precipitate dissolving on further heating. If a small quantity of acetic acid were added to the urine, no precipitate was obtained by heating. Sodium chloride to saturation gave a precipitate, and the precipitate with nitric acid behaved in the manner peculiar to albumoses. The sediment in the urine partly consisted of albumose. These reactions are similar to those given by hetero-albumose in urine, as I have ascertained by applying them after dissolving some of the proteid in normal urine. Further researches will show whether the other albumoses occur as abnormal urinary constituents. At present it will be sufficient to state that an albumose is indicated in urine by the following reactions.

1. The precipitate by heat comes down at a lower temperature than that of paraglobulin and albumin. The temperature of coagulation may be accurately taken by means of a very simple apparatus. A portion of clear urine is placed in a test tube, in which an accurate thermometer is also put, and the test tube allowed to rest in the neck of a small flask containing distilled water. The water must be above the line of the urine. The flask is then gradually heated, while the urine in the tube is stirred by means of the thermometer. The temperature at which the urine becomes cloudy is the lower limit of coagulation; the liquid is then heated further until a precipitate occurs; this is the higher limit of coagulation. For paraglobulin and albumin the lower limit is about 73° C. and the higher 75° C.; for hetero-albumose the lower limit is 43° and the higher 50° C. If hetero-albumose be suspected, the urine must not be acidified previous to heating; but in the case of paraglobulin or serum-albumin, one or two drops of dilute acetic acid must be added.

It is important to emphasise the fact that a specimen of urine containing hetero-albumose (without paraglobulin or serum albumin) will give a precipitate with heat only when no acetic or other free acid is added.

2. Nitric acid added drop by drop to the urine causes a precipitate if albumoses are present, which behave in the characteristic manner already described. This reaction is distinctive of albumoses. It is not given, it must be remembered, by deuto-albumose, unless solid sodium chloride be added to the urine.

Peptones are closely allied to albumoses, especially to deuto-albumose. A urine containing them alone would give no precipitate on boiling, and none with nitric acid, even if sodium chloride be added. Such a urine would, however, give a pink colour with copper sulphate and potash. This test (biuret reaction) would indicate the presence of peptones if the heat and nitric acid tests proved negative. A small quantity of proto- and deuto-albumose would, however give the biuret reaction, and be in such small quantity as to give a doubtful reaction with nitric acid. The biuret reaction cannot then be taken as absolutely demonstrating the presence of peptones, even when applied after the heat and nitric acid tests. It is best to apply the following: saturate the urine with neutral ammonium sulphate in the manner described above, and filter off the precipitate, if any, which occurs. The precipitate will consist of globulin, albumin, or albumose, if they be present, and the filtrate will contain the peptones, for these are not precipitated by saturation with ammonium sulphate. To the filtrate then add a drop of 10 per cent. copper sulphate solution and a large excess of potash; if a pink colour is produced peptones are present. Or add two or three drops of nitric acid, boil and add liquor ammoniæ after cooling; if the liquid turns brown peptones are present. This method of saturation with ammonium sulphate is the only certain one of testing for peptones in urine.

A method which has been commonly applied is to filter the urine after concentration into a large excess of alcohol; the peptones are thrown down, and may be collected on a filter and dissolved in water. If such a solution gives no precipitate on heating, or with nitric acid, or with acetic acid and ferrocyanide of potassium, or on saturation with ammonium sulphate, and yet gives a brownish colour on heating with nitric acid and adding ammonia, and a pink colour with copper sulphate and potash, the urine contains no proteid but peptones, and the case is one of simple peptonuria. But in every case it is best to saturate the urine first with ammonium sulphate, as by this means all proteids are readily separated from peptones.

PROFESSOR CACCIOPIOLI recently performed extirpation of the larynx and six rings of the trachea for sarcoma on a woman, aged 50, in the Hospital for Incurables at Naples. This is the thirteenth case of laryngectomy in Italy.

ON THE TREATMENT OF STERILITY IN WOMEN.¹

By THOMAS MORE MADDEN, M.D., F.R.C.S. Ed.,

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THERE are few gynecological questions of greater practical interest, and none which have been more frequently brought under my notice in the course of a somewhat extensive clinical experience in hospital and consultation practice, than those connected with the subject of sterility in women. I therefore now venture to submit the following observations on this topic, not merely for the purpose of expressing my own views, which I believe to be well-founded, but also in the hope of eliciting the opinions of other practitioners on a matter of much importance, and one involving not only the physical health of our patients, but, moreover, in many instances also intimately affecting their social interests and the happiness of conjugal life.

Etiology of Barrenness.—As in every other morbid condition, so with regard to sterility, our first aim must be to ascertain its cause in each instance. Of the various factors in the causation of infecundity, some—such as the absence or arrested development of any of the organs essential for conception, namely, the uterus, Fallopian tubes, or ovaries—being beyond remedy need not here occupy consideration. In the great majority of instances, however, sterility, when occurring in women within the period of ovarian functional activity, admits of effectual treatment, provided that treatment be rationally directed to the special exigencies of each case.

For convenience of description, in the following observations I have followed the example of the majority of writers on female sterility, by whom, under this term, is also included the subject of impotency or sexual incapacity. Strictly speaking, however, the latter term should be restricted to those cases in which marital intercourse is prevented by some physical impediment, such as vaginal or vulvar occlusion, imperforate hymen, vaginismus, etc., whilst sterility, or reproductive inability, is commonly the result of some structural lesion, malformation, displacement, or deficiency of either the uterus or its appendages, although it may also be due to certain morbid constitutional conditions, as well as be occasioned by other causes, such as sexual incongruity or irresponsibility of a moral rather than of a physical kind.

Stenosis of the Cervical Canal.—This is not only the most common of all the causes of sterility just alluded to, but is, moreover, according to my experience, the one which proves most amenable to appropriate treatment. Until a comparatively modern period, however, atresia of the cervical canal was generally regarded as irremediable, and this opinion continued to prevail very generally for years after the period when Dr. Mackintosh, of Edinburgh, by his revival of the ancient but long-disused method of dilating the cervical canal when occluded, proved the curability of that condition. Practically, the modern treatment of cervical stenosis was initiated a quarter of a century later, when Simpson brought the subject prominently before the profession, and proved the feasibility of treating stenosis by incision with the metrotome, as well as by dilatation with sponge and laminaria tents. This, however, is not the place to trace the progressive history of the improved procedures by which the crude operations resorted to half a century ago in the treatment of obstructive dysmenorrhœa and sterility have been now replaced. My present object is a more practical one. Believing as I do that, though both dilatation and incision of the cervix may be successfully employed in many cases, I also know that both these plans very often fail in permanently overcoming the natural contractility of the cervical structures, and that after each operation the canal too commonly rapidly resumes its former condition, and frequently from cicatricial contraction becomes still less permeable than before the operation. Hence I now desire to direct attention to the advantage I have observed in the treatment of such cases from a method of procedure and the use of instruments by which the parts are so forcibly separated and torn

¹ Read in the Section of Obstetric Medicine at the Annual Meeting of the British Medical Association, held in Dublin, August, 1887.

apart, rather than cut, as to reduce any risk of their speedy reunion.

Operative Treatment of Cervical Stenosis.—As the method which I employ in such cases differs in some respects from that generally adopted, I may perhaps be permitted to refer to the details of a plan of treatment which within the past session alone has been employed in eighty-two of my hospital cases of stenosis, and in many of these with the co-operation of my friend Dr. Duke. The total number of cases on which I have operated during the past ten years now exceed five hundred instances in cases of cervical stenosis productive of obstructive dysmenorrhœa or sterility.

In such cases the operation should, if possible, be undertaken a few days after the catamenial period, and should be preceded by daily hot water syringing for some time previously. For its satisfactory performance the patient should be fully etherised, and placed in ordinary semi-prone position on a suitable gynecological table. Then the cervix being exposed by a duck-bill speculum, the anterior lip is drawn down by a strong vulsellum as near to the vulva as possible. The sound should be now used, or, if this cannot be introduced at first (as happened in a case of stenosis on which I recently operated in England), a very small flexible probe may be passed, and followed by a larger one, until the ordinary uterine sound can be introduced. This being removed, I then pass in, up to the fundus, my uterine director, which you perceive is a long probe-pointed instrument, with ball and socket adjustment in handle, and rather less bulky than the common sound; and along its groove the button of the triangular guarded, blunt-edged knife, now exhibited, is forced, with the cutting surface directed backwards into the uterine cavity. It is then rotated, and withdrawn in the opposite direction. The edge of this instrument is thick and blunted, so as to crush apart or tear, rather than sharply divide, the parts through which it is forced, and thus to diminish the risk of hæmorrhage at the time, and to prevent the subsequent reunion of the separated surfaces.

These instruments have now been used with satisfactory results in upwards of a hundred cases in my hospital and private practice during the past session. But for twenty years previously I have employed, and in many cases still use for this purpose, Simpson's original metrotome, which I regard as a far better instrument than any of the more recent metrotomes, and in every respect superior to Sims's or Emmet's, or any other intra-uterine knife.

Whether the metrotome or my knife be used, I think matters little, at least when compared with the importance of maintaining the permanent permeability of the passage by whatever means this has been restored. This, I believe, may be best secured by the use of the dilator now shown.

Immediately after the completion of the incisions I employ this instrument, not merely with the view of thoroughly expanding the canal and its orifices in the most effectual manner possible, but also for the purpose of tearing the divided tissues and vessels, and thus arresting any excessive hæmorrhage. The extent to which this dilatation may be carried must, of course, be largely determined by the special circumstances of each case. As a rule, however, in ordinary cases I pass the instrument well into the uterine cavity, and then, by means of the screw adjustment, separating the points to their full extent (that is, one inch and a quarter, and then not reducible by any external pressure to less than three-quarters of an inch), I withdraw the expanded blades forcibly through the canal, so as to expand the canal in the natural direction from within downwards and outwards, and not, as most other dilators, which act in the opposite direction; reintroducing it, and repeating the same manœuvre in opposite directions, until the passage is so expanded that I can readily pass my finger into the uterine cavity, which is then thoroughly washed out with a hot carbolised injection. In the next place, I pack the cervical canal with a long tampon of compressed absorbent cotton, saturated in dilute glycerine of carbolic acid, and fill the underlying vagina with a

large glycerine plug. The latter is removed in twenty-four hours, and the former in sixty hours, if not sooner expelled, being then replaced with a large-sized, soft rubber stem, also previously well carbolised, or else by Dr. Duke's ingenious ball and socket intra-uterine stem, which causes no irritation and requires no additional support, and which I direct to be worn, if possible, until the next monthly period passes over. For a fortnight or ten days after operation the patient should be kept in bed, and the uterine cavity daily washed out with hot water, plain or medicated. Before allowing the patient to leave her bed I invariably secure the uterus *in situ*, and lift its weight off the ligaments by a properly adjusted Hodge pessary, which to a considerable extent obviates the occurrence of the possible after-troubles that might otherwise be consequent on this operation. Moreover, I desire the patient to remain in bed during the next menstrual period, which is generally attended with some pain and increased discharge. She should then wear a soft rubber stem until the approach of the subsequent period, after which, and never sooner, she may return to marital intercourse.

These precautions and directions may perhaps be regarded as superfluous after an operation which has been described by some who ought to know better as "one of the simplest and safest of all gynecological procedures." This certainly is not my opinion, and I ascribe the success which has attended my treatment of stenosis chiefly to their adoption. For although any tyro armed with a metrotome may lay open a contracted cervical canal easily enough, the operation may probably prove worse than useless if it be rashly and needlessly undertaken or carelessly performed, being extremely apt to be followed by ill consequences, such as hæmorrhage, pelvic cellulitis, endometritis, and above all by permanent cicatricial occlusion of the canal, when abused by those who disregard those details and precautions which are essential for its safe and successful accomplishment.

Vaginal Aphoria or Incapacity.—In reference to the causes of sterility, the condition of the vagina also requires consideration. It being obviously essential that this canal should be capable of receiving, retaining, and transmitting the spermatic fluid. These requirements may be variously defeated. Thus the vagina may be wanting, as I have seen in one instance, wherein the urethra opened on the perineum directly. The vulvar orifice may be occluded by morbid adhesions from vulvitis or congenital atresia: the vaginal canal may be abnormally narrowed, or—and more frequently—it may be occluded by membranous septa consequent on former parturient injuries or inflammation, of which I have recorded several cases, one of which is at present under my care in the hospital.

Infecundity from Vaginismus.—Conceptive incapacity, or female impotency, is, according to my experience, very frequently traceable to vaginismus or excessive sensibility of the vaginal orifice and adjacent parts, attended with such spasmodic contraction of the sphincter vaginae as to form an impediment to marital intercourse. This occurs chiefly in patients of a hysterical temperament, and is generally occasioned by neuromata, confined to the parts supplied by the superficial perineal branch of the pudic nerve. In all such cases constitutional treatment by nerve tonics and sedatives should be combined with the simple plan of local treatment, which I have generally found efficient in relieving the most intense dyspareunia thus caused, without any operative interference beyond the forcible dilatation of the vaginal canal, and stretching of the pudic nerve by a method fully described in a recent paper of mine. In some instances, however, these measures fail, and we must then fall back on Sims's and Emmet's operations for the cure of vaginismus. It sometimes happens, that even in cases of vaginismus, so intense as to render complete marital intercourse impossible, the disease is not necessarily a barrier to impregnation. Thus, in one instance under my observation, so extreme was the local hyperæsthesia as not only to prevent the possibility of complete cohabitation, but also to prevent the patient submitting to any local treatment for relief of the morbid condition. Nevertheless conception occurred, and I was subsequently called in to deliver her at full term, and, in doing so, was obliged to incise the still unruptured hymen by which delivery was obstructed.

Sterility from Uterine Flexions.—The various displacements of the uterus by which sterility may be occasioned have been fully discussed by recent writers. For my own part, I am inclined to think that an undue degree of importance is attached by Dr. Graily Hewitt and his followers to the influence of anteversion and ante flexion in the causation of infecundity. In my own

practice, at least, I have not often met with cases of sterility assignable to anterior deviations from the normal position of the uterus, and I have seen early pregnancy coexistent with marked anteversions. On the other hand, I have often traced sterility to retroversion, and again still more frequently to retroflexion, by the latter of which not only is the permeability of the canal mechanically constricted at the point of flexion, but, moreover, as in cases of retroversion, and also of prolapsus uteri, the vaginal retentive capacity was necessarily interfered with. In each and all of these three latter conditions I have generally found that the reposition and maintenance *in situ* of the uterus by a properly adjusted Hodge pessary sufficed, if the canal itself was permeable, to cure the sterility thus occasioned; otherwise, the operation of opening, by incision and dilatation, the cervical canal is also necessary, more especially in cases of flexion with elongation of the cervix, where, from long-continued pressure at the angle of flexure, much absorption of tissues has taken place. In such cases the result of incising the cervix, which should always be divided backwards, is, as Dr. Emmet observed, to bring the neck of the uterus to a more natural length, and it then becomes straighter, shorter, and thicker. This change in the neck is brought about, it is supposed, by the action of the longitudinal fibres after the circular ones have been divided.

Endometritis and Sterility.—Chronic endometritis is incompatible with fecundity, and as long as that disease exists to any serious extent the patient must remain barren. This fact, to which I called attention many years ago, is one of great practical importance, and is too generally ignored in practice. I have known many instances in which patients were subjected to active surgical treatment to overcome some supposed mechanical obstacle to impregnation, and who nevertheless remained childless, no attention having been paid to the existence of chronic cervical inflammation, on the subsequent cure of which pregnancy has followed. In such cases not only is impregnation mechanically obstructed by the viscid glairy secretion by which the os and inferior segment of the cervical canal is sealed in all cases of endocervicitis, but also, as Mr. Whitebread long since pointed out, the inflammatory action going on within the uterus may prevent the formation of the membrana decidua; and hence the ovum, even though impregnated, is necessarily thrown off without any manifestation of its existence in the fertilised state. Secondly, the diseased condition of the lining membrane of the uterus may be extended to the Fallopian canals, obliterating for a time their internal orifices, so as to oppose an insurmountable barrier to impregnation. Thirdly, the uterine secretions, in cases of endometritis, may be inimical to the active existence of the spermatozoa.

Hence, agreeing as I do with Mr. Whitebread's views, I may also recapitulate briefly the conclusions on this subject which I published several years ago in the first volume of the *Dublin Obstetrical Transactions*, and which have been confirmed by my more recent experience, namely: 1. That congestive hypertrophy of the uterus, and especially of the cervix uteri, is a very common cause of sterility. 2. That these conditions are, in the majority of cases, occasioned by constitutional causes, one of the most frequent of which is the scrofulous diathesis. 3. That these diseases require constitutional as well as local treatment; and in this connection I therefore would again urge the benefits derivable in such cases from certain mineral and thermal waters, the uses of which are fully described in my work on *The Health Resorts of Europe*.

Ovarian and Tubal Sterility.—Ovarian inflammation is one of the most frequent consequences and accompaniments of endometritis. In these cases the inflammation extends from the uterus along the Fallopian tubes to the ovaries, and this to a great extent accounts for the fact just mentioned, that patients suffering from endometritis or endocervicitis are invariably sterile. In such cases the inflammatory action is generally attended by a viscid exudation, by which the tubes, and especially their uterine orifices, are mechanically sealed against the possibility of impregnation. Independently, however, of its frequent sequence on endometritis, tubal obstruction, productive of dysmenorrhœa and sterility, may also arise from those possibly graver, but, according to my experience, comparatively exceptional diseases, namely, idiopathic salpingitis and pyo-salpinx, in the treatment of which operative procedures, involving loss of all future conceptive ability by the complete removal of the uterine annexa, are now so readily resorted to by some practitioners. For my own part, having in not a few cases seen all the supposed symptoms of pyo-salpinx subside completely without any surgical interposition

whatever, it would seem to me quite as rational to amputate the breast for an ordinary mammary abscess as to remove the Fallopian tubes merely because they may be the seat of serous or purulent exudations. In some cases of the latter kind there is, as I can vouch from clinical experience, no absolute impossibility of reaching and removing such collections by aspiration or even by catheterisation of the Fallopian tubes.

Many years ago, having occasion to use the sound in a patient suffering from dysmenorrhœa and sterility, I was surprised, there being no enlargement of the uterus, to find the sound pass in up to the handle, and on palpation discovered that obviously it had entered the right Fallopian tube. A year subsequently that lady gave birth to her first child, after eight years of married life. Since then I have more than once succeeded in accomplishing by a little careful manipulation what in the first instance was but a happy accident. And hence I endeavour to impress on those who attend my hospital practice, the fact that the catheterisation of the Fallopian tubes, when employed by a practised hand and with due caution, is a feasible, and in some exceptional instances may possibly prove an effectual, method of treating certain cases of dysmenorrhœa, sterility, and other morbid conditions.

Sterility may also arise from causes irrespective of any physical lesion; and although impregnation in no way depends on the sexual orgasm, unquestionably it may be prevented by strong mental emotion or personal dislike. In some instances, however, sexual incongruity productive of sterility coexists with conjugal affection. Thus, I have more than once been consulted by sterile patients, happily married, desirous of offspring, and not suffering from any physical disability, who informed me that, though warmly attached to their husbands, not only was there absolutely sexual indifference, but even positive repugnance to coition, any attempt at which in one of these cases invariably produced nausea. In that case I may add that the last-mentioned symptom was allayed by the use of cocaine suppositories.

Still more commonly is sterility dependent on abuse or abnormal irritation of the sexual organs, and hence the general sterility of prostitutes. It is hardly necessary to observe that in such cases a long period of abstention from all sexual stimulation affords the only hope of curing the *impotentia generandi*.

In the treatment of infecundity, independent of any local disease, malformation, or displacement, or of any obvious derangement of the general health, or other tangible cause, and in which the mineral waters already referred to have either been tried without benefit, or are contraindicated or not available, a course of sea-bathing, whatever may be its *modus operandi*, is a prescription the occasional efficacy of which in such cases I have seen proved by experience.

HÆMORRHAGIC PHARYNGITIS.

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I WISH to draw attention to a condition I may call, from its chief symptom, "hæmorrhagic pharyngitis." It is not mentioned in our textbooks. I have found it very obstinate to cure if its cause be overlooked, and also because I have found amongst patients suffering from it some of the greatest grumblers at medical men whom I have ever met. And no wonder. Five out of eleven very marked examples of this condition were thought to be, or were to become, victims of phthisis, had got no benefit from medical treatment, and before they came under my care had drifted, by the advice of friends, to the tender mercies of quacks, who promised to cure their consumption, and had made themselves worse in pocket and digestion by swallowing many bottles of tarry emulsions. Three other patients, whom I saw when at the Riviera, were wandering from one town to another there, at great inconvenience to their work in life, and without any benefit to their ailment. Let me give a case fairly typical of them all, as much as possible in the patient's own words.

Mr. B. came to see me, and, almost before I had time to say a word, produced his pocket handkerchief, and, with a voice expressing the deepest concern, said, "Doctor, what's this? Is it serious? Is it a return of consumption?" I saw on the handkerchief several masses of dusky, red-stained expectoration. He told me that, preceding this attack for several days, he had a sensation of constant tickling in his throat, and an equally tormenting desire to clear it; and his throat felt dry and burning, and this burning feeling was greatly increased by swallowing