The Causes, Prognosis and Treatment of Sterility.¹

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THE subject of sterility in women does not derive its importance from considerations of the preservation of health or the saving of life, as is the case with many subjects in obstetrics and gynæcology. Its importance has other sources, not less worthy of the careful attention of the medical profession, and recognisable as being of two kinds, the one concerning the welfare of the State, and the other the happiness of the individual. A nation with a falling birth-rate is usually a decadent nation; and a falling birth-rate, though doubtless in a measure dependent on social and economic conditions, is partly the result of sterility, which, in turn, is in some degree preventable or curable. On the other hand, the childless home lacks one great source of human happiness, and one great factor in the welding together of ideal family life.

We, as members of the medical profession, and especially as exponents of the diseases of women, can do something towards the prevention and cure of sterility; and therefore no apology is needed for discussing the subject in the Obstetrical and Gynæcological Section of the Royal Society of Medicine. We can do something else, which is by no means unimportant; we can recognise those cases in which sterility is inevitable and incurable. When it is quite certain that a woman cannot bear children it is much better that she and her husband should know the truth and face the disappointment once for all. Not only are they saved the constantly recurring disappointment that marks each appearance of menstruation; they are also able to adjust their lives to the facts: I am persuaded that many a husband and wife, if they knew early in their married life that they could not expect to have a child of their own, would adopt one, and thus find at least a partial outlet for the expression of those instincts of fatherhood and motherhood the unsatisfied repression of which mars the happiness of so many families.

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In this communication I propose to touch on two of the general aspects of the subject, namely :—

- (1) The prevalence of sterility.
 - (2) The responsibility of the male partner,
- and then sketch out, as briefly and clearly as possible, three types of sterility in women, viewed from the standpoint of prognosis and treatment, namely :—

- (3) Inevitable and incurable sterility.
- (4) Functional sterility.
- (5) Conditions that cause or favour sterility, but allow of treatment.

Data and statistics referred to are derived from my recent monograph¹ to which I need not make more particular reference. The references to authors quoted will be found there, unless otherwise specified.

1. THE PREVALENCE OF STERILITY.

Estimates of the proportion of infertile marriages vary widely with different authors and in different countries. Some, like Frank and Burdach, place it as low as 2 per cent., others as high as 20 per cent.

I endeavoured to form an estimate from my case papers, with the following results :—Among 3,128 married women who were seen *as patients* the percentage of sterile cases was 22·2. Many of these, however, were still young and might yet conceive; when I took into consideration only women who had reached the age of 40, the percentage dropped to 15·3. In a large proportion of cases the women sought advice on account of some disease of the reproductive organs; comparing such a group of women with an equal number drawn from the community at large, it is certain that the number of sterile women in the latter group would be notably less. It is, therefore, I think, a sound deduction, that the proportion of sterile marriages is well below 15 per cent. Dependence upon figures given by various writers is weakened by the fact that in some statistics still-births are taken into account while in others they are not.

Miscarriages and extra-uterine pregnancies are mostly overlooked or ignored. Yet it is obvious that a woman who has conceived is not sterile, even though the ultimate product of conception be not a living child. Of published estimates I am disposed to regard those of Simpson as being nearest to the truth; he found the proportion of unfruitful marriages to be 10·9 per cent.

1. "Sterility in Women," by Arthur E. Giles, M.D., etc. London: Henry Frowde, Hodder & Stoughton, Oxford University Press, 1919.

in village communities; and 16·3 per cent. in families of the aristocracy. The ratio is probably higher among dwellers in towns than among dwellers in the country. In any case, the proportion is undesirably and unnecessarily high. Compared to this certain fact, the actual figures are of only academic interest. If we wished to obtain a really reliable estimate of the number of unproductive marriages the only way would be to get the particulars of at least 1,000 marriages, in which the wife was under 35 and the husband under 40 at the time of marriage, and married life had lasted at least 15 years. But even these figures would not tell us the proportion of sterile *women* in the community, because in a number of cases the husband would be at fault.

2. THE RESPONSIBILITY OF THE MALE PARTNER.

This brings me to the second general question. It is not sufficiently realised that in many cases the woman is not at fault. Estimates again vary widely as to the proportion of cases in which the husband is to blame; Court placed it at 10 per cent., Duncan at 12 per cent.; Brothers at 20 per cent. (based on 250 cases); Engelmann at 25 per cent.; Hühner at 41 per cent. (186 cases); and Noeggerath at 90 per cent. Noeggerath was apparently obsessed by the idea that gonorrhœa was the one important factor in the causation of sterility; and both he and Engelmann include under man's responsibility all cases of disease in the female which are directly traceable to the male. It is no doubt morally justifiable to blame the man who has made his wife sterile by giving her gonorrhœa; but from the point of view of statistics it leads to fallacious results. For while the woman whose tubes have been destroyed by gonorrhœa is permanently sterile, the man who infected her may remain quite capable of procreating children. But again, the actual figures do not greatly matter; what does matter is that we should appreciate the fact that in a childless marriage the woman may not be at fault, because it has an important practical corollary which is this: that in doubtful cases the wife should not be assumed to be responsible and submitted to operative procedures without obtaining definite evidence that the husband is healthy.

3. INEVITABLE AND INCURABLE STERILITY IN WOMEN.

It will make it all the easier to recognise the cases of incurable sterility if we bear in mind the conditions necessary for successful impregnation. They are:—

(a) *On the man's part.*—Ability to deposit healthy seminal fluid in contact with the os externum cervicis.

(b) *On the woman's part.*—(1) Ability to receive this fluid in contact with the cervix.

(2) Such a healthy condition of uterus tubes and ovaries as will enable the spermatozoa to travel up to meet the ovum.

(3) The production and discharge of healthy ova.

(4) Such a healthy condition of the uterus as will enable it to harbour the fertilised ovum.

We have to consider here only the woman's side of the question.

(1) Under the first heading the conditions that cause sterility are absence of the vagina and want of communication between the vagina and the uterus. When investigating a case it is not sufficient to accept a patient's statement that intercourse takes place: that may be so, and yet we find that the vagina ends blindly in a *cul-de-sac*. In such a case the woman has never menstruated, and this would at once put us on our guard against overlooking the condition. Three striking illustrative cases occur to me, in which intercourse was said to be normal and yet the vagina was closed above.

A case of androgyny, the patient living as a married woman. This case is related in my monograph. (Case 22, page 68).

¹*A case of absence of the uterus with well-formed vagina, and double ovarian tumour.*

¹*A case of uterus bicornis with undeveloped cervix separated by connective tissue from a closed but fairly developed vagina.*

Atresia of the vaginal orifice, such as occurs with retained menses, naturally prevents intercourse; but it does not come under the category that we are considering, because it is not incurable. We shall refer to it again later.

When the lower end of the vagina is closed and the upper end is patent, it is not always possible to tell whether it is merely a case of a septum across an otherwise developed vagina, or whether the upper part of the vagina is absent. It may be necessary to undertake a dissection of the parts before this point can be cleared up. When the vagina is absent, the question may arise whether an artificial one should be made. From the point of view of our present subject, sterility, I should say that the procedure would be quite hopeless. Whether it should be done in order to make married life possible is another matter. It is a very difficult thing to do, and in some cases repeated operations have been undertaken to make and maintain a patulous artificial vagina. Ingenuity, to my mind misplaced, has been exercised in the form of bringing down a

1. I propose shortly to report these two cases in full.

portion of the colon for the purpose. If the tube, when made, does not lead to a uterus, what is the use of it all? Nature has at least provided another channel that can be used, if a perverted and unnatural sexual act is the only object.

(2) The second condition for impregnation is such a healthy condition of the uterus, tubes and ovaries as will allow of the meeting of the spermatozoa with the ovum. This condition is unfulfilled in the case of absence or marked under-development of the uterus, congenital atresia of the tubes, and occlusion of the tubal channel by inflammation. Pyosalpinx, which is due to gonorrhœa in about 95 per cent. of cases and to tuberculosis or bacillus coli infection in the remaining 5 per cent., certainly causes incurable sterility. Whether a tube that has become occluded by mild salpingitis can be made functional by surgical means is a doubtful question, to which I shall make further reference.

(3) We know that for conception to be possible the ovary must produce healthy ova; but it is very difficult to say when it is not doing so. We know that age and the action of X-rays lead to ovarian atrophy; and we may presume that when this atrophy has come about ovulation ceases. But there are other conditions that apparently interfere with normal ovulation: for example, anæmia, chronic taking of drugs such as morphia, certain febrile conditions and some nerve-conditions, including pituitary disease. Obesity may come into this category: certainly obesity and sterility are related; but whether obesity is the cause of the sterility, or whether they are both the results of some disturbed metabolic process, we do not know. Nor do we know what are the factors that disturb normal ovulation or what is the influence, if any, of internal secretions on ovulation. If any product of internal secretion does play a part, we should expect that it is not the ovarian secretion, which is probably a product of ovulation rather than a causal factor in the process.

It would not be unreasonable to assume that the physical and chemical causes of defective ovulation act by interfering with the nutrition of the germ cells. Further researches on the internal secretions may shed some light on this very obscure and difficult subject.

(4) The fourth condition is not strictly one upon which successful impregnation depends, since failure thereon leads to miscarriage, not to sterility. But it is conveniently included here, because when patients consult us they are not so much concerned in the possibilities of conception as in the chances of having a living child. From this point of view the cases that we must regard as hopeless and incurable are those of uterine tuberculosis, carcinoma and

sarcoma of the body of the uterus and uterine fibrosis. In the last-named condition, the absence of the mucosa renders impossible what has been described as the "nidation of the ovum."

4. FUNCTIONAL STERILITY.

When a childless woman who has been married for some years gives a history of regular menstruation without undue loss or unusual pain, and, on examination, the pelvic organs appear to be normal, we may regard the case as one of functional sterility. There are then several possibilities to be considered. In the first place, complete intercourse may not have taken place, and this may have been due to impotence on the man's part or to nervousness and shyness on the woman's part; or because the first attempt was painful the woman has been too fearful to try again, or the man has refrained lest he should seem unkind; or both young people have been obsessed with a morbid fear that a confinement would necessarily be fatal, such ideas being fostered by a certain type of sensational fiction in which the novelist always arranges for the heroine to die after an apparently natural child-birth. One patient, who had been married twenty-six years, told me that when she was married the period was on, and this seemed to have put her husband off, and she "had never had any provocation since." Secondly, it may be one of those cases where the husband is at fault, suffering from azö spermia or from a deficient vitality of spermatozoa, and this point may require investigation. Thirdly, it may be an instance of "sexual incompatibility." We know that there are cases in which a husband and wife have been unable to effect a conception together, and yet each has been fertile with a different mate. The reason is not known, and we do not even know whether this defect is psychological or physiological. There is certainly nothing that the medical attendant can do in the presence of this difficulty.

5. CONDITIONS THAT CAUSE OR FAVOUR STERILITY BUT ALLOW OF TREATMENT.

We come now to the more hopeful side of our subject. It will be convenient to keep to the same classification that we used before.

(1) *Conditions that Prevent Normal Intercourse.*

Atresia of the Vaginal Orifice.—This is a curable condition, but the prognosis as regards sterility will depend on the stage at which treatment is undertaken. If menstruation has been going on for some time and its products accumulating in the closed vagina, secondary changes may be set up in the mucosa of the uterus, and

later in the tubes, which may be inimical to conception. But if the patency of the vagina is established early there is a good prospect of fertility.

Stenosis of the Vagina and Rigidity of the Hymen.—Dilatation of the vaginal orifice under anæsthesia by means of the fingers or with graduated specula is often sufficient. In more pronounced cases of stenosis the vaginal wall should be incised vertically, and the resulting wound sewn up transversely. The prognosis is very good.

Dyspareunia and Vaginismus.—The source of pain during intercourse should be sought; it is most frequently in the neighbourhood of the vaginal orifice and the remedy is usually simple. More deeply-seated pain may be due to a prolapsed ovary or some inflammatory condition of the appendages and abdominal operation may be needed. Inflammatory disease will, of course, require treatment on its own account, apart from the question of sterility; but a prolapsed ovary can be sutured up; and if associated with retroversion, the fixing of the uterus in place is often sufficient to lift the ovary out of the painful zone. Vaginismus is more difficult to treat; but even here a good dilatation of the vaginal orifice under anæsthesia will often help matters, and the rest will depend mainly on the persuasive powers of a judicious husband. It is a condition in which suggestion might play a useful part. Once the mechanical difficulty is overcome, the prognosis as regards sterility is good, as long as the patient has not waited until she is handicapped by the factor of age.

Tumours Encroaching on the Vagina.—An ovarian tumour or a uterine fibroid situated in the pelvis may cause a mechanical obstacle to intercourse.

The treatment is, of course, surgical, and the prognosis will depend on the possibility of leaving at least one ovary and a not too much damaged uterus. I have not wished to expand these remarks by the narration of cases, and shall be sparing of them. The following is worth mentioning: I saw the patient, aged thirty-six, when she had been married two months. She sought advice on account of difficulty with intercourse, and on examination the vagina was found encroached upon and apparently shortened by a large fibroid in the posterior wall of the uterus, pressing down the pouch of Douglas. I did a myomectomy and hysteropexy; she became pregnant three months later and had a normal confinement on the anniversary of her operation.

Prolapse and Procidentia.—Inasmuch as these conditions are usually the sequel of child-bearing they are the cause of secondary rather than of primary sterility. The obstacle to intercourse is

mechanical, and treatment allows us to give a good prognosis. When pregnancy is greatly desired I consider that operation is much better than pessary treatment; for the latter is apt to defeat the object by setting up of noxious discharges. I have many records of pregnancy and normal confinement following hysteropexy for prolapse and procidentia.

(2) *Conditions that Allow Intercourse but Interfere with Ascent of Spermatozoa.*

Under-development of the Uterus.—In this condition the prognosis depends mainly on the patient's age; if she is not much over twenty years of age it may be an instance of delayed rather than of arrested development. This is sufficiently rare to warrant the narration of an example. In the summer of 1911 I saw a girl, aged nineteen. She had had amenorrhœa for a year and a half, and had previously menstruated slightly for a few months. Examination under anæsthesia showed a markedly under-developed uterus; it felt small and the sound passed in $1\frac{3}{4}$ inches. I saw her again five years later. Menstruation had been going on regularly for two years; the menstrual flow not very much, but lasting three to four days. She had been married six months. On examination the uterus felt quite normal in size. In quoting this case in my monograph I added, "I shall not be surprised if pregnancy occurs." This forecast has proved correct and my colleague, Dr. Ellison, is expected to confine her within the next few weeks. Kisch has related a similar case. Obviously one need not give a hopeless prognosis in such cases, but it must be borne in mind that most of the cases that we see of under-development are really arrested development; and I know of no treatment that will remedy the defect.

Anteflexion of the Uterus and Stenosis of the External Os.—These conditions are frequently, but not necessarily, found together; and there is no doubt that the presence of either one or both of them must be regarded as very unfavourable to conception. But we cannot say that conception is impossible. From the point of view of prognosis following treatment, these are among the most satisfactory cases that we meet; for if a proper dilatation of the cervical canal be carried out, and especially if this be followed by the insertion of an intra-uterine stem for a fortnight, the chances of subsequent pregnancy are very good. I have met with a number of instances of this.

Retroversion of the Uterus.—This is another condition which must be considered as unfavourable to conception, but not as definitely preventing it. Retroversion of the gravid uterus is not rare, and there is no doubt that in many of the cases the displace-

ment has preceded the pregnancy. On the other hand, one meets with a fair number of cases in which a patient who has had several years of sterile married life is found to be suffering from retroversion ; and on correcting this, either with the help of pessaries or by operative means, pregnancy follows. One cannot lay down a general rule as to whether surgical or other treatment should be adopted, and it would take too long to discuss the matter now. Each case must be dealt with according to all the circumstances attending it.

Atresia of the Os Externum.—Here prognosis is hopeless without treatment and not very good with it. As a rule such atresia is the result of inflammatory conditions, which are likely to have other bad effects on the uterus besides closing its orifice. Nevertheless, an attempt should be made to restore the patency of the canal.

Polypus in the Uterine Canal.—Under this heading we may include fibroid and mucous polypi and submucous fibroid. In nearly every case the condition can be cured ; the operation may be very simple, amounting to little more than a curetting, or it may be a big affair, namely, an abdominal myomectomy by hysterotomy (that is, the removal of a fibroid from inside the uterus by the abdominal route). Prognosis ranges from "very good" in the case of small polypi to "moderate" or even "bad" in the case of large intra-uterine fibroids.

Salpingitis.—It is nearly certain that in cases of mild salpingitis without occlusion of the tubal ostia, conception can take place ; and in all probability the sequel is often a tubal pregnancy. We may suppose, however, that uterine pregnancy also follows ; for we are all familiar with cases in which child-bed fever is apparently due to the lighting up of a latent infection of the tubes. But such a condition can hardly be diagnosed before operation, and so the question of prognosis hardly comes in.

There is another condition to be considered—namely, *Salpingitis with Occlusion*. Obviously, when this is present conception is impossible ; but within certain limits it can be remedied by operation—namely, in those cases in which there has not been extensive suppuration or damage to the tubes. An artificial ostium can be made by making an incision in the tube, near the ovary, and oversewing the edges, to prevent the opening from closing up again. A good deal of this conservative surgery has been done, and some successful cases have been reported in which pregnancy has followed. I have done it myself in a few cases, but I have not heard of any of my patients having become pregnant. The prognosis should be very guarded, because, although we may count

on restoring patency, we cannot tell how far the damage to the tubal mucosa may vitiate the chances of pregnancy.

There are certain methods of treatment that have a place when the cause of sterility lies with the man. Thus a vaso-vasostomy has been carried out when the vasa deferentia are occluded and there is evidence of live spermatozoa in the testicle; and in cases of male impotence, when the semen is normal, artificial insemination has been tried. I have not gone into these questions, as my observations are more particularly concerned with sterility in women.

I have endeavoured, in this short résumé, to outline the principles that will help us in giving a prognosis as to the prospects of child-bearing, and the treatment that should be carried out in those cases that offer a chance of improving those prospects. In conclusion, I should like to emphasise three points:—

(1) The possibility of the responsibility of the husband must always be borne in mind.

(2) It is unwise to promise a successful issue as the result of treatment; for though we may secure correct anatomical conditions, we cannot control their physiological working.

(3) The idea that every sterile woman should be curetted ought to be discouraged. In fact, no operation on a woman should be undertaken unless we are reasonably satisfied that her husband is all right.