Remarks ON CONSERVATIVE GYNAECOLOGICAL SURGERY *

BY
W. BLAIR BELL, B.S., M.D., F.R.C.S.
HON. F.A.C.S.

PROFESSOR OF OBSTETRICS AND GYNAECOLOGY, UNIVERSITY OF
LIVERPOOL; OBSTETRICAL AND GYNAECOLOGICAL SURGEON,
ROYAL INFIRMARY, LIVERPOOL; PRESIDENT, BRITISH
COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

Some day perhaps a surgeon, possessing a wide historical knowledge of the art and science of surgical intervention, and gifted with a philosophical quality of mind, will tell us why the rugged efforts of the earliest times have lingered on, even to the present day, side by side with the advance of scientific methods in gynaecological surgery. I cannot do more here than indicate the circumstances as they appear to me.

Until a hundred years ago surgery was almost entirely urgent in character—the surgery of injuries of war or of peace time. Gradually physiological and pathological knowledge was acquired, and this stimulated further surgical endeavour, at first without corresponding reward. Then came anaesthesia and antiseptic surgery, which made operations of convenience as well as life-saving and health-giving procedures possible.

The gynaecological enterprises of the general surgeon, following on the work of men like Spencer Wells and Lawson Tait, soon commenced: "Surely if *they* can remove ovaries, tubes, and uteri, so can we," said the general surgeon, and acted accordingly. For a time gynaecological surgery became an eradicated competition among all those who handled the knife; and, as I have indicated, to some extent it still is. At the end of last century, however, Liverpool began to tower over the rest of the surgical world in regard to conservative surgery. A scientifically-minded general surgeon, William Alexander, who will in due time be posthumously accorded his rightful place as a wise pioneer, as has happened in the case of Hugh Owen Thomas of the same city, was making contributions to conservative gynaecological procedures of the highest value. Elsewhere gynaecological surgery, Alexander neglected, lagged behind. The general surgeon still removed everything he found abnormal in the pelvis, and the gynaecologist did the same, when, indeed, he was not prevented from operating altogether by his surgical colleagues, as obtained at St. Bartholomew's and other hospitals in London.

About thirty years ago, when gynaecology shook off the medical trammels imposed upon it in many places by its surgical brethren, and reached out for surgical recognition, it was found that the physiologists, anatomists, and pathologists had overlooked the fact that before a person can function normally or abnormally he must be born, that the organs concerned in this process are worthy of consideration, and that all that is gynaecological is not restricted to the pelvis, as is still believed by the ignorant to-day. Consequently it was necessary that the gynaecologist should investigate the structure of the female genitalia and the physiological performances of which these organs are capable. This was the state of affairs when I myself entered the field of gynaecology: very little was known of the physiology and pathology of the genital organs and their functions. Only in the last few years has any real help been given by others who are not practising gynaecologists; so the fact remains that the gynaecologists of the present generation have them-

selves laid down the scientific lines on which recent advances and refinements have proceeded, and in so doing have legitimately excluded the conscientious general surgeon from cobbling on lasts with which he is not familiar.

It is therefore of the utmost importance that those practising gynaecology should have one mind on the question of conservative surgical procedures. This is physiological surgery, as opposed to the older anatomical surgery. Yet I have myself in recent years taken part in many controversies concerning the value ("if any," some have said) of the ovary in the functional equipment of woman, and the advantages of operations designed to conserve as far as may be her feminine state and functions, as opposed to what has been called the "clean sweep."

It seems curious that controversy should ever arise on such matters, for the principle of all surgical operations, whatever region be concerned, is the same: the mechanical treatment of lesions causing symptoms with the conservation of structure and function, so long as this practice does not endanger the life of the patient. I am, however, happy to think that, although the last discussion on this subject took place as recently as 1927,^{12 18 22} it would be difficult to-day to find an advocate of the "clean sweep" as a routine procedure. It has never seemed to me unreasonable to regard the conservation of the ovarian function as of no less biological importance than that of the testicular. The fictitious difference some have sought to maintain has in reality been created by the prominent position of the male organ, and the pride men take in their potency! Yet the possibility of conception, pregnancy, and parturition is no less important psychically and physically to a woman, because she alone is capable of these life-giving phenomena.

FUNCTIONS OF THE PELVIC GENITALIA AND PASSAGES

Primarily reproductive, the genital organs in the consummation of this function are closely linked up with the metabolism of the soma. We cannot regard the reproductive phenomena as processes apart from the rest of the bodily functions.

Formerly the genitalia of woman were regarded as being local in function as well as in position. Now we know that from birth till after the menopause the genital secretions and functions play a very important part in determining the mental and physical development of the individual, and in maintaining the attributes of the normal woman. Moreover, as I showed many years ago, the ovaries are but one link in the chain of organs, such as the pituitary and thyroid, which form a genital system.⁴ Ablation or serious disturbance of any one of these may seriously affect the other links in the chain, and therefore the metabolism of the body, with many physical and psychological consequences.

To-day, all surgeons have acquired a physiological, in place of a purely anatomical, outlook; so, with such knowledge as I have outlined, the scientific gynaecologist sets before him the ideal of preservation of function. Conservative gynaecological surgery, then, is concerned with the maintenance of the ovarian function and menstruation, and with the fostering of conception and childbirth.

CONSERVATIVE OPERATIONS ON THE OVARIES

Ovarian Resection.—One of the commonest and most important of conservative operations on the ovary is partial resection of the organ in well-defined circumstances. Unfortunately it is usually the custom of gynaecological surgeons to remove, quite unnecessarily, an ovary which is the seat of an innocent neoplasm. Often enough mere bisection of the specimen subsequently to removal shows us on naked-eye examination that part of the ovary could have been preserved, for very commonly—indeed, almost

* The substance of addresses, with lantern illustrations, delivered to the Southport Medical Society on March 4th, 1931, and to the Blackburn Medical Society on March 11th, 1931.

always—the unaffected portion is that which is in immediate connexion with the blood supply. One must be careful, of course, to be sure that the lesion is innocent, but only now and then is there any room for doubt. Nevertheless on one occasion I removed in their entirety bilateral ovarian tumours (fibromata) which very closely resembled solid malignant tumours; and on another occasion I removed bilateral ovarian cystic multilocular tumours from a young woman, preserving a portion of one ovary. On histological examination some parts of the tumours were difficult to recognize as being of an innocent character. However, no further pathological developments have occurred, and the patient is menstruating normally, nearly a year later. It is possible, too, that she may some day conceive. I have excised even endometriomata from the ovaries of women, and pregnancy has subsequently occurred. In this connexion I would refer to the view, which influences many surgeons, that one ovary is sufficient for all the needs of a woman, and in a sense this is perfectly true. But, on the other hand, how often when one ovary has been removed because it was the seat of an innocent neoplasm, has the second ovary been removed at a later date for a similar condition! It has never come to my knowledge that a new growth has developed subsequently in any ovary I have resected. This might happen, it is clear; but such an event must be very rare, for if resection be properly performed, the region in which neoplasms most frequently arise is excised, as they tend to grow away from the hilum. So, too, with retention cysts, whether follicular or parovarian, careful technique will generally enable us to save a considerable part of the normal ovarian tissue. When it is not possible to resect an ovary satisfactorily a graft from it may usually be made. The technique of ovarian resection may be very simple or may require careful planning, for the blood supply must not be impaired. Suture, too, of the ovarian wound should be neatly performed and a turning-in stitch employed. It is useful, also, to cover the scar with the peritoneum of the mesosalpinx, and to support the tube and ovary by making use of the round ligament.

Ovarian Grafting.—I have published so much on this subject, and have so often given statistics of the results of a large number of cases,⁸ that I do not propose to deal at great length with this important procedure. Up to April, 1928, I had performed the operation of ovarian grafting 210 times in women during the reproductive period of life. Here, again, to secure good results the most careful technique is required. The chief factors for success seem to be:

1. Homoplastic grafting—that is, using the patient's own ovarian tissues.
2. Obtaining and using active ovarian substance.
3. Cutting the material into connected fragments with a sharp knife, that rapid vascularization may be favoured. I employ a skin-grafting knife and cut the ovarian substance in criss-cross fashion on a rubber pad.
4. Putting the material so treated in a suitable place.

Ovarian grafting may be (a) extragenital, or (b) genital. In the latter case the ovarian tissue is placed in the wall of the uterus—presenting, or not, in the uterine cavity according to the conceptional needs of the case. When extragenital implantation is practised this should be in a dry but vascular area, such as between fibres of the rectus muscle. So far as results are concerned, I can only speak of those attending the methods I have practised and published. These, however, have been confirmed recently by Norris²⁵ of Philadelphia, who states that he has followed my technique in all its details. My own results show that of all cases in which menstruation has been possible this function has been maintained in over 70 per cent.—not always regularly, of course, but often so—and has continued for many years. I have a patient in

whom the function has now persisted for so long as thirteen years and three months, and is still regular. Of those cases in which menstruation was not possible, owing to the removal of the uterus, no less than about 90 per cent. remained free from menopausal symptoms, after the first few months following implantation—that is, after the graft has become vascularized. In spite of such good results let me repeat what I said in a paper on ovarian grafting many years ago:

"I wish to insist that this procedure be looked upon as a measure of necessity, which can never be weighed in the balance against the preservation of the natural connexions of the normal ovary."⁸

Ovarian Transposition.—By this procedure we imply the transposition of an ovary with its normal connexions to an unusual site in order that conception may be made possible. The chief indication for this is unavoidable removal of the tubes in a woman, during the reproductive period, in whom an ovary can be preserved with its vascular supply. The operation was first suggested by Estes,¹⁹ and Tuffier.²⁷ The former excised a cornu of the uterus and fixed an ovary, presenting in the uterine cavity, over the aperture. Pregnancy subsequently occurred in 4 cases out of 27 whose after-history was obtained. Tuffier placed the ovary partly in the uterine cavity through an incision in the posterior wall. I have practised the latter procedure nine times; the after-histories of seven of these patients have been obtained. In none of these seven has pregnancy yet supervened; some of the operations, however, were recently performed. On the other hand, it may well be that when practicable Estes' operation is the better, and I intend to give it a trial when a suitable case presents itself. A second indication for ovarian transposition, which I have practised, is in the case of an ectopic pregnancy when conservation of the tube is desired, but, owing to the oozing of blood from the fimbriated end, seems impossible of consummation. In these circumstances the slight pressure of an ovary placed in the lumen of the tube with the fimbriated end closed round it may enable a functional result to be secured. The technique of transposition of the ovary is, however, in its infancy, and we are still seeking the simplest and most effectual methods.

CONSERVATIVE OPERATIONS ON THE TUBES

Salpingotomy.—This was advocated for acute suppurative salpingitis first, I believe, by Holden in America, and subsequently practised by Bourne¹³ and others in this country. The method of dealing with acute infections has not, however, received much support, probably because after the rude awakening, in the form of a high mortality rate, that came to many gynaecologists who formerly operated on salpingitis during the acute phases, the greater security afforded by operations conducted in the chronic stage, when the infecting organisms are dead, is not likely to be lightly cast aside.

It is, on the other hand, curious that salpingotomy in tubal pregnancy has not become a method of choice in suitable cases. In 1922 I recorded¹⁰ my first case in which this procedure was deliberately performed to remove a tubal mole, which measured 5.5 by 3.5 cm., and contained chorionic villi. Since that time I have practised this method in suitable circumstances—that is to say, in those cases in which tubal haemorrhage had been arrested naturally or could be controlled, and in which there were still products of conception in the lumen which could not be removed through the abdominal ostium. In view of the routine way in which tubes and even ovaries together with the tubes were formerly, and still are by many, removed in cases of tubal pregnancy, even in those cases in which complete tubal abortion has occurred, it is necessary to say that such eradictive procedures may be entirely unjustifiable. It is enough to evacuate from

the peritoneal cavity the blood clots and products of conception which have been aborted through the abdominal ostium of the tube, or to remove them by that route with sponge forceps, and to suspend the tube and ovary if tubal haemorrhage has ceased. If bleeding is still going on, it may be necessary to remove the tube, but I think it is worth while in these cases to incise the tube and under-stitch, if possible, the bleeding points. In some cases the ovary may be transposed into the lumen of the tube as already described. I cannot believe that in such circumstances oozing of blood would continue for long. If the case is of longer standing, and a mole has formed in the tube, this may readily be removed by salpingotomy and the tube subsequently sutured. In some cases of this character salpingostomy may also be performed. Curiously enough in two consecutive cases of ectopic pregnancy on which I operated recently—one old-standing, and one in the acute stage—I found that each patient had a haemato-salpinx on the other side, apparently due to a tubal pregnancy a long time previously. I have seen this several times. It is perhaps not an unexpected finding, for we have all operated on cases of repeated ectopic pregnancy in the same patient, and at considerable intervals of time. In the last of the two cases mentioned above lipiodol was injected into the uterus a fortnight after operation—double salpingotomy and salpingostomy—and both were seen to be patent. It is possible that this patient will now conceive normally.

Salpingostomy.—This, as I have just said, may be performed in cases of ectopic pregnancy, but undoubtedly the chief indication is occlusion of the fimbriated extremity of the tube due to infection. It is, of course, useless to perform this operation alone when there is obstruction in the isthmal or intramural regions, for which resection may be required. For the most part, therefore, salpingostomy is indicated for occlusion of the fimbriated extremity caused by pelvic infections following appendicitis, by ascending infections of the streptococcus (puerperal infection), or by infections following pelvic operations. Gonococci, unless the attack be very mild and the organisms rapidly perish, damage the mucosa of the tubes so much that it is rare to see fimbrial occlusion only. Even when this does happen, and salpingostomy is successfully performed so far as patency is concerned, pregnancy is not very likely to follow owing to the damage done to the mucosa, although at the time there be no obstruction elsewhere. Besides, reinfection with reocclusion is not uncommon. It is most important that, when the lumen has been exposed in the first step of salpingostomy, the patency of the isthmal and intramural regions should be tested by means of air inflation from above, as I first advocated in 1917,⁷ some years before transuterine inflation was suggested. The technique of this procedure is simple. A metal syringe with a fine nipple-like nozzle is taken and the nipple gently inserted into the lumen of the tube. Pressure is then slowly exerted on the piston. If the tube be occluded nearer the uterus the distal portion is greatly distended. When the air has passed quickly to the uterine cavity it may often be heard gurgling through the cervix, or if the uterus be nipped between the fingers it can be felt and heard escaping into the vagina. As with other conservative operations, salpingostomy, if it is to be successful, requires the greatest care in its performance. The chief points on which stress must be laid are:

1. Absolute haemostasis. If there be any blood in the neighbourhood of the new ostium it will subsequently be occluded.
2. Close connexion between the ovarian end of the opening and the ovary; in this way an ovarian fimbria is replaced.
3. Suspension of the tube and ovary to the round ligament to prevent the new ostium adhering to the peritoneum of the lateral wall of the pelvis.

In a limited number of cases of salpingostomy subsequently tested by air inflation or with lipiodol we have found patency in over 70 per cent.

Tubal Resection.—This operation is concerned with the removal of portions of the tube which cannot satisfactorily be conserved, with the maintenance of the tubal lumen. The following are the conditions for which I have performed the operation:

- (a) Ectopic pregnancy, when it is occasionally necessary to excise an affected area, usually at the fimbriated extremity.
- (b) Infections, when the lumen of the tube is obstructed at one spot, generally in the intramural portion.
- (c) Congenital abnormalities. The only states of congenital origin of which I have had the experience are in the case of an impervious uterine horn to which a normal tube has been attached, and in the not very uncommon forms of local impermeability of the tube. This latter condition is seen in the isthmal part of the tube, which is represented by a convoluted hard cord in the mesosalpinx.

In cases of tubal resection I have never myself performed tubo-tubal junction—that is, anastomosis of a patent fimbrial portion to a pervious uterine segment. I have, however, in a certain number of cases, resected the whole or part of the isthmal portion, together with the intramural, and have implanted the outer moiety of the tube in the uterus with success. As I have indicated, success may be noted by the subsequent examination with x rays of intrauterine lipiodol injections. Here I may relate a very remarkable case of tubal conservation, accomplished, first, by resection of an impervious uterine horn and implantation of the left tube into the main uterine body, and at a later date by salpingotomy of right tube for ectopic pregnancy, with subsequent full-term pregnancy for the first time in the uterus. These events are recorded below under sections (1), (2), and (3).

Mrs. C., aged 22 years; married for one year and four months; had never been pregnant.

(1) Admitted on December 18th, 1925, to the Royal Infirmary, Liverpool, suffering with pain in the back and premenstrual and intramenstrual dysmenorrhoea, which had been present since menstruation commenced when the patient was 13 years of age. The menstrual cycle was 3.5/23-26. On examination the uterus was found to be retroverted and retroflexed; nothing else abnormal was detected. The uterus was replaced in the normal position and a test made to discover whether the retroversion and flexion were responsible for the symptoms by keeping the uterus in the normal position with a pessary. All symptoms except the intramenstrual dysmenorrhoea were relieved. So the pessary was removed and surgical procedures were advised in order that the uterus might be fixed in a normal position. On February 4th, 1926, I performed laparotomy. The uterus was found to be retroverted and retroflexed, and the left cornu of the fundus was seen to terminate in a small rudimentary horn, such as I have described elsewhere as being a cause of intrinsic intramenstrual dysmenorrhoea. Attached to the distal end was an apparently normal Fallopian tube, which, on intra-abdominal inflation, was shown to be patent as far as its insertion into the rudimentary horn. Air passed through the right tube into the uterus. The rudimentary horn was excised and the tube was implanted into the cornu of the uterus. A "sling" operation was then performed to keep the uterus forwards, and the appendix was removed. The patient made a smooth recovery. On February 26th, 1926, lipiodol was injected into the uterus, and both tubes were found to be patent.

(2) The patient was not seen again until December 9th, 1927, when she returned to the out-patient department. She stated she had been quite well until November 20th, 1927, when a menstrual period began, and that since then she had bled without cessation. There had been no amenorrhoea. On examination a right tubal swelling was found, an ectopic pregnancy diagnosed, and she was admitted to the wards. On December 15th I once more opened the abdomen. A little blood was seen in the pelvis. The right tube and ovary were adherent to bowel. The tube was distended in its isthmal portion and dark in colour. The ovary was enlarged (ca. 7 by 5 cm.) and cystic. The distended tube was incised and the contents with blood clot were removed. The mole measured 3.2 by 1.5 cm., and chorionic villi were found in it. The wound in the tube was sutured, and the lumina of both tubes were tested by air inflation and found to be

patent. The cyst in the right ovary was removed by partial resection of that organ. Sections showed the cyst to be follicular in nature. The tube and ovary were suspended. There was no deformity on the left side where the tube had been implanted at the previous operation. An uneventful recovery followed.

(3) On April 7th, 1930, the patient reported at the ante-natal clinic that she had had amenorrhoea since January 30th, 1930. She was found to be pregnant. The patient went to full term. There was a breech presentation, and she was delivered in the Royal Infirmary on October 18th, 1930. Mother and child did well.

Successful tubal resection is not an easy operation, and it must be perfectly performed mechanically if the desired end is to be obtained. The chief points in the technique that make for success are:

1. Exposure of the uterine cavity through the cornu, or by means of vertical bisection of the uterus, as advocated by Solomons.²⁶
2. Division into two flaps of the uterine end of the tube to be implanted, and the suturing of the anterior to the anterior wall of the uterine cavity and the other to the posterior.
3. Avoidance of pressure on the intramural part of the implanted tube when suture of the uterus is performed.
4. The passage of catgut or silkworm gut through the whole length of the tube into the uterine cavity.

CONSERVATIVE OPERATIONS ON THE UTERUS

Congenital Anomalies.—I have already discussed the resection of imperforate uterine horns. In many cases, however, of bicornuate uterus it is found that the two horns are well developed and of approximately equal size. In a majority, no doubt, there is no symptom or difficulty, but in some there is severe dysmenorrhoea, and occasionally obstructed labour, due to the non-pregnant horn blocking the pelvis. I have myself seen such cases. Provided the horns are not too widely separated, as may sometimes occur, and there is only one cervix, it is possible, by excising the inner sides of the two horns sufficiently to expose the cavities to unite the two outer halves and to form one uterus. I have performed this operation several times; so, too, has Munro Kerr,²³ and he has reported pregnancy subsequently to this operation; and this, indeed, is to be expected after so simple a procedure. When the cervix is duplex the operation is not so simple, but it is possible to deal with such cases surgically if there be necessity. Congenital occlusions of the cervix and uterine diverticula should always be treated conservatively, for hysterectomy is rarely required.

Infections.—The body of the uterus, to a great degree, is protected from infection and the lesions resulting therefrom by the endometrium, which undergoes cyclical changes and replacement. Nevertheless, the cornua and neighbouring fundus uteri are usually involved in serious tubal infections, even when of gonorrhoeal origin. In the acute phases of such an infection it is possible to find round-cell infiltration of the muscle coat of the uterus in these regions.⁶ No doubt this and the subsequent fibrotic changes of chronic infection are in part responsible for the menorrhagia which is so common a symptom. For this reason Beuttner of Geneva, and I myself independently a little later, devised an operation which I called acrohysterectomy⁵—meaning removal of the summit of the uterus. At the same time, and in one piece, the seriously damaged tubes—pyosalpinges—are removed with it, and also the ovaries, if it is impossible to retain them safely in their normal situation, and an ovarian graft is made. So long ago as 1925 I recorded the results of 127 cases of acrohysterectomy.¹¹ In 108 of these ovarian grafting was necessary, and in 68 per cent. menstruation subsequently occurred. Success, in that the symptoms

were relieved and the menopause averted, was obtained in 90 per cent. of all the cases. It is perhaps necessary to emphasize the fact that this operation—indeed, in my opinion, all operations designed for the treatment of salpingitis—should not be performed until the condition has become chronic. I have discussed this matter more fully elsewhere.⁹ My mortality rate for the above series of cases, which included those of puerperal (streptococcal) origin, was 2.6 per cent., whereas Beuttner's, for his first 40 cases, was 12.5 per cent. It appears probable, therefore, that he may have been less cautious in this respect than I have been. In most of the patients, in whom the organism has been the gonococcus, the cervix is badly infected, and it may be lacerated. To complete the treatment it is necessary in such circumstances to amputate the cervix. An essential point—not practised by Beuttner—is the covering of the stumps of the infundibulo-pelvic ligaments and the sutured uterine wound with a flap of peritoneum dissected free from the utero-vesical pouch; this prevents intestinal adhesions. Undoubtedly this combination of conservative operations to relieve severe cases of salpingitis with cervical and fundal infection of the uterus is most satisfactory, for menstruation is usually maintained to the comfort and happiness of the patient.

Neoplasms.—Conservative surgery in regard to neoplasms of the uterus concerns, of course, only those which are innocent in nature. From the dawn of gynaecology it is certain that uterine polyps, adenomatous and fibromyomatous, have been successfully treated by conservative measures—vaginal removal—but I shall not have time to say more about such tumours here, although there are many points of clinical and operative interest in connexion with them. Fibromyoma uteri, and endometriomata and endometriomyomata uteri, however, are so common, and so much attention is at the present time being paid to the conservative principles enunciated by Alexander and others in connexion with them, that I must occupy some time in discussing them. First, with regard to endometrioma of the uterus. This is usually seen as a diffuse growth in the wall of the uterus, nearly the whole of which may be involved. The symptoms associated with the condition are severe dysmenorrhoea and menorrhagia. In well-developed states of this lesion I do not believe it is possible to conserve the whole of the uterus satisfactorily; but it may be possible to save some endometrium, and there is no justification for the removal of healthy ovaries. The case is often different with fibromyoma and endometrio-fibromyoma. In certain patients it may be possible to remove the tumours and to conserve the uterus for menstruation and pregnancy; and in others to leave enough endometrium to enable menstruation to continue.

Before I consider the operation of enucleation of fibromyoma, let me discuss the question of partial hysterectomy with endometrial conservation. As I have said, the "clean sweep"—removal of ovaries, tubes, and uterus—has been practised, and was advocated so recently as 1927,¹⁸ for fibromyomata uteri and for some infections as a routine procedure. This I believe to be unjustifiable, except in a few exceptional cases. As with infections, even where subtotal hysterectomy is required for fibromyomata, it is nearly always possible to conserve some endometrium. I have known a patient in whom a very small area of endometrium has been preserved to menstruate subsequently for as long as seventeen years, until the natural menopause. It seems, therefore, that as with a small portion of ovary, so a little endometrium will sometimes go a long way. When, therefore, it is necessary to perform hysterectomy in young women it is advisable to leave some endometrium.

Transperitoneal Myomectomy.—I now come to the important conservative operation which during the last few years has been ardently proclaimed by Bonney.^{16 17} What is the history of transperitoneal myomectomy? It has been stated that Spencer Wells first performed it, by removing subperitoneal pedunculated fibromyomata, and that it was afterwards practised on the Continent by A. Martin and by Shroeder, but was abandoned by them owing to a mortality rate of over 30 per cent. In 1894 William Alexander of the Liverpool Southern Hospital reported to the North of England Obstetrical and Gynaecological Society a case of myomectomy.³ When Alexander read his second paper on the subject in Liverpool in 1897,¹ Professor Wallace called attention to his own paper²⁸ on the evolution of the treatment of fibromyoma uteri, read at the British Medical Association meeting in 1896, and stated that he had practised enucleation for twenty years—that is, since 1877—in the gynaecological ward of the Liverpool Royal Infirmary. However, there is no doubt that at the discussion which followed the third contribution by Alexander, before the British Gynaecological Society in March, 1898,^{2 3} his position as a pioneer of myomectomy was recognized, if not applauded, by his London audience,^{3 16} for he was the first strong advocate of the method, and showed that it could be safely performed even in difficult cases. From one patient he had removed nearly thirty tumours, a photograph of which is reproduced in his paper.³ Since that date the operation has been consistently practised in suitable cases in Liverpool and elsewhere; and from 1903 transperitoneal myomectomy has figured among my own operations for fibromyoma uteri. In 1900 Giles²⁰ reported a successful case. In 1918 Bonney¹⁴ published a short paper advocating an increase in the practice of myomectomy; no statistics were given. In 1922 Giles²¹ and Bonney¹⁸ read papers at a meeting in London. Whereas Bonney's paper, with a record of 100 cases, was an appeal for myomectomy without proper reservations being made, so far as I can discover, in regard to age and other essential qualifications, Giles's paper, as I shall show, was far more cautious. In mentioning Mayo's paper of 1911,²⁴ Bonney¹⁵ wrote: "W. Mayo, in 1911, also wrote a paper on the myometomies performed at the Mayo Clinic, 157 in number, with one death, but as they had done a very large number of hysterectomies during the same time it is obvious that the cases were selected." What else should be expected of an experienced surgeon of sound judgement and common sense? Giles, with Mayo, did not limit himself to myomectomy; he recorded and compared 987 cases of hysterectomy for fibromyoma with 167 cases of myomectomy performed by himself during the same period. I do not think a more judicial statement than his could be made to-day. The indications and limitations of the operation are clearly defined, and the important comparison between hysterectomy and myomectomy, to which I have referred, is made.

The chief difficulty associated with the enucleation of intramural, and of some cervical, fibromyomata is the bleeding. Bonney places a special clamp around the round ligaments and cervix, and sponge forceps on the infundibulopelvic ligaments. Other forms of compression may be used. The closure of the cavities is always effected by suture. In Bonney's latest series¹⁷ the after-histories of 210 patients were obtained. This is about half the total number of his cases. In this series, moreover, 42.8 per cent. were over 41 years of age. Of 77 in whom pregnancy was desired and possible, 30 conceived. Caesarean section was an unusually prominent feature in the delivery of these. In 13 (nearly half) of the 30 women who conceived, the fibromyoma was single; in 17 there were multiple tumours, but in more than half of these the number did not exceed 8, and we are given no

indication of their sizes and positions, so we must draw our own conclusions. The value of such statistics in regard to well-recognized operations is that we can discover how far and in what direction our procedures have been justified.

Indications for Myomectomy.—In certain cases the indications are so definite that no gynaecologist would be performing his duty if he did not practise myomectomy. I do not propose here to discuss those in which nothing but one-eyed enthusiasm would lead an operator to perform this operation when it is clear the full genital functions cannot be conserved; by this I mean both menstruation and conception. I cannot insist too strongly, however, that the sole advantage of transperitoneal myomectomy over partial hysterectomy lies in the possibility of conception, for, as I have shown, it is easy to leave enough endometrium for menstruation in the performance of supravaginal hysterectomy. We should not as gynaecologists with judgement, and conscious of our duty to our patients, be interested in the performance of surgical feats once the pioneer stage has been passed, especially when at best they may lead, in inexperienced hands, to worse results than other methods so far as immediate and remote mortality is concerned. Hence it may be definitely stated there is no place for myomectomy after the menopause, unless, perhaps, it be for solitary and pedunculated tumours causing symptoms. There are, at the same time, very definite indications for this operation, as has long been recognized, in women under 40 years of age, and in exceptional circumstances a little older, who can bear children, but in such cases the tumour should be single, or there should not be more than a few. The hunting out of dozens and dozens of "seedlings," and excessive trauma of the uterus must unfit this organ for reproduction. These facts have long been recognized, and seem supported by all the figures at present available. The operation is, too, a simple performance in comparison with certain of the other conservative gynaecological procedures. The indications, then, are:

1. Acute degenerations in fibromyomata during pregnancy.
2. The tumour is single or there is a limited number only of fibromyomata in women under 40 years of age, unless the patient marry shortly after that age and wish to bear children. If a woman has already several children, unless the fibromyoma are few in number and there is no special difficulty, this operation is not indicated; panhysterectomy by the vaginal or abdominal route is preferable in order that the cervix, which may have been injured in parturition, may be removed.

The contraindications are:

1. Women about or after the menopause.
2. Associated tubal infection, or old haematosalpinges.
3. When excessive mutilation of the uterus will be produced by the operation.

I have dealt with transperitoneal myomectomy somewhat fully, for there is, I believe, a very great danger that this operation, which is most beneficial in certain cases, will again fall into disrepute if it be practised indiscriminately in cases in which conception is not possible or thereby is made impossible.

CONCLUSION

In conclusion, I would ask those practising gynaecological surgery always to think conservatively rather than eradically when operating on women in the reproduction period for non-malignant conditions, and to give a proper trial to all conservative procedures that are designed to preserve function: time alone will show which deserve perpetuation and what is the best technique for their performance. I would, last of all, commend to notice the following words of my friend Professor W. P.

Graves of Harvard University, spoken in 1927 at the British Congress of Obstetrics and Gynaecology²²:

"Conservative surgery of the pelvis is one of the most important branches of all gynaecology, in that its proper performance requires great skill, expert judgement, and a thorough knowledge of pelvic pathology. Success depends, therefore, in a great measure on the individual capacity of the operator."

REFERENCES

- ¹ Alexander, W.: *Med. Press and Circular*, 1897, cxiv, 411.
- ² Idem: *Ibid.*, 1898, lxx, 349.
- ³ Idem: *Brit. Gynaecol. Journ.*, 1899, xiv, 47.
- ⁴ Bell, W. Blair: *Lancet*, 1913, i, 809 and 937; *The Sex Complex*, London, second edition, 1920.
- ⁵ Idem: *System of Operative Surgery*, Burghard, 1914, v, 249.
- ⁶ Idem: *Surg., Gynecol. and Obstet.*, 1914, xvi, 634.
- ⁷ Idem: *Disorders of Function, New System of Gynaecology*, Eden and Lockyer, 1917, i, 409.
- ⁸ Idem: *Lancet*, 1920, ii, 879; *Surg., Gynecol. and Obstet.*, 1925, xli, 706.
- ⁹ Idem: *Journ. Amer. Med. Assoc.*, 1921, lxxvii, 696.
- ¹⁰ Idem: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1922, xxix, 504.
- ¹¹ Idem: *Surg., Gynecol. and Obstet.*, 1926, xlii, 1.
- ¹² Idem: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1927, xxxiv, 213 and 384.
- ¹³ Bourne, A.: *Ibid.*, 1927, xxxiv, 185.
- ¹⁴ Bonney, V.: *British Medical Journal*, 1918, i, 278.
- ¹⁵ Idem: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1922, xxix, 591.
- ¹⁶ Idem: *British Medical Journal*, 1925, ii, 931.
- ¹⁷ Idem: *Lancet*, 1931, i, 171.
- ¹⁸ Donald, A., et al.: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1927, xxxiv, 360.
- ¹⁹ Estes, W. L.: *Surg., Gynecol. and Obstet.*, 1924, xxxviii, 394.
- ²⁰ Giles, A. E.: *Obstet. Trans.*, 1901, xlii, 299.
- ²¹ Idem: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1922, xxix, 608.
- ²² Graves, W. P.: *Ibid.*, 1927, xxxiv, 360.
- ²³ Kerr, J. M. Munro: *Proc. Roy. Soc. Med.*, (Sect. Obstet. and Gynaecol.), 1924, xvii, 123.
- ²⁴ Mayo, W.: *Surg., Gynecol. and Obstet.*, 1911, xii, 97.
- ²⁵ Norris, C. C.: *Ibid.*, 1929, xlix, 642.
- ²⁶ Solomons, B.: *Journ. Obstet. and Gynaecol. Brit. Emp.*, 1927, xxxiv, 218.
- ²⁷ Tuffier, T.: *Surg., Gynecol. and Obstet.*, 1924, xxvix, 401.
- ²⁸ Wallace, J.: *British Medical Journal*, 1896, ii, 1284.

ACTIVATED (IRRADIATED) FLUORESCIN IN THE TREATMENT OF CANCER

BY

S. MONCKTON COPEMAN, M.D., F.R.C.P., F.R.S.

EMERITUS LECTURER ON PUBLIC HEALTH, WESTMINSTER HOSPITAL

In a paper by Mr. Frank Coke, Dr. Gouldebrough, and myself, published in the *Journal* in August, 1929,¹ we described a method of treatment, initiated about two years previously,² which had continued to afford satisfactory results in certain cases of cancer, some of so advanced a character that they had been regarded by the surgeons in charge as definitely inoperable. It consists of the use of a slightly alkaline solution of the sodium salt of fluorescein sprayed or painted widely over the surface of the growth and followed by the application of radium, or of a dosage of x rays of moderate penetration.

INTERNAL ADMINISTRATION

In some instances this superficial use of fluorescein may suffice for the required purpose, but where the growths are somewhat more deeply seated, or where there is reason to suspect dissemination of the disease, the fluorescein is also given orally or intravenously. Owing to the extremely low toxicity of the fluorescein salt considerable quantities may be administered in one or other of these ways, an ordinary dose given by the mouth consisting of two capsules of $7\frac{1}{2}$ grains each (15 grains, or 1 gram in all). Mr. Stanford Cade, however, has reported to me an instance in which 1 drachm was administered, by mistake, in place of the

1 gram ordered—fortunately without the supervision of any unpleasant symptoms. In a few cases, however, the oral method has caused a feeling of sickness, when it has therefore been discontinued in favour of the intravenous route. The drug is gradually eliminated by the kidneys, its presence in the urine being demonstrable within about an hour after the administration.

The object of giving the fluorescein internally is to bring under its influence, on irradiation, outlying cells which may have become affected, or an organ like the liver, which may be suspected of harbouring secondary deposits, even though no clinical evidence of the fact may be apparent. Our more recent experience has, indeed, afforded reason for the hope that by giving the fluorescein internally as well as by local application to the skin, together with appropriate distribution of the subsequent irradiation, this technique may prove successful in preventing recurrence, not only locally, but generally. For intravenous inoculation 20 c.cm. of a sterilized 5 per cent. solution of sodium fluorescein should be slowly injected. The rapid diffusion of the drug, when given intravenously, may be manifested within a few minutes after the injection by a yellow coloration of the skin, although in comparatively dark-skinned individuals this effect may not be marked.

ACTIVITY OF X RAYS OR RADIUM INCREASED BY FLUORESCIN

In the correspondence which ensued on publication of our former paper in the *Journal*, reiterated stress was laid on a criticism to the effect that no evidence was available to prove that when successful results were obtained following on treatment with activated fluorescein, these might not equally have been obtained by the use of x rays or of radium alone. It may be well, therefore, to point out that evidence is now available which appears to have definitely disposed of the suggestion that equally good results can be produced without concomitant application of fluorescein. As a matter of fact, details of three cases giving information on this question were reported in the paper referred to, and a set of photographs (to which we specifically directed attention) was published about nine months previously.³

Lately, Mr. Stanford Cade informed me that he has now treated eight additional cases of breast cancer with radium and fluorescein. He added that, though difficult of decisive proof, he was definitely of opinion that the action of the radium had been reinforced by the simultaneous use of fluorescein. He promised full clinical details at a subsequent date.

More recently further cases have been brought to our notice, in which successful results have been obtained after previous failure with x rays alone. Reference to one of these is to be found in the annual report for 1928-29 of the medical superintendent of the North Middlesex Hospital. He states, on page 20, that "recently one remarkable case which had proved refractory to x -ray treatment, a large rodent ulcer of the face, healed up in a remarkably short time" as the outcome of the additional use of fluorescein.

A similar sequence of events is reported (August 20th, 1930) by Dr. H. M. Cutler, who, writing from Sydney, Australia, of his experience of the use of activated fluorescein in the treatment of malignant disease, says, *inter alia*: "With reference to the treatment of superficial conditions we cannot speak too highly. . . ." He adds that the response of rodent ulcers to radiation, when a preliminary painting with fluorescein is undertaken, is more marked than in the cases where no such painting is done, and instances a case of rodent ulcer involving the cartilage of the nose, recurrent after previous x -ray treatment, which, when treated with fluorescein irradiated