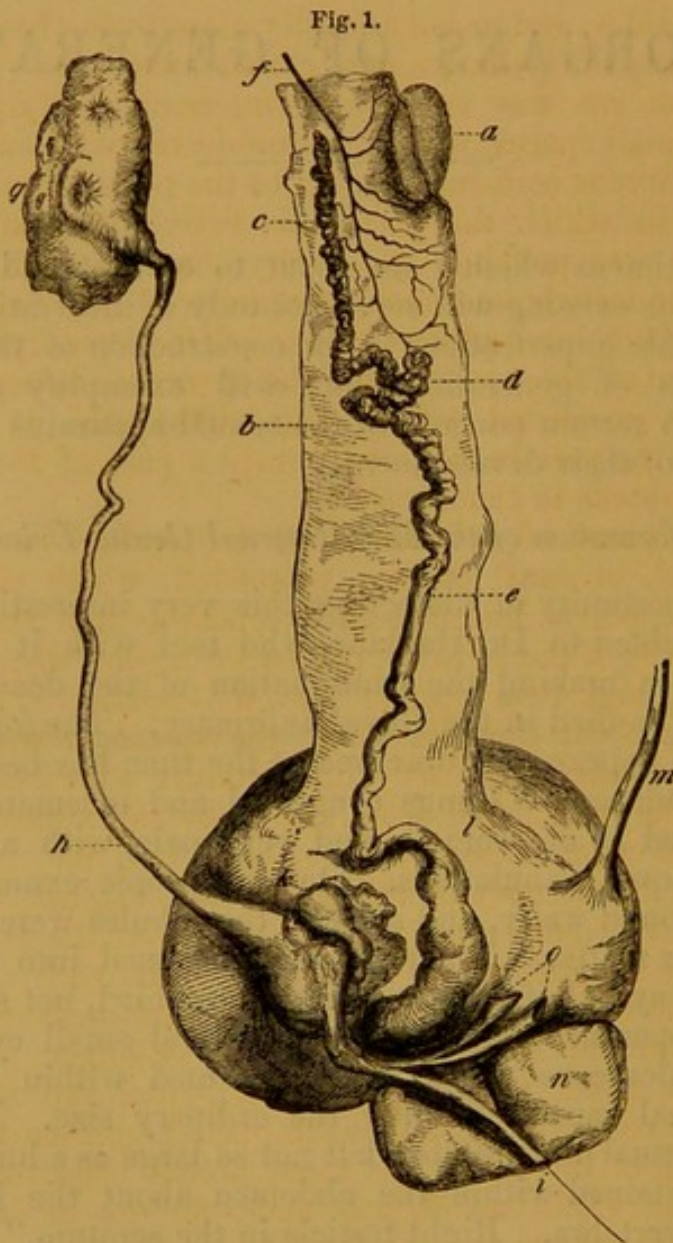
THE four specimens which I am about to exhibit and describe to the Society this evening will serve not only as illustrations of some very remarkable imperfections in the construction of the male and female organs of generation, but will exemplify some of the changes which certain portions of the sexual apparatus go through in the course of their development.

CASE 1. *Malformation of the Male Internal Genito-Urinary Organs.*

For the opportunity of dissecting this very interesting preparation I am indebted to Dr Haldane, who met with it about three years ago, when making the examination of the dead body of a man æt. 32, who died in the Royal Infirmary. The following note of some of the appearances observed at the time has been furnished me by Dr Haldane:—"Lungs congested and œdematous. Right kidney weighed 10 oz., smooth, and very pale, with a few indistinct semi-opaque granulations. On microscopic examination, the vessels were found waxy, and some of the tubules were filled with finely granular matter. The right ureter opened into the bladder in the usual way. Left kidney greatly atrophied, not so large as a prune; its proper structure absent, but several small cysts, one of which had calcareous walls, were contained within its capsule. Left supra-renal capsule of fully the ordinary size. Right renal artery of the usual dimensions; left not so large as a lumbar artery. Left testicle retained within the abdomen about the level of the third lumbar vertebra. Right testicle in the scrotum."

The left testicle and kidney, the bladder, with the adjacent structures, were the parts submitted to me for dissection. Situated behind the peritoneum of the left side of the back of the abdomen, and covered by that membrane on its anterior and lateral aspects, was an elongated body, nearly $1\frac{1}{2}$ inch long and about $\frac{1}{2}$ an inch in its antero-posterior diameter. This body was the left testicle. Beneath

its serous coat, a well-marked fibrous tunica albuginea existed, and when this was cut through, the characteristic tubuli seminiferi were seen both with the naked eye and the aid of the microscope. None of the tubuli, however, pierced the tunica albuginea, and it was evident that the globus major or head of the epididymis was completely absent. In relation to the posterior margin of the testicle, and towards its lower end, but quite separate from it, was a fine tubule, thrown into tortuous, convoluted folds, which had the same appearance as the body of the epididymis, and apparently represented



Explanation of FIG. 1.—*a.* Left testicle. *b.* Parietal peritoneum. *c.* Body of epididymis. *d.* Globus minor. *e.* Vas deferens. *f.* Spermatic artery. *g.* Left kidney. *h.* Ureter. *i.* Bristle in prostatic orifice of ureter. *k.* Vesicula seminalis. *l.* Bladder. *m.* Right ureter. *n.* Prostate gland. *o.* Remains of right vas and vesicula. Figs. 1 and 3 have been engraved from drawings of the preparations made by my pupil, Mr J. W. Moir.

that structure. After a course of something less than two inches this convoluted tubule was doubled several times upon itself, and presented the appearance of the globus minor of the epididymis. The tubule, as it emerged from this body, gradually increased in size, lost its convoluted arrangement, and became much thicker in its coats, possessing, in fact, all the characters of a vas deferens. It then passed downwards behind the peritoneum into the pelvis, where it came into relation with the base of the bladder. Twice in its course it was thrown into folds, and when it reached the base of the bladder it became considerably dilated, formed cæcal pouches at its sides, and ended abruptly close to the base of the prostate in a short, finely-drawn-out, closed extremity. The dilated portion of the vas was subdivided internally by imperfect septa into several small spaces, which communicated with each other.

A slender fibrous cord ran parallel to the posterior margin of the left testicle, in which the spermatic vessels were situated. An injecting pipe was put into the artery, and through it injection passed into the testicle, and along a number of small arteries which supplied the body and globus minor of the epididymis, and the commencement of the vas. From the spermatic artery also many fine branches proceeded, which were distributed to the areolar tissue behind the peritoneum, and formed a part of the sub-peritoneal arterial plexus in that locality.¹

From the hilus of the atrophied left kidney a ureter, well formed, though of small calibre, proceeded, which passed downwards into the pelvis, but instead of opening into the bladder it entered the base of the prostate, passed for a short distance through its substance, and then opened into the urethra. The prostate gland had been cut through before the specimen reached me, so that it was not possible to say with certainty where the exact termination of the ureter had been, but from the appearance of the part it seemed as if it had either opened into the utriculus—the representative in the male of the uterus and vagina—or, following the course of the common ejaculatory duct, into the urethra at the margin of the mouth of the utriculus. As the ureter lay at the base of the bladder, it lost its cylindrical form, and assumed an appearance like the lower end of a vas deferens. Its canal, for example, was subdivided by imperfect septa, and several small cæcal pouches connected with its walls opened into its cavity. Close to this portion of the ureter was a convoluted body like a vesicula seminalis. A careful search was made for the excretory duct of this body, but without success, for it became so intimately blended with the outer fibrous coat of the ureter that all attempts to separate them resulted in injury to the latter. In the cæcal pouches of this vesicula, an inspissated secretion was contained, but no sperma-

¹ For an account of the connexions and relations of the sub-peritoneal arterial plexus, I may refer to my Memoir on the subject in the *Medico-Chirurgical Review*, July 1863, p. 222.

tozoa could be detected in it on microscopic examination. Some of the pouches had their walls affected with calcareous degeneration. In close relation to the right half of the base of the prostate were two tubes, both of which had been cut short before the preparation reached me. They were evidently the right vas and vesicula. Their excretory ducts were impervious, and converted into slender fibrous cords, which ran along the lower end of the left ureter before it entered the prostate and were blended with the fibrous coat of the left vesicula as it surrounded the ureter.

In considering the peculiarities exhibited by this interesting preparation, it must be noted that not only was the left testicle retained in the abdominal cavity, but the vas deferens corresponding to it was a tube closed at both ends, having no connexion with the testicle at the epididymis, and possessing no opening into the urethra at its lower end. The atrophied condition of the left kidney, and the termination of its ureter in the prostatic portion of the urethra, are also worthy of notice. That one or other kidney may atrophy almost to complete disappearance is a fact so well known to pathologists that I need not adduce other examples in confirmation of this specimen. But cases of transposition of the lower end of an ureter are so rare that it may not be amiss to cite a few examples. And, not to speak of cases in which, with congenital absence of the bladder, the ureters opened either on to the pubic region or into the urethra,¹ I may here refer to a case recorded by Thilow (Meckel, Path. Anat., p. 742), in which the ureter went beyond the bladder and opened into the urethra; to a case recorded by Förster,² where the left kidney and ureter were wanting, and the right ureter opened into the left side of the bladder, at the spot where the left ureter should have terminated had it been present; and to a second case detailed and figured³ by the same accurate pathologist, in which, in a female, the ureter ended in the left side of the uterus. If the ureter, in the case I have related in this paper, ended in the utriculus, then it may be compared with the second case recorded by Förster, for the prostatic vesicle is the homologue of the uterus and vagina. Sometimes the ureter ends inferiorly in a closed extremity. When on a recent visit to Oxford, Dr Acland showed me, in the pathological collection of the University, a preparation of the kidney and ureter of a pig. The ureter, about ten inches long, ended inferiorly in a blind pouch, which was distended with a brown fluid.

Cases of retention of the testicle in the cavity of the abdomen are by no means unfrequent; but cases of retention, conjoined with lack of connexion between the testicle and the vas deferens, and with or

¹ For specimens of this kind I may refer to the cases by Thilow, Blasius, and Binninger, cited by Förster, in his recent treatise, "Die Missbildungen des Menschen," Jena, 1861.

² Virchow's Archiv, vol. xiii. p. 275. 1858.

³ Die Missbildungen, p. 127.

without closure of the vas at its urethral end, are amongst the most unusual specimens of imperfect development. Brugnone¹ saw a man, æt. 27, in whom the right vas was deficient from the entrance to the pelvis as far as the head of the epididymis. John Hunter,² in dissecting a male subject, found on the right side the vas deferens absent in the cord from the epididymis to the neighbourhood of the external abdominal ring, whilst, on the left side, the vas was present, but the body and globus minor of the epididymis were not developed. The vasa had no communication with the urethra. Mr Paget³ relates a case in which, with imperfection of the left testicle, the excretory duct was deficient as far as the inner aspect of the external abdominal ring. He alludes to a case by Bosscha, where the whole of the left vas was wanting, except two inches that ascended from the epididymis. Other cases by Gosselin and Tenon are referred to by Mr Curling in his "Treatise on the Testicle." In all these instances of imperfection of the vas, or epididymis, the testicles had entered the scrotum. But in the museum of St Bartholomew's Hospital is a preparation which more closely, though not altogether, resembles Case 1; for the testicle is described as detained in the inguinal canal, the epididymis is absent, and the vas ends near the testicle in a cul-de-sac.

Some recent inquiries into the mode of development of the organs of generation may perhaps assist us in determining the changes which have taken place in the production of the peculiar malformation of the epididymis in the case before us. Embryologists agree in stating that the genital gland—testicle in the male, ovary in the female—arises as a thin white streak along the inner border of the Wolffian body, or primordial kidney. But the relation between the two is merely that of contiguity, for no continuity of structure exists between them. Two tubes extend along the outer border of the Wolffian body,—one the excretory duct, into which the tubular secreting structure in the interior of the gland opens; the other the Müllerian duct, which is not continuous with the secreting tubules, but simply lies in contact with the outer border of the Wolffian body, and terminates superiorly in a free closed end. Both the excretory duct and the duct of Müller open inferiorly into the sinus urogenitalis. If the changes taking place in these structures be traced in the male embryo, it will be seen that the Wolffian body atrophies, or at least does not increase in proportion to the growth of some of the other structures, and so, by comparison, seems to atrophy; whilst, as most embryologists admit, the excretory duct of the Wolffian body persists, increases in size, and becomes the vas deferens, globus minor, and body of the epididymis. Thus the excretory duct of the testicle is developed from a structure distinct

¹ Meckel, Path. Anat. vol. i. p. 687.

² Animal Economy, p. 31.

³ London Medical Gazette, vol. xxviii. p. 817. 1841.

from the gland itself, and has at first no connexion with it.¹ It is not until the globus major, or head of the epididymis, is formed, that the communication between the testicle and its excretory duct is established. From what, then, is the globus major developed? Kobelt held, and his opinion has been adopted, with some slight modification, perhaps, in the details, by many subsequent writers,² that the head of the epididymis consists of the persistent tubules of a part of the Wolffian body, which, whilst on the one hand preserving their continuity with the excretory duct, on the other acquire a connexion with the seminiferous tubules of the testicle. But this opinion of Kobelt's has been of late disputed by more than one observer. Thus Dr Cleland, in an account of the development of the testis, introductory to his prize thesis "On the Mechanism of the Gubernaculum Testis,"³ states that the cono-vasculosi of the head of the epididymis are formed in a convoluted mass which is situated at a spot originally occupied by a part of the Wolffian body, but quite distinct from, and not composed of, the tubules of that organ. Still more recently, Dr William M. Banks, in his prize thesis "On the Wolffian Bodies in the Fœtus,"⁴ confirming the observations of Dr Cleland, has described a new structure filling up the place in which the upper end of the Wolffian body, now atrophied, originally lay. "As the Wolffian body disappears, this new structure becomes more and more distinct." It eventually rests on the upper end of the testis, lies in the position of the globus major, and the tubes which it contains become continuous with the canal of the epididymis on the one hand, with the tubuli seminiferi within the testis on the other. By these observations, the statement originally made by Johannes Müller, that the Wolffian bodies are not converted in the process of development into any other organ, is strikingly confirmed.

It will be remembered, that in the case the peculiarities of which I have detailed, the left testicle, the vas, the globus minor, and body of the epididymis, were all present, but that the globus major was entirely absent. Hence, in this case, the genital gland and the excretory duct of the Wolffian body, from which those parts are developed, had been formed in the usual way. The left Wolffian body, also, had in all probability originally existed, but its atrophy had been so complete that no remains of it, not even the corps innominé of Giraldès could be detected. With the atrophy, however, of the Wolffian body, no new structure had formed at its upper end, hence the globus major was altogether absent, and the testicle

¹ It is but right to state, however, that some embryologists hold that the vas deferens and body and tail of the epididymis are developed from the Müllerian duct, and not from the excretory ducts of the Wolffian body. But the balance of evidence seems to me to be in favour of the opinion stated in the text, in accordance with which the hydatids of Morgagni, and the prostatic vesicle, are in the male the sole persistent remains of the ducts of Müller.

² Kölliker *Entwicklungsgeschichte*, p. 444.

³ Edinburgh, 1856.

⁴ Edinburgh, 1864.

was dissociated from its excretory duct. It is not so easy to offer an embryological explanation of the mode of production of the malformation in its lower or prostatic portion. The closure of the vas at its prostatic end, the peculiar vesicular-like condition of the lower end of the left ureter, and the prolongation of that tube onwards in the course of the ejaculatory duct, are important features in the specimen. And although it would be quite possible to frame an hypothesis to account for the way in which the closed condition of the one tube and the substitution for it of the other tube in the prostatic part of its course have been brought about, yet I am doubtful if the present state of embryological knowledge will admit of one that would be altogether satisfactory.

In the absence of any history of the man from whom this preparation was obtained, it is not possible to say whether he had at any time possessed any sexual desires. So far as regards the construction of the left testicle and its excretory duct, it cannot be doubted that there must have been a complete want of any seminal secretion from that organ—the closure of the duct at both ends shutting off the gland completely from the urethra—and the defect is, without question, one of a congenital nature. But even if the canal between the testis and the urethra had been continuous and quite pervious, and the testicle still retained in the cavity of the abdomen, it would not necessarily have followed that the fluid secreted by the gland so situated should have contained spermatozoa; for the cases observed and recently published by Mr Curling,¹ seem to me to show that the seminal fluid in cryptorchismus is not unfrequently destitute of spermatozoa, even when the sexual desire and capacity for intercourse of the man are strongly developed. Of the condition of the right testicle I am unable to say more than that it occupied the right side of the scrotum. Its excretory duct was also closed at the prostatic end, so that on this side too, even if the secreting powers of the testis were perfect, there could have been no passage of seminal fluid into the urethra. But whether this closure of the right vas and its corresponding vesicula was congenital, or was occasioned by some inflammatory affection of the tube, it is now impossible precisely to determine, though I am inclined to think, from the manner in which these structures were blended with the left vesicula and left ureter at the base of the prostate, that on this, as on the other side, a congenital defect in development had occurred.

CASE 2.—*Uterus Unicornis.*

This example of a very rare malformation of the uterus was met with in the body of a woman, past the middle period of life, which was admitted into the dissecting-room early in the present session. When the coils of the small intestines were

¹ Medico-Chirurgical Review, April 1864, p. 498.

drawn on one side, it was noticed that the uterus did not possess its usual form and position; and on a careful examination, the following arrangement of parts was observed:—The uterus was situated in close relation to the inner wall of the right side of the pelvis, its upper end being three-fourths of an inch below the pelvic brim. It was smaller than usual, its length being one inch and a-half, its greatest breadth one inch and a-quarter. Its shape differed from that of the normal uterus, the left margin being convex, and the upper margin almost pointed. From the latter the ovary, with its ligament, the Fallopian tube, and the round ligament of the right side only sprang. The organ was invested by peritoneum, which was reflected from its anterior and posterior surfaces to the pelvic wall, without the intermediation of a broad ligament. From its form, position, and connexions, it was evident that the uterus in this person consisted solely of the right uterine cornu. The right ovary was situated partly at the pelvic brim and partly in the right iliac fossa. It looked shrivelled, and on its surfaces were faint traces of scars. The Fallopian tube also reached into the same fossa; the peritoneum surrounding it and the ovary was continuous with the peritoneal lining of the fossa. The fimbriated end was connected to the ovary by a slight fibrous band. The tube was pervious, and could be readily inflated. Between the layers of its peritoneum were faint traces of the organ of Rosenmüller. Attached to the left margin of the uterus, close to the junction of the body and cervix, was a flattened band, not more than three-eighths of an inch in diameter at its widest part, which passed across the back of the bladder six-eighths of an inch above the line of reflection of the peritoneum, from the rectum to the bladder. From the bladder it extended to the inner surface of the left pelvic wall, up which it proceeded as far as the pelvic brim, where it terminated in a free stump-like extremity. This band, although readily recognisable at its uterine and free extremities, could with difficulty be traced along the bladder and pelvic wall, for it appeared to be little more than a mere thickening of the peritoneum in those localities. From the position and connexions of this band there can be no doubt that it represented the left uterine cornu, atrophied in this case almost to complete disappearance. The left ovary was connected by a short ligament, proceeding from its lower end, to the stump-like end of the flattened band, and it possessed a meso-arium one inch in length, which was continuous over the line of the external iliac artery, on the one hand with the peritoneal lining of the pelvis, on the other with the serous covering of the left iliac fossa. The ovary was thin, its surfaces perfectly flat, and with no trace of scars. Between the folds of its meso-arium a brownish mass, probably the organ of Rosenmüller, was situated. The left Fallopian tube was two inches long, and completely detached from the atrophied left uterine cornu. It was connected to the upper end of the left ovary by the pointed ex-

Fig. 2.



Note of Explanation to FIG. 2.—Uterus Unicornis. *a, a.* Supra-renal capsules. *b.* Right kidney. *c.* Mass of fat in left lumbar region. *d.* Uterus unicornis. *e.* Left ovary; the rounded structure *g*, immediately below, is the stump-like free end of the left uterine cornu. *f.* The Fallopian tube. This figure is engraved from a careful drawing of the specimen by my pupil Mr Richard Caton.

tremity of a triangular-shaped fold of peritoneum, one and a-half inches long, which permitted the tube to be readily moved about, and even drawn as far upwards as the iliac crest. Its fimbriated end was well marked, the mouth open, the tube pervious. The opposite end was closed, and formed a rounded cul-de-sac. The left round ligament was connected to the stump-like end of the atrophied left uterine cornu.

The hymen was absent. The vagina, three inches long, readily admitting three fingers, and directed obliquely to the right. Into its upper end the os and cervix projected. There was a slight bulging of the vagina, to the left of the cervix. The pelvic surface of the posterior wall of the vagina was covered by peritoneum. Lips of the os uteri smooth. The cavity of the right uterine cornu and cervix measured together two inches in length.

The rectum was in its normal position. The left colon descended over the surface of the psoas. The superficial surface of the left quadratus and iliacus was invested by peritoneum, which had therefore an extensive relation to the abdominal wall on this side. When the colon was removed, the left kidney was found altogether absent, the position of that organ being in part occupied by the gut, and in part by a mass of adipose tissue. The left supra-renal capsule was of ordinary size. From the absence of the left kidney there was no renal artery or vein on this side, but a vein formed by the junction of the left capsular and ovarian veins with one of the lumbar veins crossed the front of the aorta in the usual position of the left renal vein to join the inferior vena cava. The right kidney and capsule were normal, and it could not be said that this kidney was hypertrophied. There was no appearance of inflammatory affection of the peritoneum either in the pelvis or abdomen proper. The pelvis was symmetrical, and possessed the usual dimensions met with in the female.

CASES 3 AND 4. *Uterus Bicornis Unicollis.*

Two specimens of this malformation of the uterus have now come under my notice in the dissecting-room,—one three years ago, the other early in the present session. The women in whom they were found were advanced in years. In both specimens the pelvic peritoneum exhibited evidence of an old inflammatory attack. In Case 3, a number of fibrous bands passed in the antero-posterior direction across the pelvic cavity from the bladder to the rectum, and in their course were attached to the uterus, and more especially to a small calcified fibrous tumour connected with its right cornu. In Case 4, the ovaries and Fallopian tubes were situated in the iliac fossæ, the right ovary being attached to the under surface of the meso-cæcum by adhesions, the left to the under surface of the sigmoid meso-colon. The peritoneal investment of the uterine cornua and of the rectum was rough and flocculent.

The uterine characters in both specimens corresponded in so many particulars that they may in a great measure be embraced by a single description. Vagina, os externum, and cervix uteri undivided. Body of uterus separated into two distinct cornua, each about two inches long, which, diverging widely from each other, stretched almost transversely across the lateral diameter of the pelvis, so that the angle formed by the junction of their inner margins was very obtuse. Each cornu was somewhat ovoid in form, the extremity representing the larger end of the egg being the furthest removed from the cervix. Each cornu had a special opening into the upper and outer angle of the canal of the cervix on its own side; the cavities of the horns extended throughout almost the entire length of their respective cornua. The hymen was absent, and the mucous membrane of the vagina comparatively smooth. The lip of the external os smooth and without fissures. The ovarian ligaments were connected to the outer end of each uterine cornu posterior to the place of origin of the Fallopian tubes. The round ligaments arose from the outer ends of their respective cornua, and then passed outwards between the folds of the broad ligaments.

Case 3 is the only one of the two specimens which has been opened, and in it the canal of the cervix was seen to be one inch in length, and its folds or plicæ sharp and well defined. Projecting

Fig. 3.

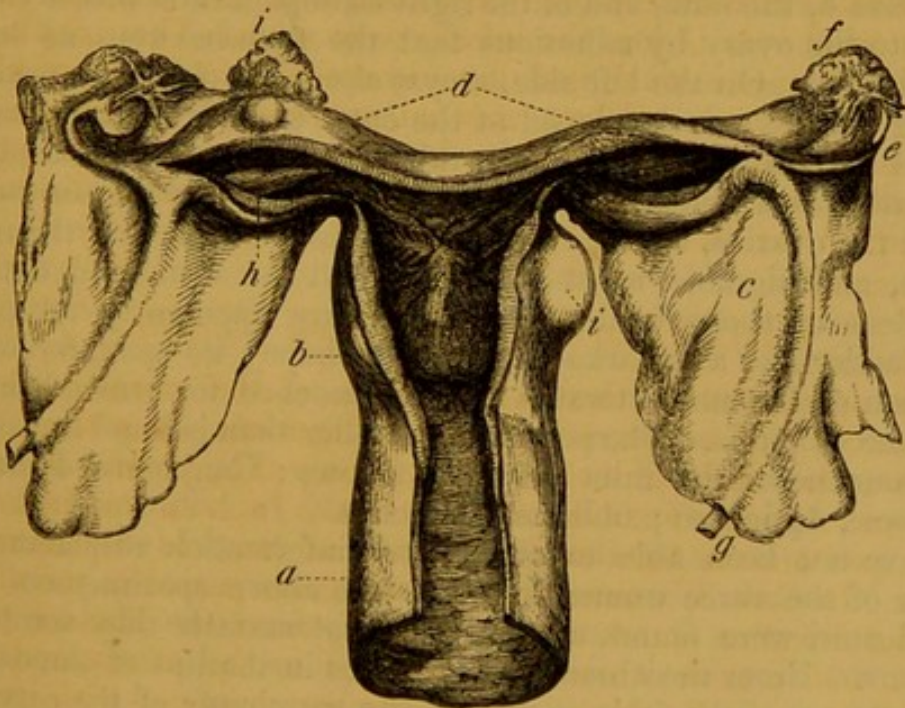


FIG. 3 represents Case 3.—Uterus Bicornis Unicollis. *a.* Vagina. *b.* Cervix uteri. *c.* Broad ligament. *d.* Uterine cornua. *e.* Fallopian tube. *f.* Ovary. *g.* Round ligament. *h.* Uterine polypus. *i, i.* Fibrous tumours. The four specimens described in this paper are now deposited in the Anatomical Museum of the University of Edinburgh.

into the cavity of its right horn was an elongated polypus, connected to the uterine wall by a very short stalk proceeding from its upper part. When examined microscopically with a power of 200 diameters, this polypus was seen to be composed partly of connective tissue, and partly of tubular glands, the latter resembling in form and anatomical characters those glands which constitute so important an element in the uterine mucous membrane.¹ The Fallopian tubes attached to the outer end of their respective cornua curved upwards, outwards, and then inwards; their fimbriated ends being in close contact with, and united by adhesions to the ovaries. The ovaries were deeply and frequently scarred. The meso-arium was much thickened by adhesions, more especially on the right side, so that the condition of the organ of Rosenmüller could not very satisfactorily be made out; traces of it on the left side were, however, noticed. The orifice of each tuba amidst the fimbriæ was dilated, and the tubes were widely pervious for about two-thirds of their extent; but at their uterine ends they seemed to be quite closed, for I was unable to pass either a probe or fine bristle from them into the uterine cavity. Embedded in the substance of the left side of the cervix was a small fibrous tumour, and similar tumours about the size of peas were situated in the anterior and posterior walls of the right cornu. Projecting from the same horn was a calcified fibrous tumour about the size of a hazel nut, which was firmly connected to the rectum by strong adhesions.

In Case 4, the outer end of the right Fallopian tube was so closely united to the ovary by adhesions that the fimbriæ were no longer recognisable. On the left side, a cyst about the size of an ordinary playing marble was developed at the outer end of the ovary, and to its wall the fimbriated end of the tuba was so firmly connected that its mouth was occluded. The thickened condition of the peritoneum around the ovaries, and the adhesions between them and the meso-cœcum, and sigmoid meso-colon obscured the form and external characters of those bodies, but they were apparently atrophied. The bladder had a remarkable pyriform shape; its apex, formed by a portion of the unobliterated urachus, reached for nearly 3 inches above the os pubis. The pelvis was smaller than is usual in woman, the diameters of the inlet being as follows: Conjugate, 4 inches; transverse, $4\frac{1}{2}$ inches; oblique, $4\frac{3}{4}$ inches.

I have not been able to obtain any information respecting the history of the three women in whom the above specimens of malformed uteri were found, so that I cannot state if they were ever pregnant. From the absence of cicatrices in the lips of the os, and the sharpness of the folds of the mucous membrane of the cervix in Case 3, it is probable that she had never given birth to children.

¹ For an excellent description of the gland structures met with in some forms of uterine polypi, I may refer to an essay by Rokitansky: Ueber, Uterus-drüsen-neubildung in uterus und ovarial sarcomen: Zeitsch. der Gesellschaft der Aerzte zu Wien, 10th September 1860.

That such malformations are not necessarily incompatible with pregnancy, if the ovaries are properly developed and the Fallopian tubes pervious, is, however, sufficiently proved by numerous recorded cases. Dance, Robert Lee, Thilo, and others, have related cases of impregnation of the right horn; Rokitansky, Cruveilhier, and others, cases of impregnation of the left horn; and Hohl and Generali, cases of impregnation of both horns, and consequent production of twins in the uterus bicornis. The case of Generali is one of much interest, for the presence of twins in the uterus was diagnosed before the labour commenced, and a month's interval elapsed between the birth of the two children. The case was regarded at the time as one of superfœtation dependent on the peculiarly malformed condition of the uterus. On the death of the woman, thirty years after, in the year 1847, Generali found the body of the uterus divided into two lateral halves, to each of which a Fallopian tube was connected.

Again, the uterus unicornis, in which the second horn was completely wanting, has been met with in the impregnated state by Chaussier and Chiari, and in Chaussier's case (related by Dr Granville in the Philosophical Transactions for 1818), the woman had on one occasion given birth to twins. Amongst the examples of uterus unicornis in which a rudimentary second horn existed, Stoltz has related a case in which the woman had had both male and female children in the developed horn; and Dionis, Canestrini, Ingleby, Heyfelder, Rokitansky, Scanzoni, Luschka, and some others, have related cases in which impregnation had taken place in the cavity of the rudimentary horn itself.¹ Several of those last named were at first supposed to be pregnancies of the Fallopian tube, and in them rupture of the rudimentary cornu and extension of the foetus into the abdominal cavity took place before the sixth month of intra-uterine life.

The various forms of uterine malformation which have now been recorded by different pathologists has rendered necessary some system of classification under which the different varieties may be arranged. Two of the most convenient of these systems are those employed by Dr Arthur Farre in his excellent article "On the Uterus and Ovaries,"² and by Kussmaul in his exhaustive treatise "On Deficiencies and Malformations of the Uterus."³ Case 2 belongs to Dr Farre's second group, and Cases 3 and 4 to his third group; whilst their position in Kussmaul's system of classification is sufficiently indicated by the names I have employed in the course of my description. Indeed, the figure 23⁴ which

¹ Abstracts of all the cases mentioned above, excepting the cases of Stoltz and Luschka, are given by Kussmaul in his Treatise on Malformations of the Uterus. Stoltz and Luschka's cases are recorded in the *Monatschrift für Geburtskunde*, vol. xvi., 1860, and July 1863.

² Todd's Cyclopædia,—Supplement.

³ Von dem Mangel, &c., der Gebärmutter. Würzburg, 1859.

⁴ A drawing of the same uterus is also given by Martin in his *Hand Atlas der Gynakologie und Geburtshülfe*. Taf. xxxi., fig. 5. Berlin, 1862.

Kussmaul gives, from a specimen sent to the anatomical museum at Heidelberg by F. C. Naegele, may be considered to afford a fair representation of my specimens of uterus bicornis unicollis. The term uterus bicornis is indeed much to be preferred to that of double uterus, so often applied to this particular kind of malformation; for the latter term does not, like the former, accurately express the nature of the mal-development, and conveys, moreover, an inexact conception of its morphology. Both specimens completely bear out the remark which Rokitansky makes when describing the different forms of uteri possessing two cornua, that the closer the junction of the two horns takes place to the cervix or os externum, the more obtuse is the angle at which they unite, and the wider is the fissure which exists between them.

The number of specimens of uterus bicornis, more or less modified in different instances, which have now been recorded in the adult human female, is so considerable, that one may almost regard it as one of the most common forms of uterine mal-development. It does not appear to affect the reproductive functions of the organ, and it frequently exists without any malformation of other parts of the body. In both my specimens, the body and the other viscera were perfectly well developed, excepting that, in Case 4, the pelvis was somewhat below the average size, and the urachus was not completely obliterated. And as in part offering an explanation of this, it must be remembered that the uterus bicornis represents not only a stage which the human uterus goes through in its progress to its perfect condition, but one also which is the persistent form in many of the mammalia. At the third month of intra-uterine life of the human foetus, the uterus presents the two-horned condition. The two Müllerian ducts from which it is developed have at that period only so far blended together at their lower ends as to form an undivided vagina and cervical canal. After this period, if the process of development advances, a gradual blending of the two horns takes place, so as to form the undivided body of the uterus, and the only portions of the ducts of Müller which remain separate from each other, are their upper ends, which constitute the Fallopian tubes. Hence these cases of uterus bicornis, instead of exhibiting a doubling of the uterus, really present a separation of the single organ into its two primary halves.

The uterus unicornis is not only a more unusual and more serious form of mal-development of the organ than the uterus bicornis, but it appears to be very frequently associated with an imperfect condition of other parts of the body though in it: other things being favourable, all the processes of gestation may be carried on. Thus, it has been found conjoined with deficiencies in the lower limbs and one half of the pelvis, as in cases of monopodia and sympodia. But it may also, as in Case 2, exist in persons well-formed externally, but with a remarkable irregularity or defect in some of the internal organs, more especially in the urinary apparatus. In cases

related by Stoltz and Rokitansky, the urinary bladder as well as the uterus was one-sided. In a preparation in the University of Freiburg, described by Kussmaul in his treatise, p. 112, the left kidney was situated in the left posterior part of the cavity of the pelvis, and the pelvis itself was contracted and small in all its diameters. In cases recorded by Chaussier, Rokitansky, Stoltz, and others, as in the specimen I have described this evening, the kidney on the affected side was altogether wanting; in most of these cases it was noted that the kidney on the opposite side was hypertrophied, but I cannot say that any hypertrophy of the right kidney existed in mine.

It very seldom happens that the atrophy of one of the uterine cornua occurs so completely as in Case 2. Not only has the canal of the left Müllerian duct been in a great measure obliterated in that case, but the duct has almost entirely disappeared in some parts of its extent. It is probable, however, that both of the ducts of Müller had assisted in the production of the vagina; the width of that tube and the existence of the cul de sac at its upper end to the left of the cervix uteri tend to that conclusion. Whether or how far the left duct had assisted in the production of the cervix it is more difficult to determine. On the back of the bladder and inner side of the left pelvic wall, the position of the Müllerian duct was indicated merely by a thickening of the peritoneum. At the left pelvic brim the remains of the duct were represented by a short, stump-like, free process, which evidently represented the outer end of the uterine cornu, for both the short ovarian ligament and the round ligament of the uterus were connected to it. The upper or Fallopian end of Müller's duct was, however, pervious, but quite detached from the uterine portion of the structure, the atrophy having been so great at their original line of junction as to effect a complete separation between them. Its position, almost on a line with the posterior part of the iliac crest, was an approximation to the primary seat of the duct.

We must look for the mode of production of this serious defect in uterine and renal development to some cause operating at a very early period of embryonic life in the immediate neighbourhood of the Wolffian bodies; for though neither the uterus nor the kidneys take their rise from these structures, yet the Müllerian ducts from which the former springs, and the latter organs at their first appearance, are in such close proximity to those bodies, that circumstances tending to produce atrophy of the one, are not unlikely to affect the other, and that this is the case is shown by the frequent conjunction of renal and uterine atrophy in the same individual. And, further, in the male, as in the case I first described this evening, a partial atrophy of the kidney may exist in conjunction with a complete atrophy of the structure at the head of the Wolffian body from which the globus major of the epididymis is produced.

The perfect condition of the supra-renal capsule, both in my case, where the kidney was absent, and in the one described by Stoltz, bears out in a striking manner the statements made by embryologists of the complete independence of the kidney and the supra-renal capsule in their mode of development.