

STERILIZATION OF FEMALES*

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TWENTY-THREE centuries ago Plato advised the castration of criminals for certain offenses and from that date up to the present time much has been written on this subject. Methods of sterilization such as radium, x-ray and operative procedures for the removal of the uterus and appendages, will not be discussed. More conservative methods are now used in order that the women may retain their ovaries and enjoy the beneficial effects of their internal secretions. A method of this description means sterilization without unsexing.

I will not discuss in detail the legal sterilization of criminals, but will merely mention a few of its interesting features. Eugenic laws for this procedure are now on the statute book of twenty-seven states. The state of California has sterilized more criminals and feeble minded than all the rest of the world put together. Over 8000 patients coming under this group have been legally sterilized in the state hospitals of California. Sterilization is first advised by the medical superintendent of a state institution and his opinion is either ratified or rejected by the Director of the State Department of Public Health and Director of the State Department of Institutions. These three officials constitute what might be called a State Board of Eugenics. It is also the custom in California to get the consent of the nearest relatives. To those who are interested in eugenics, I suggest a perusal of the articles by Popenoe¹ and Dickinson.²

The first tubal sterilization on record was carried out by Lungren of Toledo, Ohio in 1880. He tied both tubes one inch from their uterine insertions following a cesarean section.

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From 1880 to 1897 Whitridge Williams³ collected 42 cases of tubal sterilization. In many instances the tubes were cut between two ligatures. In a few cases a portion of the tubes

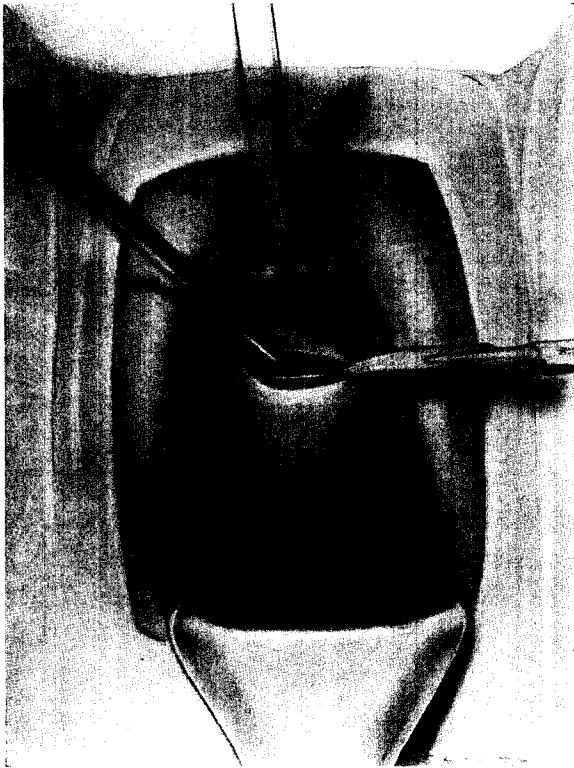


FIG. 1. Peritoneum opened posteriorly to cervix.

were excised. There were 2 failures among the 42 cases. At the subsequent cesarean section in the 2 cases that became pregnant, it was discovered that the ligatures had disappeared and the tubes had become reunited.

Sterilization should not be carried out unless contraceptive measures have failed, or are irksome, or both parties will not cooperate in their use.

It is impossible to lay down all of the indications for sterilization of females. Each case presents a problem of its own and it is only by a careful review of the history, consulta-

tion with men who are especially trained in the unusual aspects of the case, that a sane and safe conclusion can be arrived at. Sterilization for economic reasons is contraindicated.

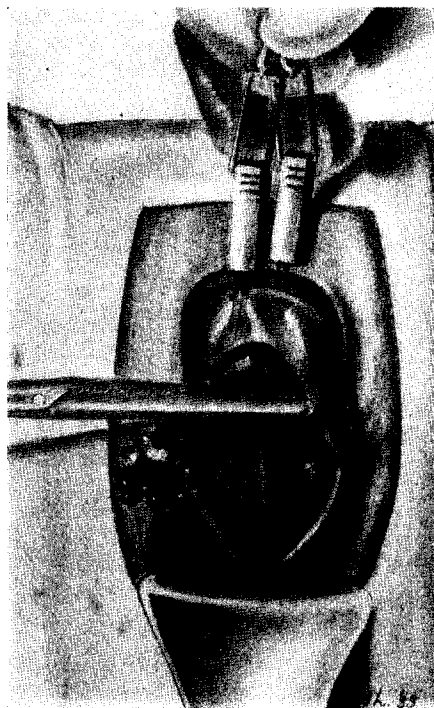


FIG. 2.

FIG. 2. Tube brought down through vaginal incision and clamped.

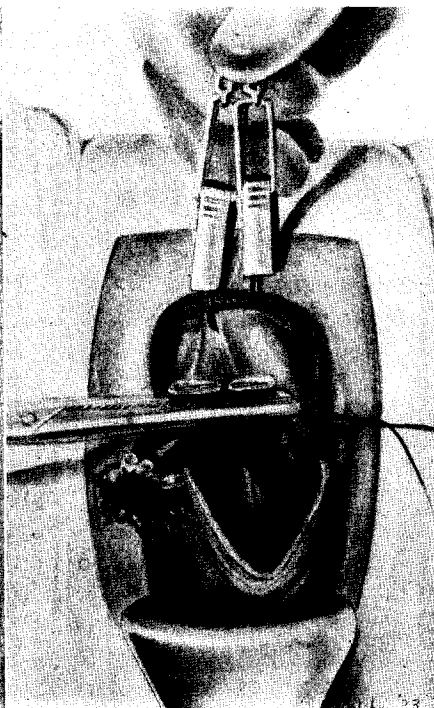


FIG. 3.

FIG. 3. Loop of tube removed and silk ligature ready to be tied in groove made by clamp.

A most debatable problem is whether sterilization is indicated following cesarean section. I am strongly of the opinion that it is not indicated after the first cesarean section unless a constitutional condition is present that would make it hazardous for the patient to conceive again. The limit on cesarean sections should be four, and perhaps in the majority of women, three. If the first cesarean section is well done, subsequent sections, provided the indications still exist, carry but little additional risk. Constitutional diseases such as chronic nephritis, advanced or non-compensating heart disease, certain mental ailments and many more chronic conditions

call for sterilization regardless of the number of babies or sections that the patient has had.

One finds quite a diversity of opinion regarding sterilization following therapeutic abortion. There are two problems to be settled: first the advisability of the therapeutic abortion, and second, should the women be sterilized. It is impossible to lay down an absolute formula as each case offers a different problem. It is one of the most important and serious situations that can arise in the practice of medicine. Should therapeutic abortion be carried out for a constitutional disease that is incurable and that would place the patient's life in jeopardy if a subsequent pregnancy should occur, under these circumstances sterilization would be justifiable. In conditions like this, with an uncontaminated uterus, hysterotomy is a safer procedure than emptying the uterus from below, either by the introduction of foreign bodies as gauze or catheters or the removal of products of conception manually by the use of placental forceps or the curette. Hysterotomy has the advantage that it can be carried out with a local anesthetic and at the same time the woman can be sterilized. There is not a great loss of blood at the time of operation and it obviates, to a great extent, the dangers of sepsis or perforation of the uterus. All of these complications are to be feared if the uterus is emptied from below. F. C. Irving⁴ reports 4 cases of hysterotomy and sterilization carried out per vagina by his special technique. All four of his patients were chronic nephritics.

I view with great alarm the change of the opinion abroad concerning the indiscriminate production of abortion. In Russia it is legalized. In Germany the Russian viewpoint is looked on favorably by many medical men. Even in England, the home of conservatives in all matters, a more tolerant view of abortion exists. The Right Honorable Lord Riddell quotes the opinion of Mr. Justice McCardie and concurs with it on the following case:

A female abortionist was charged with wilful murder on account of the death of a woman on whom she had produced an abortion. Mr. Justice

McCardie remarks: "Such a change illustrates the ignorance and brutality with which the law of abortion is too often administered, and it is plain to me that many of those who seek to uphold and administer the present law of abortion are wholly ignorant of the social problems which not only persist in our midst, but which menace the nation at the present time. In this case the now dead woman had no wish for a child. She had already borne three, aged six, five and three years. Her husband had wished for a child, but it was the wife who had to undergo the burden of childbearing, and I repeat once more that this case illustrates the need for wider extension of birth control knowledge than at present exists. I can not think it is right that a woman should be forced to bear a child against her will."

Taussig prepared an elaborate summary of abortions in this country which he presented at the White House Conference. He estimates the number of abortions annually at 700,000. He asserts that 15,000 die, making a mortality of about 2 per cent, and that 50 per cent of these are criminal. I believe I am correct in emphatically stating that the consensus of medical opinion in this country is that an abortion or sterilization should only be carried out in cases where the continuation of the pregnancy or the occurrence of pregnancy would place the life of the woman in great peril. I do concur in the opinion of the celebrated jurist, Mr. Justice McCardie, that a wider distribution of birth control information would to a great extent solve this problem.

As previously stated sterilization as an operation per se should not be carried out unless birth control methods are not applicable to the case under consideration. X-ray or radium are the least dangerous and perhaps the most certain methods of sterilization but they have the overwhelming objection of stopping menstruation and depriving the woman of the benefits of the internal secretions of the ovaries. There is no absolute surgical method of producing sterilization in 100 per cent of cases. Occasionally a failure will occur. Lochrane⁵ says that "pregnancy has occurred under such anomalous circumstances as to suggest that there is a definite positive chemiotaxis between ovum and spermatozoon." Jarcho⁶ reports some interesting experiments in animals in which he

produced temporary sterility by the injection of spermatozoa from other animals. Kolpikov has standardized a vaccine containing a definite number of spermatozoa. Should this

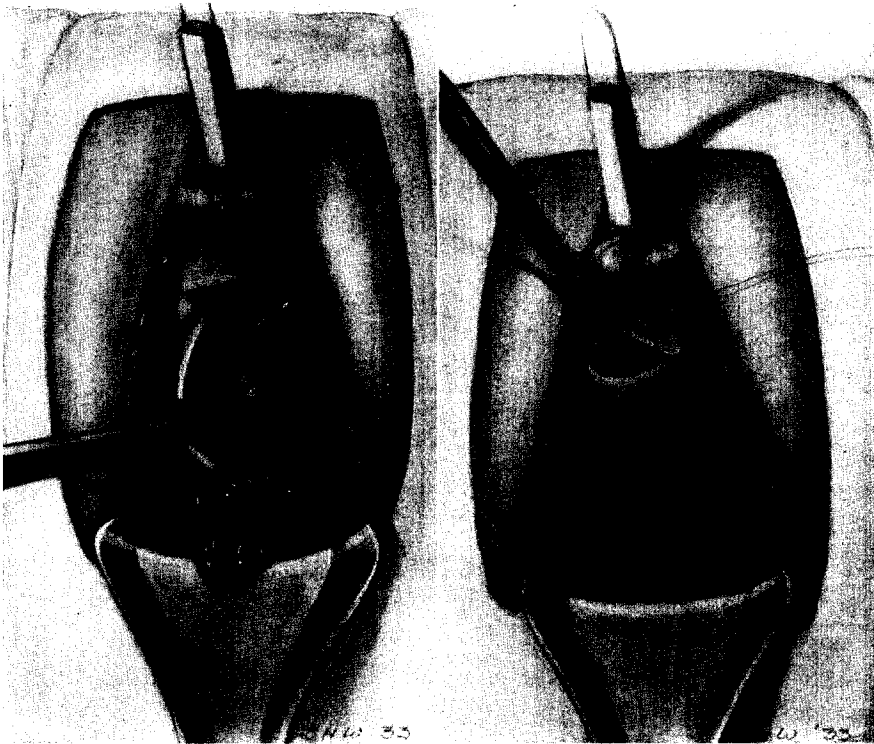


FIG. 4.

FIG. 4. For temporary sterilization: clamp applied across tube $1\frac{1}{2}$ inches from fimbriated extremity.

FIG. 5.

FIG. 5. Closure of wound. Deep sutures are shown in position closing peritoneum. Superficial sutures closing mucous membrane are also seen.

method prove a success it would be most attractive for business women.

Robert L. Dickinson is working on the problem of producing an obliteration of the lumen of the tubes in the cornu of the uterus by means of chemicals or electrocoagulation. Should this method prove effective it would make sterilization in the female a very simple procedure. Turenne⁸ sutures the fimbriated ends of the tubes into the broad ligament for tem-

porary sterilization. This method has not proved reliable. The crushing of the tubes, application of a ligature in a groove and amputation of the tube beyond the ligature is a quick and easy method and has proved to be reliable in most cases. The wedge-shaped excision of the tubes at the uterine cornu is looked on by most gynecologists as the most reliable method. It has the objection that it may produce a hemorrhage that is troublesome and occasionally takes some time to control. Irving⁹ advocates a method that obviates this objection. The tube is doubly ligated and divided $1\frac{1}{2}$ inches from the uterine cornu, the distal portion is buried between the layers of the broad ligaments. The proximal portion is dissected free from the mesosalpinx and buried in a prepared pocket in the uterus, near the insertion of the round ligament, and the raw surfaces covered over. He used this method by the vaginal route in the 4 cases of hysterotomy previously mentioned. I consider the Irving method preferable to the wedge-shaped excision of the tube.

Time and experience may demonstrate that all contraceptive appliances and operations for sterility are unnecessary provided the exact time of ovulation can be foretold in all women and that they will abstain from coitus during this time. It is now known that the woman who menstruates on a regular twenty-eight day cycle ovulates between the tenth and seventeenth day after menstruation has started. It is also known that the ovum lives only one to two days and that the sperm cell lives two or three days and that the sperm cell moves at the rate of 1 cm. in three minutes. Miller⁹ with these facts as a basis has worked out the conception time of women who have a regular cycle. If the cycle is more or less than twenty-eight days the period of conception is moved up or back so many days.

The method I advocate is simple and easy. It has the following advantages: It is not a major surgical procedure. A local or general anesthetic may be used. The patient can be gotten out of bed in a few days' time. It is preferable to

cesarean section where the chief indication for cesarean section is sterilization. Under these circumstances the operation for sterility is carried out two to three months after normal labor.

The patient is placed in the exaggerated lithotomy position. After the parts have been prepared and draperies applied the cervix is exposed and seized with a cervical hook or forceps. A semi-circular incision is made behind the cervix from 1 to $1\frac{1}{2}$ inches in length and the peritoneum opened. A crushing forceps is placed across the tube $\frac{3}{4}$ inch from the fimbriated extremity. The tube, external to the crushing forceps is removed and a silk ligature is tied securely in the groove made by the crushing forceps. The same procedure is carried out on the opposite side. This procedure leaves the tubes in good shape for a plastic operation for restoration of their lumen, provided the patient's condition improves to the point where pregnancy would not be a menace to life.

Should the disease for which the sterilization is carried out be an incurable one I advocate the method of Medlener which consists of applying a crushing clamp to a loop of the tube, a silk ligature applied in the groove and the tube excised distal to the ligature. The peritoneum is closed with two or three sutures of plain catgut and the incision in the mucous membrane of the vagina is closed in the same manner. In cases where the uterus is high-lying and with little mobility the approach may be made through the anterior fornix. This, of course, makes the operation more difficult but can be easily carried out by any one with proper gynecological training and experience.

The patient is propped up in bed at the end of twenty-four hours, placed in a chair at the end of forty-eight hours and allowed to leave the hospital within four to five days from the time of operation.

I have been using this operation for the past three years and can heartily recommend it. A Rubin's inflation test of the tubes should be carried out annually for the first two years following any operation for sterility.

REFERENCES

1. POPENOE, P. J. *Social Hygiene*, 14: 271, 1928.
2. DICKINSON, R. L. *J. A. M. A.*, 92: 373-379, 1929.
3. WILLIAMS, J. W. *Am. J. Obst. & Gynec.*, 1: 783, 1920-21.
4. IRVING, F. C. *Am. J. Obst. & Gynec.*, 14: 170, 1927.
5. LOCHRANE, C. D. *J. Obst. & Gynec. British Empire*, 28: 228, 1921.
6. JARCHO, J. *Am. J. Obst. & Gynec.*, 16: 813, 1928.
7. TURENNE, A. *Surg., Gynec. & Obst.*, 29: 577, 1919.
8. IRVING, F. C. *Am. J. Obst. & Gynec.*, 8: 335, 1924.
9. MILLER, A. G. *Surg. Gynec. Obst.*, 56: 1020, 1933.

DISCUSSION

DR. EDWARD H. RICHARDSON, Baltimore, Md.: A few years ago I performed a therapeutic sterilization upon a twenty-five year old married woman the ultimate result of which was so unique that a brief report of it should be appended to Dr. Burch's excellent paper.

The technique employed was bilateral wedge-shaped resection of the uterine cornua together with the proximal 4 cm. of the tubes. The uterine wounds were accurately and snugly closed with interrupted sutures of chromic catgut and the tubal stumps were buried between the layers of the broad ligaments. The round ligaments were then neatly plicated over the suture lines. The patient's convalescence was quite uneventful.

Twenty-one months later I again saw this young woman in consultation with both her physician and her obstetrician at which time pelvic examination disclosed that she was three and one-half months pregnant. A subtotal hysterectomy was promptly performed. At the conclusion of the operation I carefully passed a metal catheter well up into the uterine cavity outside the fetal sac and then closed the cervical canal snugly about it by means of a purse-string suture. I then submerged the entire specimen in water and gently pumped air through the catheter and noted that it escaped at once through multiple tiny openings situated at the site of the previously resected right cornu. On opening the uterus and carefully inspecting the cornual areas, it was found that on the left side the tubal orifice was effectively separated from the surface of the uterus by a dense band of scar tissue 1 cm. in width which was entirely impervious; but on the right side the tubal mucous membrane could be traced almost out to the surface of the uterus. This observation seemed to indicate that the resection had not been deep enough on the right side and that patency of the tubal stump through the cornu had become reestablished. Microscopic study of this area, however, provided another and rather remarkable explanation. Serial blocks were cut at intervals of 3-4 mm. extending through the entire

cornual area. Sections from these were carefully studied by the pathologist whose report is as follows:

"In only one section, taken at the serosal surface, is there tubal epithelium, which is atrophic and merges gradually into the endometrium. The tissue intervening between the outside and inside of the specimen is extraordinary, in that it is spongy and is traversed by many channels lined by endothelium. The conclusion to be drawn is that pregnancy occurred by means of the ovum traversing these channels into the uterine cavity. At any rate, the absence of tubal epithelium in all the sections intermediate between the serosal and endometrial surfaces of the specimen points to such an interpretation."

DR. H. J. BOLDT, White Plains, N. Y.: I presume that you are all aware of the law that was passed in Germany, which is to be in force January 1, 1934. I took part in the debate on that question for I have been advocating sterilization for fifteen years whenever opportunity occurred. In Germany eugenic sterilization is to be used on all women who have a bad heredity history of any sort. The doctor is required to report to the Health court every instance of hereditary defect that comes to his knowledge and then the court will appoint three physicians to look into the case. The principal cases are criminals who have been convicted of felonies, the feeble minded, those with all kinds of mental illness, and chronic inebriates, that is, persons who become intoxicated daily. The time for sterilization of the children of such parents has not yet been decided, but it is likely that the girls will be eleven years old and the boys sixteen years. The method of sterilization is likely to be left to the option of the physician; whether radium or operative measures will be used will be decided upon later. This law will go into effect on January 1 and no questions will be asked as to whether they are willing or not. The person doomed to sterilization will be sterilized.

DR. THOMAS S. CULLEN, Baltimore, Md.: The operation Dr. Burch recommends is an unusually simple one. I feel that, as a rule, the best results are obtained by cutting away a wedge of the uterine cornu with the tube when this is disconnected. In a case just reported by Dr. Richardson removal of the wedge did not prevent a subsequent pregnancy, but this is the only case I have ever heard of in which pregnancy followed the removal of a wedge of uterine cornu after the tube had been disconnected.

Recently I operated upon a woman whose tubes had been disconnected and the outer end of the tube had been embedded in the broad ligament. Further pregnancies had been deemed hazardous because of the patient's physical condition, but a few years later she had regained her health and was exceedingly anxious to have more children. In her case we re-implanted the tubes into the uterus at the cornu.

A number of years ago I saw a patient who had had the right tube and ovary removed. When I saw her she had a cornual pregnancy on the left. We took out a wedge, removing the cornual pregnancy and a small portion of the left tube. When the wedge had been removed, there was an opening into the left uterine horn. The small piece of normal tube was implanted here and the cornu sutured. The patient soon became pregnant but lost her baby at the seventh month because of placenta previa. She again became pregnant and was delivered of a normal child. This case was reported by my resident, Dr. Shaw, in the *Johns Hopkins Hospital Bulletin*, and a few years later I recorded the subsequent history in the same medical journal.

DR. F. WEBB GRIFFITH, Asheville, N. C.: Two statements of Dr. Burch prompt me to discuss his paper. One, that sterilization should not be undertaken until contraceptive measures have failed; the other that sterilization should not be done for economic reasons. A good share of my patients come from the mountains of Western Carolina and Eastern Tennessee. The young girls in these mountains are well developed, of good physique and have a color in their cheeks which would be the envy of any city girl. By the time that they reach sixteen years of age they are married and by the time they are thirty they have from six to ten children and are literally worn out and look like old women. If in such women it is necessary to open the abdomen for other reasons, I feel that we are justified in sterilizing them. To allow them to continue bearing children is simply slow suicide.

It is generally recognized that in cases of pelvic inflammation where the woman is of the better class and can take a long rest, that the female organs can be saved, whereas if the woman has to work for a living and cannot afford to have prolonged rest, removal of the uterus and adnexa is advised. If then, a woman can be unsexed for economic reasons, certainly a simple ligation and cutting of the tubes would be justifiable.

I was at one time connected with a hospital where it required the sanction of at least one, and preferably two, other physicians before a woman could be sterilized. Yet if the same operator saw fit, he could remove all of the pelvic organs or even portions of the bowel without anyone questioning his judgment. For that reason, I have seen surgeons do a high amputation of the uterus to sterilize a woman rather than go through all of the red tape necessary to ligate the tubes. Recently one of the mountaineers said to me, "Doc, I have had an awfully hard time. I have had eighteen children and have buried three wives."

DR. EMIL NOVAK, Baltimore, Md.: Dr. Burch included in his paper a consideration of sterilization and contraception, and the discussion indicates the interest in and the importance of these problems. He referred

to the so-called "safe period" of the menstrual cycle, during which conception rarely, or, according to some, never occurs. This method of "biological contraception" has excited much discussion along medical, sociological and even theological lines. It is based on several fairly well-established premises, viz. (1) The egg is given off from the ovary at some time between the eighth or tenth to the eighteenth or twentieth days of the cycle; and most often at about the twelfth to the fourteenth days; (2) the ovum survives in a fertilizable condition only a day or so, and, according to some, only a few hours; (3) the spermatozoan, while it may remain motile for a longer time, is not capable of fertilizing the ovum after from two to three days.

There is much that might be said in the elaboration of these premises, but the evidence for their essential correctness is quite convincing, so that in the woman with a regular four weekly cycle there can be no doubt that the premenstrual period, after the twentieth day of the cycle, is a "safe period," that the immediately postmenstrual period is relatively safe, and that the ovulation phase is the dangerous one for those anxious to avoid pregnancy. The difficulty comes when, as is so often the case, we have to deal with patients whose menstrual cycles are very irregular. In these an application of the Ogino teachings is probably of great service, though there is still a difference of opinion as to its infallibility. For that matter, even in women with very regular menstruation, such qualified investigators as Grosser believe the so-called O. K. technique (Ogino-Knaus) a very fallible one, chiefly on the ground that the mere act of coitus itself may be a determiner of ovulation, as it is in some of the lower animals. There has been no scientific proof of the occurrence of coital ovulation in the human, though its theoretic possibility can not be denied.

All in all, therefore, this method of birth control through periodic abstention has been a real contribution. Among other things, it should be borne in mind that it is the only method, aside from complete abstention, to which the Catholic church makes no objection. Whether infallible or not, there can at least be no question as to its relative efficacy, which is perhaps as much as can be said of any form of contraception.

DR. FRANCIS R. HAGNER, Washington, D. C.: I wish to say a word on the male side of sterilization. We have many patients who come to us asking to be sterilized because they do not wish to have any more children and I think it is a great mistake to operate on such patients. Conditions may be such that they do not wish to have children at that time, but in later life they may wish to have children and if you tie off the vas these patients get very unhappy about it and often get a psychosis that is distressing. We have made it a rule to refuse operation to such patients and only do sterilization when insanity is present or something equally serious.

I remember a case in the last year when a patient brought in a specimen of semen in a condom to see if he was sterile. That was on a Saturday morning and it was mislaid and was not examined until Monday afternoon. This specimen was at room temperature over forty-eight hours. When we put the specimen on a cold slide the spermatozoa were actively mobile, so I feel we do not know much about the duration of life of spermatozoa.

DR. LUCIUS E. BURCH, Nashville, Tenn. (*Closing*): The case reported by Dr. Richardson is very interesting and is a valuable addition to the literature on this subject. It proves beyond doubt that no operation for sterilization is 100 per cent perfect, regardless of the technique or the operator. This case also emphasizes the necessity of an inflation test annually following operations for sterilization.